

FREE RUSSIA FOUNDATION



EFFECTIVENESS OF U.S. SANCTIONS TARGETING RUSSIAN COMPANIES AND INDIVIDUALS



WASHINGTON, DC
2023

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Analysis Team

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Executive Summary

This report evaluates the effectiveness of U.S. sanctions targeting Russian companies and individuals using the detailed trade data from 2021-2022 compiled by the Federal Customs Service of Russia. By cross-referencing this data with the comprehensive list of U.S. Russia-focused sanctions produced by the Free Russia Foundation (FRF), the report identifies and analyzes sanctions-related changes in trade volumes, costs and geographies following Russia's full-scale invasion of Ukraine in February 2022. In particular, the analysis examines Russia's imports of UAVs and microchips— two categories of controlled commodities critical to the Kremlin's ability to wage war and sustain military aggression.

The paper finds that:

- In 2022, **Russia has redirected a significant portion of its energy exports** to China and India.
- Countries that have **scaled back their trade with Russia most drastically include the U.S., the UK, Japan and Singapore**. Germany continues to be the source of a large share of Russia's imports despite significant reductions.
- Sanctions have **significantly reduced the trade between Russia and the US**. By October 2022, Russia's exports to the US had fallen by almost 50% compared to 2021. During the same period, US exports to Russia declined by \$2.5 bln compared to the previous year.
- The sanctions regime, closely coordinated by the US and EU, was able to **disrupt the Kremlin's direct access to western technology in the short term**.
- **Russia established alternative routes** fairly quickly with imports of dual-use and controlled commodities now exceeding pre-war levels.
- **Evasion routes can be detected with macro-data analysis**, for example, by correlating the chronology of relevant events (e.g., the onset of Russia's military assault on Ukraine in late February 2022, the western imposition of sanctions) with significant shifts in goods' origin, volume supplied by trading partner, and their position as share of overall trade with Russia by each respective partner.

¹ The opinions expressed in this publication are those of the authors and do not represent the views of the organizations they are affiliated with.

- Our data shows that countries **most actively facilitating circumvention of wartime sanctions by Russia include: China, Turkey, Cyprus and the UAE.**
- In 2022, **China became Russia's most important trade partner**, receiving about 20% of Russia's total exports and serving as the source of 35% of Russia's total imports.
- US sanctions have resulted in a significant **decline in the monetary value of global transactions by designated Russian companies, but did not eliminate them.**
- **Sanctions have not stopped Russia's import of controlled and dual use high tech goods** critical to its ability to wage war on Ukraine, such as UAV/parts and microprocessors/semiconductors.
- **UAV deliveries continued to Russia** as late as November and December from UAE, Hong Kong, China, and Singapore.
- Russia's **imports of microprocessors/semiconductors increased** from \$1.82 bln in 2021 to \$2.45 bln in 2022 (for the year as a whole).
- China has become Russia's most important source of semiconductors and integrated circuits. In 2022, **China, Hong Kong, Germany, the Netherlands and Finland** led by dollar value of microchip sales to Russia; **China, Hong Kong, Estonia, Turkey and Germany** led by the number of transactions.
- Despite sanctions, in 2022, Russia hit its **highest current account surplus in history**. The surplus in 2022 reached \$227 billion, more than twice the previous record (\$122 billion in 2021).
- Russia has **retained its access to vast amounts of foreign exchange**, which has been critical to its ability to continue its war on Ukraine.
- Sanctions have resulted in a **16% contraction of Russia's imports in 2022** for the year as a whole. The significant 35% contraction in the first few months of the war was followed by a recovery that we expect to be sustained in 2023.
- Russia's **total exports increased** by more than 30% between January-September 2022 over the corresponding period in 2021, driven mostly by oil and gas exports.
- Since the start of the war, **foreigners have paid Russia \$190 bn for oil exports or \$225 billion in the entirety of 2022** (comprising 11% of Russia's GDP).
- The delay in the EU embargo implementation and the G-7 price cap has weakened the effect of the EU embargo. For now, even data on Russian oil prices is limited. However, it appears Russian oil is selling already below the current price cap of \$60.

Based on the insight garnered from this project, we recommend the following measures to improve the effectiveness of sanctions:

- **Link each of the existing sanctions to specific objectives**, measurable and defined in time.
- **Establish a formal ranking of sanctions by priority** (both in terms of intended impact and in terms of urgency/timing)— and **focus bilateral discussions of enforcement on the top of this list.**
- **Continue lowering the price caps on Russian energy exports and expanding the coalition of countries abiding by these caps**, as the most effective way to shut off revenues funding Russia's war; audit the chain of contractors that are involved in delivering Russian oil to the market to ensure that the price cap is being enforced.
- Establish a **sanctions implementation task force at NATO** to ensure policy alignment on top priority sanctions among all of its members.

- Advocate for the **establishment of an EU-wide sanction enforcement authority**. At the moment, member states are responsible for sanctions' implementation, which results in vastly uneven implementation.
- Advocate for an **increase in EU allocation of resources for sanction enforcement**, including with subsidies enabling select member-states to expand their customs and border control personnel, detection and interdiction training for high-priority sanctioned goods categories.
- Incentivize compliance by companies from competitor-states and non-aligned states strengthening enforcement of export control authorities, creating **new authorities to regulate out-bound investment, enhancing coordination with the EU Trade and Technology Council**,² and through **public enforcement of secondary financial sanctions against the largest violators of priority sanctions**.
- Advocate for **increased transparency and standardization of economic reporting data** by international financial institutions and individual states.
- **Establish an alternative official source for gauging the state of Russia's economy** to offset Putin's efforts to withhold and obscure important economic data.
- **Publicize select and/or aggregated data on commercial activities limited by sanctions and export controls with regards to Russia; publish relevant data on international activities by sanctioned entities and individuals**—collected by the US Departments of Commerce, Justice, Treasury and State.

2 Emily Kilcrease, "Challenging China's Trade Practices," CNAS, April 14, 2022. <https://www.cnas.org/publications/congressional-testimony/challenging-chinas-trade-practices>.

US Sanctions Regime Targeting Russia

The U.S. has imposed a number of trade sanctions on Russian individuals and entities, which fall into five categories. Sectoral sanctions target entire sectors of the Russian economy, including financial institutions, energy companies, and defense firms. These sanctions include restrictions on access to U.S. capital markets and limits on exports of certain goods and technologies.³ The U.S. has also designated a number of Russian individuals and organizations as “Specially Designated Nationals” (SDNs) or “Blocked Persons,” which subjects them to asset freezes and other financial restrictions. These designations are typically made in response to activities such as human rights abuses, corruption, or illicit activities.⁴ Furthermore, the U.S. has implemented export controls on certain goods and technologies destined for Russia or Russian individuals or organizations. These controls may be imposed in order to prevent the proliferation of certain goods or technologies that could be used for military or other harmful purposes. The U.S. has also imposed investment restrictions on certain Russian companies and individuals, which may include restrictions on U.S. investment in Russian firms or on Russian investment in U.S. firms. Finally, the U.S. has imposed financial sanctions on Russian individuals and organizations, which may include restrictions on financial transactions with designated entities and asset freezes.

Cold War Period. Soviet expansionism in Eastern Europe following the end of World War II created an ideological and political conflict of interests between the U.S. and USSR. In 1949, the U.S. Congress adopted the Export Control Act, a series of restrictions on export of certain strategic and military items to the Soviet bloc and other countries

that could be detrimental to US foreign policy during the Cold War. At the same time, a multilateral export control system was institutionalized as the Coordinating Committee for Multilateral Export Controls (CoCom) in partnership with the Western European governments. Trade Agreement Extension Act of 1951 and Trade Expansion Act of 1962 further limited trade concessions to the USSR.

In 1974, the Jackson-Vanik Amendment denied normal trading relations to non-market economies that restricted emigration rights in response to Soviet restrictions on Jewish emigration. Between 1978 -1980, the United States banned the exports of technologies to the Soviet Union following the arrests of Aleksander Ginzburg and Anatoly Shcharansky, well-known Soviet dissidents. For a brief period in the 1970s, trade restrictions were lightened, and the USSR was permitted to purchase large amounts of American wheat when Soviet crops failed in 1973.

The restrictions were tightened again when the USSR invaded Afghanistan in 1979; and embargoes on grain, technology, and phosphate were introduced. This measure was widely criticized due to its minimal impact on the Soviet economy, which found alternative suppliers and subsequently undermined the U.S. agricultural industry.

The Trans-Siberian pipeline embargo of 1981-82 attempted to prevent the Soviet construction of the Yamal natural-gas pipeline, which would allow the Soviet Union to transport natural gas from Siberia to Western Europe. It also further restricted exports of oil and gas technology from the U.S. and Europe. The measure was widely criticized by the European governments, who continued supplying the USSR with pipeline equipment.⁵

3 U.S. *Sanctions on Russia*. CRS Reports. Congressional Research Service, January 18, 2022, 4. <https://crsreports.congress.gov/product/pdf/R/R45415/12>.

4 Ibid.

5 Mergen Doraev, The “Memory Effect” of Economic Sanctions Against Russia: Opposing Approaches to the Legality of Unilateral Sanctions Clash Again, 37 U. Pa. J. Int’l L. 355 (2015). <https://scholarship.law.upenn.edu/jil/vol37/iss1/7>.

From the Collapse of the Soviet Union to 2012. The dissolution of the Soviet Union and the promise of Russia’s democratization reset the U.S.-Russia relations in such areas as trade and investment, international security, and environmental protection. Most of the Cold War trade restrictions were lifted through such policies as the Friendship Act of 1993 and the termination of the CoCom in 1994.

The relationship between the U.S. and Russia in the 1990s-2000s was marked by a number of conflicts, including the wars in Yugoslavia, Chechnya, Afghanistan, Iraq, and Georgia. However, during this period, when restrictive measures were introduced, such as during the Chechen war, they did not significantly impede the general trend toward a rapprochement in economic and political relations.⁶

Magnitsky Act and the Invasion of Crimea, 2012-14. In August 2012, Russia became a member of the World Trade Organization, which created a strong push for the repeal of the Jackson-Vanik Amendment. This led to a heated debate in Congress that was resolved by coupling the return to normal trade relations with an introduction of a new system of economic sanctions designed to penalize persons responsible for corruption and

human-rights violations in Russia. 54 Russians have been designated under the Sergei Magnitsky Rule of Law Accountability Act of 2012 for their involvement in the death of auditor Sergei Magnitsky, known for uncovering Russian government corruption, in the Matrosskaya Tishina prison and other human rights abuses. 14 Russian nationals have been sanctioned under the Global Magnitsky Human Rights Accountability Act of 2016.⁷

In response to Russia’s illegal annexation of the Crimean Peninsula in 2014, the U.S. imposed a number of new sanctions. Executive orders 13660⁸, 13661⁹, 13662¹⁰, and 13685¹¹ targeted individuals and entities involved in activities undermining democratic processes and institutions in Ukraine, as well as those providing material support to Russian government officials or entities involved in these activities. These orders also imposed sectoral sanctions against the Russian financial services, energy, metals and mining, engineering, and defense sectors¹² and forbade the export and sale of U.S. goods, services, and technology to Crimea.¹³ By 2021, over 700 individuals and entities had been designated under these sanctions.¹⁴

6 Ibid.

7 U.S. Sanctions on Russia. CRS Reports. Congressional Research Service, January 18, 2022, 24. <https://crsreports.congress.gov/product/pdf/R/R45415/12>.

8 “The Federal Register.” Federal Register . Executive Office of the President, March 6, 2014. <https://www.federalregister.gov/documents/2014/03/10/2014-05323/blocking-property-of-certain-persons-contributing-to-the-situation-in-ukraine>.

9 “The Federal Register.” Federal Register. Executive Office of the President, March 16, 2022. <https://www.federalregister.gov/documents/2014/03/19/2014-06141/blocking-property-of-additional-persons-contributing-to-the-situation-in-ukraine>.

10 “The Federal Register.” Federal Register. Executive Office of the President, March 20, 2022. <https://www.federalregister.gov/documents/2014/03/24/2014-06612/blocking-property-of-additional-persons-contributing-to-the-situation-in-ukraine>.

11 “Ukraine/Russia- Related Sanctions Program ” Office of Foreign Assets Control. U.S. Department of Treasury, June 16, 2016. https://home.treasury.gov/system/files/126/ukraine_overview_of_sanctions.pdf.

12 “The Federal Register.” The Federal Register. Office of Foreign Assets Control, U.S. Department of the Treasury, May 2, 2022. <https://www.federalregister.gov/documents/2022/05/02/2022-09371/ukraine-russia-related-sanctions-regulations>.

13 “The Federal Register.” Federal Register. Executive Office of the President, December 19, 2014. <https://www.federalregister.gov/documents/2014/12/24/2014-30323/blocking-property-of-certain-persons-and-prohibiting-certain-transactions-with-respect-to-the-crimea>.

14 U.S. Sanctions on Russia. CRS Reports. Congressional Research Service, January 18, 2022, 10-11. <https://crsreports.congress.gov/product/pdf/R/R45415/12>.

U.S. Election Interference and Russian Influence in Europe and Eurasia, 2016-21.

Another wave of the U.S. sanctions was triggered by the Kremlin's interference in the U.S. Presidential elections in 2016. The U.S. responded with sanctions targeting Russian individuals and entities involved in malicious cyber activities that threaten the national security, foreign policy, or economic health of the United States. Issued on April 1, 2015, Executive Order 13694, blocks the property and interests in property of persons determined to be responsible for or complicit in cyber-enabled activities that are likely to result in or contribute to a significant threat to the national security, foreign policy, or economic health or financial stability of the United States.¹⁵ Russian individuals were first designated pursuant to the Executive Order 13694 following the 2016 U.S. presidential election. Executive Order 13757, issued on December 28, 2016, expanded these cyber-related sanctions.¹⁶

The Countering America's Adversaries Through Sanctions Act (CAATSA) imposed additional sanctions on Russia in response to its interference in the 2016 U.S. presidential election and its aggression in Ukraine. These sanctions targeted a wide range of individuals and entities, including Russian intelligence, energy and defense companies, and

individuals involved in corruption and human rights abuses.¹⁷ As of 2021, over 100 individuals and entities had been designated under these sanctions.¹⁸

Numerous investigations have uncovered ways in which Putin's government has attempted to spread its influence throughout Europe and Eurasia through financing "political parties, think tanks, and civil society groups that sow distrust in democratic institutions and actors, promote xenophobic and illiberal views, and otherwise undermine European unity."¹⁹ In response, the Countering Russian Influence in Europe and Eurasia Act (CRIIEA) imposed sanctions against individuals and entities involved in activities that undermine democratic processes or institutions in Europe and Eurasia, or that pose a threat to the peace, security, stability, sovereignty, or territorial integrity of these regions.²⁰ Most notably, Section 231 of CRIIEA imposes sanctions with respect to persons engaging in transactions with the intelligence or defense sectors of the government of the Russian Federation.²¹ In August 2018, then-U.S. Assistant Secretary of State Wess Mitchell said the threat of Section 231 sanctions had led to some \$8-\$10 billion in "foreclosed arms deals."²²

On August 20, 2021, the U.S. imposed sanctions on entities, people, and vessels involved in the construction of the Nord Stream 2 pipeline,

15 "The Federal Registry." The Federal Registry. Executive Office of the President, April 1, 2015. <https://www.federalregister.gov/documents/2015/04/02/2015-07788/blocking-the-property-of-certain-persons-engaging-in-significant-malicious-cyber-enabled-activities>.

16 "The Federal Registry." The Federal Registry. Executive Office of the President, December 28, 2016. <https://www.federalregister.gov/documents/2017/01/03/2016-31922/taking-additional-steps-to-address-the-national-emergency-with-respect-to-significant-malicious>.

17 "CAATSA Section 231 (e) Defense and Intelligence Sectors of the Government of the Russian Federation." U.S. Department of State <https://www.state.gov/caatsa-section-231-d-defense-and-intelligence-sectors-of-the-government-of-the-russian-federation/>.

18 U.S. Sanctions on Russia. CRS Reports. Congressional Research Service, January 18, 2022, 47. <https://crsreports.congress.gov/product/pdf/R/R45415/12>.

19 Congress.gov. "S.1221 - 115th Congress (2017-2018): Countering Russian Influence in Europe and Eurasia Act of 2017." June 6, 2017. <https://www.congress.gov/bill/115th-congress/senate-bill/1221>.

20 "Appendix B: U.S. Sanctions on Russia." *U.S. Sanctions on Russia*. CRS Reports. Congressional Research Service, January 18, 2022, 24. <https://crsreports.congress.gov/product/pdf/R/R45415/12>.

21 "Sections 231 and 235." U.S. Department of State. U.S. Department of State, December 1, 2020. <https://www.state.gov/countering-americas-adversaries-through-sanctions-act-of-2017/sections-231-and-235/>.

22 Appendix B: U.S. Sanctions on Russia." *U.S. Sanctions on Russia*. CRS Reports. Congressional Research Service, January 18, 2022, 24. <https://crsreports.congress.gov/product/pdf/R/R45415/12>.

which is designed to transport natural gas from Russia to Germany. These sanctions were implemented through Executive Order 14039, which targeted entities and vessels involved in the construction, financing, and insurance of the pipeline.²³

2022 Drastic Expansion of the Sanctions Regime

February 22-25, 2022 Financial Services Sector

2022 saw a rapid expansion of sanctions targeting Russia in response to its full-scale invasion of Ukraine. In the days leading up to the invasion, the Biden administration attempted to deter escalation of the crisis by issuing Executive Order 14065 that stopped new US investment, exports, and imports from the regions.²⁴ The U.S. Treasury Department followed this measure by sanctioning two major Russian state-owned financial institutions critical to the defense industry and five Kremlin-connected oligarchs, as well as imposing new restrictions on Russian sovereign debt.²⁵

On February 24 2022, the day Russia began its full-scale invasion of Ukraine, the U.S. Treasury sanctioned Joint Stock Company Sberbank of Russia along with 13 other Russian business entities and oligarchs and froze the assets of VTB Bank Public Joint Stock Company (VTB Bank), Otkritie, Novikom, and Sovcom.²⁶ The Treasury also sanctioned 24 Belarussian individuals and entities connected to the defense and financial sectors in response to Belarus' involvement in the invasion.²⁷ The following day, the Treasury sanctioned all U.S. properties connected to Vladimir Putin, Sergey Lavrov, and 11 other members of the Russian Security Council.²⁸

February 25-28, 2022 SWIFT Access, Russian Central Bank

In the days that followed the invasion, the U.S. announced a joint action with the EU, UK, Canada, France, Germany, and Italy, removing a number of Russian banks from the SWIFT financial messaging system, preventing the Russian Central Bank from using reserves to undermine sanctions, and precluding oligarchs from evading sanctions by obtaining citizenship in other countries.²⁹ In accordance with the announcement, the U.S. Treasury Department enacted a prohibition on transactions with the Central Bank of Russia, National Wealth Fund of the Russian Federation, and the Ministry of

23 Russia's Nord Stream 2 Natural Gas Pipeline to Germany Halted." CRS Reports. Congressional Research Service, March 10, 2022. <https://crsreports.congress.gov/product/pdf/IF/IF11138>.

24 "FACT SHEET: Executive Order to Impose Costs for President Putin's Action to Recognize So-Called Donetsk and Luhansk People's Republics." The White House, February 22, 2021. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/21/fact-sheet-executive-order-to-impose-costs-for-president-putins-action-to-recognize-so-called-donetsk-and-luhansk-peoples-republics/>.

25 "U.S. Treasury Imposes Immediate Economic Costs in Response to Actions in the Donetsk and Luhansk Regions." U.S. Department of the Treasury, February 22, 2022. <https://home.treasury.gov/news/press-releases/jy0602>.

26 "U.S. Treasury Announces Unprecedented & Expansive Sanctions Against Russia, Imposing Swift and Severe Economic Costs." U.S. Department of the Treasury, February 24, 2022. <https://home.treasury.gov/news/press-releases/jy0608>.

27 "U.S. Treasury Targets Belarussian Support for Russian Invasion of Ukraine." U.S. Department of the Treasury, February 24, 2022. <https://home.treasury.gov/news/press-releases/jy0607>.

28 "U.S. Treasury Imposes Sanctions on Russian Federation President Vladimir Putin and Minister of Foreign Affairs Sergei Lavrov." U.S. Department of the Treasury, February 25, 2022. <https://home.treasury.gov/news/press-releases/jy0610>.

29 "Joint Statement on Further Restrictive Economic Measures." The White House, February 26, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/26/joint-statement-on-further-restrictive-economic-measures/>.



Finance of the Russian Federation.³⁰

These measures have immobilized around \$300 billion worth of Russian Central Bank assets. However, they have not been sufficient in inducing Russia to end its military assault on Ukraine. This is because these measures were not paired with efforts to restrict Russia's revenue from oil and gas exports, which constitute a direct source of foreign currency and approximately 40% of budget revenues, as well as freezing of correspondent accounts of major state-controlled banks. Putin's war budget is in the hands of the Government, and the Central Bank does not finance the war directly. Unhindered access to foreign exchange helps Russia buy critical imports to support the war effort. Taxes on the oil and gas industry are an important source of Russia's budget revenue.

March 3-11, 2022 **Defense Industry, WTO and IMF Support,** **Sanctions Evasion Mechanisms**

In March 2022, the U.S. Treasury and State Departments announced a new round of sanctions against Russian oligarchs and their families with ties to the defense industry in an effort to curb Russian disinformation efforts and support for the Russian government.³¹ The U.S. and its allies also announced their intent to increase tariffs on Russian imports, revoked Russia's WTO membership benefits, denied Russia access to World Bank and IMF support, and imposed additional financial and trade sanctions.³² In accordance with this announcement, the Biden administration issued Executive Order 14068, introducing new prohibitions on trade

30 "Treasury Prohibits Transactions with Central Bank of Russia and Imposes Sanctions on Key Sources of Russia's Wealth." U.S. Department of the Treasury, February 28, 2022. <https://home.treasury.gov/news/press-releases/jy0612>.

31 "Treasury Sanctions Russians Bankrolling Putin and Russia-Backed Influence Actors." U.S. Department of the Treasury, March 3, 2022. <https://home.treasury.gov/news/press-releases/jy0628>.

32 "FACT SHEET: United States, European Union, and G7 to Announce Further Economic Costs on Russia." The White

and investment in Russia³³, and the U.S. Treasury Department imposed new sanctions targeting oligarchs, business executives, and politicians. The Treasury also released new guidance concerning sanctions evasion through cryptocurrencies or other virtual currencies.³⁴

April, 2022 **Government Officials, Financial Sector, Military and Other Technology Acquisition**

One month after the invasion began, the U.S. Treasury sanctioned “dozens of defense companies,” 328 members of the Russian Duma, and other individuals including the head of Russia’s largest financial institution.³⁵ Shortly thereafter, the Treasury expanded sanctions against 21 entities and 13 individuals to prevent sanctions evasion and technology acquisition and expanded sanctions under Executive Order 14024 to include aerospace, marine, and electronics sectors.³⁶

April began with sanctions against Hydra, the world’s largest dark web market, and Garantex, a virtual currency exchange tied to Russian

ransomware.³⁷ The Biden Administration then issued Executive Order 14071 banning outgoing investment to Russia and services exports.³⁸ On the same day, the U.S. Treasury also imposed sanctions against Sberbank and Alfa Bank, as well as family members of Putin, Lavrov, and 11 other members of the Russian Security Council.³⁹ The Treasury also sanctioned Alrosa, Russia’s largest diamond company, and the State Department sanctioned United Shipbuilding Company, a Russian company responsible for building Russian warships.⁴⁰ Later that month, the Treasury sanctioned several entities attempting to evade sanctions, including Transkapitalbank, Bitriver, and other companies in Russia’s virtual currency mining industry.⁴¹

May – October, 2022 **Military-Industrial Complex, State-owned Entities**

In May, the U.S. Treasury and State Departments announced new financial sanctions and visa restrictions on Russian bank executives, defense companies, and state-owned television

House, March 11, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/03/11/fact-sheet-united-states-european-union-and-g7-to-announce-further-economic-costs-on-russia/>.

33 “The Federal Register.” The Federal Register. Executive Office of the President, March 11, 2022. <https://www.federalregister.gov/documents/2022/03/15/2022-05554/prohibiting-certain-imports-exports-and-new-investment-with-respect-to-continued-russian-federation>.

34 “Treasury Sanctions Kremlin Elites, Leaders, Oligarchs, and Family for Enabling Putin’s War Against Ukraine.” U.S. Department of the Treasury, March 11, 2022. <https://home.treasury.gov/news/press-releases/jy0650>.

35 “U.S. Treasury Sanctions Russia’s Defense-Industrial Base, the Russian Duma and Its Members, and Sberbank CEO.” U.S. Department of the Treasury, March 24, 2022. <https://home.treasury.gov/news/press-releases/jy0677>.

36 “Treasury Targets Sanctions Evasion Networks and Russian Technology Companies Enabling Putin’s War.” U.S. Department of the Treasury, March 31, 2022. <https://home.treasury.gov/news/press-releases/jy0692>.

37 “Treasury Sanctions Russia-Based Hydra, World’s Largest Darknet Market, and Ransomware-Enabling Virtual Currency Exchange Garantex.” U.S. Department of the Treasury, April 5, 2022. <https://home.treasury.gov/news/press-releases/jy0701>.

38 “The Federal Register.” The Federal Register. Executive Office of the President. April 6, 2022. <https://www.federalregister.gov/documents/2022/04/08/2022-07757/prohibiting-new-investment-in-and-certain-services-to-the-russian-federation-in-response-to>.

39 “U.S. Treasury Escalates Sanctions on Russia for Its Atrocities in Ukraine.” U.S. Department of the Treasury, April 6, 2022. <https://home.treasury.gov/news/press-releases/jy0705>.

40 “The United States Sanctions Major Russian State-Owned Enterprises.” U.S. Department of the Treasury, April 7, 2022. <https://home.treasury.gov/news/press-releases/jy0707>.

41 “U.S. Treasury Designates Facilitators of Russian Sanctions Evasion.” U.S. Department of the Treasury, April 20, 2022. U.S. Treasury Designates Facilitators of Russian Sanctions Evasion. <https://home.treasury.gov/news/press-releases/jy0731>.

stations.⁴² In June, the Treasury Department imposed financial sanctions against another 70 Russian entities and 29 individuals.⁴³ Sanctions against an additional 22 individuals and 2 entities followed in September, including sanctions against individuals operating in occupied Ukrainian territory on Russia's behalf.⁴⁴ Also in September, the Treasury sanctioned an additional 14 individuals involved in Russia's military-industrial complex, including two international suppliers, three key financial leaders including Elvira Nabiullina, the governor of Russia's central bank, family members of senior Russian officials, and 278 members of Russia's legislature.⁴⁵

In October, the U.S. Treasury sanctioned a Russian network that procured military and other dual-use technologies from US manufacturers on behalf of Russian end-users.⁴⁶ The following month, the U.S. Treasury and State Departments sanctioned 14 individuals and 28 entities involved in a similar transnational technology procurement network supplying the Russian armed forces.⁴⁷ Finally, on December 9, 2022, the Treasury Department sanctioned four Russian individuals for human rights violations in Ukraine.⁴⁸

U.S. Technology Export Control Regime Targeting Russia

Bureau of Industry and Security (BIS) Licenses. Technology export control is one of the most critical sanction measures used by the United States government that refers to the regulation of the export, re-export, or transfer of certain goods, technologies, or information that may have military, dual-use, or other strategic applications. Technology export controls are often implemented through licensing systems that require exporters to obtain permission from the relevant government agency before exporting certain items. By introducing technology export controls, the U.S. aims to prevent the proliferation of certain goods, technologies, or information that could be used for military or other harmful purposes.⁴⁹

The development of technology export control measures is typically led by the Department of Commerce's Bureau of Industry and Security (BIS), which may consult with other U.S. agencies, such as the Department of State, the Department of Defense, and the Department of Energy, as well as with industry and other stakeholders, in order to determine which goods, technologies, or information

42 "U.S. Treasury Takes Sweeping Action Against Russia's War Efforts." U.S. Department of the Treasury, May 8, 2022. <https://home.treasury.gov/news/press-releases/jy0771>.

43 "U.S. Treasury Sanctions Nearly 100 Targets in Putin's War Machine, Prohibits Russian Gold Imports." U.S. Department of the Treasury, June 28, 2022. <https://home.treasury.gov/news/press-releases/jy0838>.

44 "Treasury Targets Additional Facilitators of Russia's Aggression in Ukraine." U.S. Department of the Treasury, September 15, 2022. <https://home.treasury.gov/news/press-releases/jy0954>.

45 "Treasury Imposes Swift and Severe Costs on Russia for Putin's Purported Annexation of Regions of Ukraine." U.S. Department of the Treasury, September 30, 2022. <https://home.treasury.gov/news/press-releases/jy0981>.

46 "Treasury Sanctions Russian Military Technology Procurement Network in Coordination with Law Enforcement Action." U.S. Department of the Treasury, October 19, 2022. <https://home.treasury.gov/news/press-releases/jy1035>.

47 "Treasury Sanctions Global Russian Military Supply Chain, Kremlin-linked Networks, and Elites with Western Fortunes." U.S. Department of the Treasury, November 14, 2022. <https://home.treasury.gov/news/press-releases/jy1102>.

48 "Treasury Sanctions Over 40 Individuals and Entities Across Nine Countries Connected to Corruption and Human Rights Abuse." U.S. Department of the Treasury, December 9, 2022. <https://home.treasury.gov/news/press-releases/jy1155>.

49 Emily Kilcrease, *Noteworthy: The New Russia Export Controls*, CNAS, March 7, 2022, available at <https://www.cnas.org/press/press-note/noteworthy-the-new-russia-export-controls>.

should be controlled for export.

Once technology export control measures have been developed, BIS is responsible for implementing and enforcing them. This may involve issuing licenses or other approvals for exports, re-exports, or transfers of controlled items, and enforcing penalties for violations of export control laws or regulations.

Specifically, the export of technology is regulated by the Department of Commerce and the U.S. Department of State through the Export Administration Regulations (EAR). The EAR applies to the export, re-export, and in-country transfer of most commercial and dual-use items, which are made for commercial use but could also have military applications.

BIS licenses are generally not public. Information about export licenses is considered confidential business information, in part because the release of this information could reveal sensitive details about the parties involved in the transaction and the technology or goods being exported, and could potentially compromise national security or foreign policy interests. BIS maintains a database of export licenses and other approvals, known as the Electronic Export Information (EEI) filing system, which is accessible to government agencies, but it is not publicly available.

There are some limited circumstances in which information about export licenses may be made public. For example, if a license application involves a foreign policy or national security issue that is of significant public interest, BIS may make a determination to publish a notice of the application in the Federal Register. This notice would provide information about the parties involved in the transaction, the items being exported, and the destination country, but it would not disclose the specific terms or conditions of the license.

The export of technology to Russia is majorly subject to a license requirement, as per the aforementioned procedure. It has been U.S. foreign policy for decades to prohibit exports of munition list items. Sanctions have also restricted the export of certain weapons and related technology to Russia. The EAR and the International Traffic in Arms Regulations (ITAR) have been issued in relation to these sanctions.

In 2018, BIS added a number of Russian entities associated with the oil and gas industry to its Entity List, such as Evro Polis that is connected to the Wagner Group and involved in the mining, oil and gas sectors in Syria. The addition of these entities to the Entity List means that U.S. companies must obtain a license from BIS before exporting, re-exporting, or transferring any item subject to the EAR.⁵⁰

Even prior to Russia's 2022 full-scale invasion of Ukraine, export controls were already used to restrict the supply of components to Russia's military-industrial complex.⁵¹ U.S. manufacturers could not legally export items subject to EAR to Russian defense companies and to designated entities.

In the spring of 2022, the US introduced economy-wide restrictions and licensing policy of denial, restricting the flow of even lower-level technology that might have military applications or technology that is important for Russia's energy sector, such as information-security and telecommunications systems, electronics, and computers. These include all items identified in Supplement No. 4 to EAR Part 746 that are classified as EAR99 and would not otherwise require authorization for export, reexport, or transfer to or within Russia. On September 15, 2022, the BIS issued a Final Rule, which added 57 additional items to Supplement No. 4, including a variety of semiconductor devices and electronic integrated circuits, for purposes of further undermining the Russian industrial base (see "Sector-Specific Items

50 "Russian Sanctions: Addition of Certain Entities to the Entity List." Federal Register . Bureau of Industry and Security , February 16, 2018 <https://www.federalregister.gov/documents/2018/02/16/2018-03234/russian-sanctions-addition-of-certain-entities-to-the-entity-list>

51 For more on the application of export controls of U.S. technology prior to Russia's invasion of Ukraine, see Jane Baker et al., 'Silicon Lifeline', 15-17.

listed in Supplement no. 4" in Appendix 1).⁵²

The U.S. export controls are extended extraterritorially through the foreign direct product rule (See "Foreign-Direct Product Rules for Russia" in Appendix 1). The foreign direct product rule controls not only items produced in the United States but also items made in any foreign location, if the foreign producer is using U.S. equipment, tools, or software. Chips are the most prominent sector in which the foreign direct product rule is applied. Given the U.S. dominance in chip-making tools and software, this rule applies to nearly all chips produced anywhere in the world.⁵³ For specially designated Russian military entities, the rules are expanded even further (see "Foreign-Direct Product Rules for Russia" in Appendix 1).

Russian Industries Targeted by Export Controls. In response to Russia's full-scale invasion of Ukraine on February 24, 2022, the Bureau of International Security expanded restrictions on exports of semiconductors, computers, telecommunications and information security equipment, lasers, and sensors to Russia. These export controls targeted Russia's defense, aerospace, and maritime sectors with intent to "cut off Russia's access

to vital technological inputs, atrophy key sectors of its industrial base, and undercut its strategic ambitions to exert influence on the world stage."⁵⁴ Due to the Foreign-Direct Product Rules, this was supposed to weaken Russia's ability to acquire these materials from third party nations as well.⁵⁵ Media reports have discussed how Russian civil aviation has been forced to "cannibalize existing airline parts they can no longer access abroad."⁵⁶

BIS also imposed controls on aviation-related items destined for Russia and Belarus, including new licensing requirements for specified aircraft or aircraft parts. As a result, any aircraft manufactured in the United States, or that is composed of more than 25% controlled components of U.S. origin, is subject to a license requirement if it is exported to Russia.⁵⁷ On March 18, 2022, BIS publicly identified commercial and private aircraft that have flown into Russia in violation of the EAR, warning that "providing any form of service to these aircraft requires authorization" and that those in violation "would be subject to BIS enforcement actions which could include substantial jail time, fines, loss of export privileges, or other restrictions."⁵⁸

On March 4, 2022, BIS placed new, stringent

52 "Implementation of Additional Sanctions Against Russia and Belarus Under the Export Administration Regulations (EAR) and Refinements to Existing Controls." Federal Register . Bureau of Industry and Security, September 16, 2022. <https://www.federalregister.gov/documents/2022/09/16/2022-19910/implementation-of-additional-sanctions-against-russia-and-belarus-under-the-export-administration>.

53 Kilcrease, Emily, and Maria Shagina. "Can Russia Rebuild Its Tech Sector with China's Help?" Center for a New American Security . War on the Rocks, June 2, 2022. <https://www.cnas.org/publications/commentary/can-russia-rebuild-its-tech-sector-with-chinas-help>.

54 "Commerce Implements Sweeping Restrictions on Exports to Russia in Response to Further Invasion of Ukraine." Bureau of Industry and Security. U.S. Department of Commerce, February 24, 2022. <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/2914-2022-02-24-bis-russia-rule-press-release-and-tweets-final/file>

55 Martin Chorzempa. *New technology restrictions against Russia could also target China*. PIIE, March 7, 2022. <https://www.piie.com/blogs/realtime-economic-issues-watch/new-technology-restrictions-against-russia-could-also-target>

56 U.S. Department of State. (2022, October 21). *The Impact of Sanctions and Export Controls on the Russian Federation* - United States Department of State. U.S. Department of State. January 9, 2023. <https://www.state.gov/the-impact-of-sanctions-and-export-controls-on-the-russian-federation/>

57 "Commerce Imposes Sweeping Export Restrictions on Belarus for Enabling Russia's Further Invasion of Ukraine." U.S. Department of Commerce, March 2, 2022. <https://www.commerce.gov/news/press-releases/2022/03/commerce-imposes-sweeping-export-restrictions-belarus-enabling-russias>

58 "Commerce Department Identifies Commercial and Private Aircraft Exported to Russia in Apparent Violation of U.S. Export Controls." U.S. Department of Commerce, March 18, 2022. <https://www.commerce.gov/news/press-releases/2022/03/commerce-department-identifies-commercial-and-private-aircraft-exported>.

export controls on Russia's strategic industries, especially Russia's oil refining sector, as well as 91 entities that support Russian military activities.⁵⁹ Executive Order 14068 followed on March 11, 2022 and prohibited exportation of luxury goods and dollar-denominated banknotes to Russia.⁶⁰

In April, Executive Order 14071 banned the export of services to Russia⁶¹, the Department of Commerce expanded the license requirements on export controls to all items on the Commerce Control List (CCL) bound for Russia and Belarus⁶², and another 120 Russian entities were added to the Entity List.⁶³ On May 9, 2022, BIS expanded the Russian Industry Sector Sanctions rule⁶⁴ to impose license requirements on a broad range of commercial and industrial equipment "from wood products to

construction machinery," building on the controls already imposed by the EU.⁶⁵

In June 2022, BIS applied direct restrictions against entities seeking to supply Russia's military following the invasion of Ukraine. The new rule added a total of 36 entities in nine countries to the Entity List.⁶⁶ Industrial sector export controls against Russia and Belarus were expanded again in September 2022 to include items potentially useful in the production of chemical and biological weapons as well as quantum computing technology.⁶⁷ Finally, on September 30, 2022, BIS added another 57 entities to the Entity List in response to Russia's attempt to annex Ukrainian territory by fraudulent referendum.⁶⁸

59 "Commerce Takes Further Actions to Target Russian Strategic Industries and Punish Enablers of Aggression." Bureau of Industry and Security. U.S. Department of Commerce, March 4, 2022. <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/2921-2022-03-04-bis-russia-oil-and-entity-list-rule-press-release/file>

60 "Executive Order on Prohibiting Certain Imports, Exports, and New Investment with Respect to Continued Russian Federation Aggression." U.S. Department of the Treasury. U.S. Department of the Treasury, March 11, 2022. https://home.treasury.gov/system/files/126/russia_eo_20220311.pdf.

61 "The Federal Register." The Federal Register. Executive Office of the President, April 6, 2022. <https://www.federalregister.gov/documents/2022/04/08/2022-07757/prohibiting-new-investment-in-and-certain-services-to-the-russian-federation-in-response-to>

62 "Commerce Department Expands Restrictions on Exports to Russia and Belarus in Response to Ongoing Aggression in Ukraine." U.S. Department of Commerce, April 9, 2022. <https://www.commerce.gov/news/press-releases/2022/04/commerce-department-expands-restrictions-exports-russia-and-belarus>

63 "Commerce Adds 120 Entities in Russia and Belarus to the Entity List, Further Limiting the Russian and Belarusian Militaries' Access to Items That Support Aggression Against Ukraine." U.S. Department of Commerce, April 1, 2022. <https://www.commerce.gov/news/press-releases/2022/04/commerce-adds-120-entities-russia-and-belarus-entity-list-further>

64 "The Federal Register." The Federal Register. Industry and Security Bureau, Department of Commerce, March 8, 2022. <https://www.federalregister.gov/documents/2022/03/08/2022-04912/expansion-of-sanctions-against-the-russian-industry-sector-under-the-export-administration>

65 "Commerce Increases Restrictions on U.S. Exports to Russian Industrial and Commercial Sectors ." Bureau of Industry and Security. U.S. Department of Commerce , May 9, 2022. <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/2986-2022-05-09-bis-press-release-commerce-increases-restrictions-on-u-s-exports-to-russia/file>.

66 "Commerce rule applies powerful restrictions directly on entities seeking to supply Russia's military since the start of invasion of Ukraine." Bureau of Industry and Security. U.S. Department of Commerce, June 28, 2022. <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/3042-2022-06-28-bis-press-release-russia-backfill-entity-list/file>

67 "Commerce Takes Further Actions to Expand and Tighten U.S. Export Controls on Russia and Belarus." Bureau of Industry and Security, U.S. Department of Commerce, September 15, 2022. <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/press-releases/3135-2022-09-15-bis-press-release-further-expansion-and-tightening-of-russia-belarus-export-controls/file>

68 "Commerce Responds to Russia's Attempts to Annex Parts of Ukraine." Bureau of Industry and Security, U.S. Department of Commerce, September 30, 2022. <https://www.bis.doc.gov/index.php/documents/about-bis/newsroom/>



Photo courtesy: Lucas Sankey/ Unsplash

Most of the US sanctions targeting Russia in 2022 have been introduced in close coordination with the EU, and therefore, there is a great degree of congruence between their approaches. Similarly to the US, sanctions imposed by the European Union include targeted restrictive measures (individual sanctions), economic sanctions and visa measures.⁶⁹ As of January 2023, the EU has sanctioned 1386 individuals and 171 entities⁷⁰, which majorly overlap with the progressively expanding list of sanctions administered by the US Department of the Treasury. Likewise, the EU sanctions target Russian high-ranking government officials and local politicians, as well as military personnel and oligarchs linked to

the Kremlin, prominent businessmen, propagandists and other individuals responsible for supporting the actions that undermine the territorial integrity, sovereignty and independence of Ukraine. State and private financial institutions, companies in the defense and relevant IT sectors, paramilitary groups, political parties and media companies supporting the war or benefitting from it in any way have also been sanctioned by the European Union.⁶⁹

By early 2023, Russia has become the most sanctioned country in human history, with over 3,000 individuals and entities designated by the US⁷¹ alone, yet its full-scale military aggression in Ukraine had not ended.

[press-releases/3146-2022-09-30-bis-press-release-bis-adds-57-to-entity-list-final/file](https://www.consilium.europa.eu/en/press-releases/3146-2022-09-30-bis-press-release-bis-adds-57-to-entity-list-final/file).

69 "EU Sanctions against Russia Explained." Consilium, January 18, 2023. <https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/sanctions-against-russia-explained/>.

70 "EU Restrictive Measures against Russia over Ukraine (since 2014)." Consilium, January 18, 2023. <https://www.consilium.europa.eu/en/policies/sanctions/restrictive-measures-against-russia-over-ukraine/>.

71 Russian Individuals & Entities Sanctioned by the US, Free Russia Foundation Database, <https://sanctions.4freerussia.org/consolidated/>.

Why Sanctions Assessment is Hard

There are a lot of them. Between 2014 and 2022, the number of sanctions targeting Russia steadily grew, as the West sought to curtail the Kremlin's growing domestic human rights abuses, violation of international conventions, and its international military aggression. As the understanding evolved about Russia's attempts to meddle in elections and erode democratic institutions, new sanctions proposals aimed to not only punish malign behavior, but also deny access to international financial institutions and infrastructure, thereby neutralizing enabling mechanisms, precipitating elite splits and more broadly, defending Western nations and societies. By 2021, over 15 different sanctions had been imposed on 700 Russian citizens and entities by the U.S. government, making it one of the top-sanctioned states⁷².

In 2021, responding to the concerns about the ever-expanding sanctions regime (not limited to Russia alone) and questions about its efficacy to achieve concrete objectives, the Biden administration conducted an extensive review of the U.S. sanctions policy. Many feared that the review's outcome would be a significant scaling back of sanctions.^{73 74} This, clearly, was a misplaced worry.

Putin's full-scale military invasion of Ukraine that commenced in late-February 2022, led to a dramatic, unprecedented expansion of Western sanctions against Russia, and propelled Russia to the position of the most sanctioned country in human history. By early 2023, one could count over 3,000 sanctions targeting Russian citizens and companies by the U.S. alone, with the list continuing to expand every few days⁷⁵.

Their objectives are numerous and evolving. The publicly announced objectives of the 2022 Russia sanctions by the United States have so far included:

- "To deter further invasion of Ukraine/.../ and to deescalate" the situation in Ukraine, February 21, 2022⁷⁶
- "To imperil Russia's ability to raise capital key to its acts of aggression/.../to impose immediate costs and disrupt and degrade future economic activity, isolate Russia from international finance and commerce, and degrade the Kremlin's future ability to project power," February 24, 2022
- To "restrict the ability of the Government of the Russian Federation to raise capital, and cut it off from access to critical technologies/.../ impose unprecedented diplomatic and economic costs on Russia

72 Åslund, A., & Snegovaya, M. (2021). The Impact of Western Sanctions on Russia and How They Can Be Made Even More Effective. *Atlantic Council*. <https://www.atlanticcouncil.org/in-depth-research-reports/report/the-impact-of-western-sanctions-on-russia/>; Maria Demertzis, Benjamin Hilgenstock, Ben McWilliams, Elina Ribakova, Simone Tagliapietra, How have sanctions impacted Russia? *Bruegel*, October 26, 2022. <https://www.bruegel.org/policy-brief/how-have-sanctions-impacted-russia>.

73 Paul Massaro, Biden Might Stop a Sanctions Revolution, *Foreign Policy Magazine*, August 24, 2021. <https://foreignpolicy.com/2021/08/24/biden-might-stop-a-sanctions-revolution/>.

74 James Treanor and Adam Gould, Subject to Change? *Reuters*, November 20, 2022. <https://legal.thomsonreuters.com/en/insights/articles/subject-to-change>.

75 'Russian Individuals & Entities Sanctioned by the U.S.', *Free Russia Foundation*. <https://sanctions.4freerussia.org/consolidated/>.

76 "Fact Sheet: Executive Order to Impose Costs for President Putin's Action to Recognize so-called Donetsk and Luhansk People's Republics." *White House*, February 21, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/02/21/fact-sheet-executive-order-to-impose-costs-for-president-putins-action-to-recognize-so-called-donetsk-and-luhansk-peoples-republics>.

and further isolate it from the global financial system and international community/.../ to impose costs on the ruling elite as Russia prosecutes this brutal war of choice/.../ to ensure Russia pays a severe economic and diplomatic price for its further invasion of Ukraine”, February 25, 2022

- “To impair Russia’s ability to use its international reserves in ways that undermine the impact of our sanctions, as well as to prevent Russia from accessing its wealth fund for use in its ongoing war against Ukraine,” February 28, 2022⁷⁷
- To “make it clear that there is nowhere to hide for individuals and entities that support Russia’s aggression against Ukraine,” March 3, 2022⁷⁸
- “To hold Russian officials to account for enabling Putin’s unjustified and unprovoked war,”/.../ “further isolate the severely damaged Russian economy by prohibiting trade in products that are key to the economic and financial interests of all Russian elites,” March 11, 2022⁷⁹
- “To impose severe costs on Russian military leaders,” March 15, 2022⁸⁰
- “To demonstrate the United States will continue to impose concrete and significant consequences for those who engage in corruption or are connected to gross violations of human rights,” March 15, 2022⁸¹
- “To promote accountability for the Russian Federation’s and Government of Belarus’s human rights abuses and violations,” March 15, 2022⁸²
- “To hold to account enablers of this unconscionable war of choice against Ukraine and its people,” March 24, 2022⁸³
- “To shut down the Kremlin’s sanctions evasion networks,/.../impede Russia’s access to western technology and the international financial system/../ to target President Putin’s war machine with sanctions from every angle, until this senseless war of choice is over/.../to hold President Putin’s cyber actors to account for disruptive, destructive, or otherwise destabilizing cyber activity targeting the United States and its allies and partners,” March 31, 2022⁸⁴
- To “disrupt ransomware infrastructure and actors and targets the abuse of virtual currency to launder

77 “Additional Measures Against the Russian Financial System.” *U.S. Department of State*, February 28, 2022. <https://www.state.gov/additional-measures-against-the-russian-financial-system/>.

78 “Targeting Russian Elites and Defense Enterprises of Russian Federation.” *U.S. Department of State*, March 3, 2022. <https://www.state.gov/targeting-russian-elites-and-defense-enterprises-of-russian-federation/>.

79 “Treasury Sanctions Kremlin Elites, Leaders, Oligarchs, and Family for Enabling Putin’s War Against Ukraine.” *U.S. Department of the Treasury*, March 11, 2022. <https://home.treasury.gov/news/press-releases/jy0650>.

80 “U.S. Announces Sanctions on Key Members of Russia’s Defense Enterprise.” *U.S. Department of The Treasury*, March 15, 2022. <https://www.state.gov/u-s-announces-sanctions-on-key-members-of-russias-defense-enterprise/>.

81 “Treasury Sanctions Russians Connected to Gross Human Rights Violations and Corrupt Leader of Belarus.” *U.S. Department of the Treasury*, March 15, 2022. <https://home.treasury.gov/news/press-releases/jy0654>.

82 “Promoting Accountability for Human Rights Abuses Perpetrated by the Governments of Russia and Belarus.” *U.S. Department of State*, March 15, 2022. <https://www.state.gov/promoting-accountability-for-human-rights-abuses-perpetrated-by-the-governments-of-russia-and-belarus/>.

83 “Sanctioning Additional Members of Russia’s Duma, Russian Elites, Bank Board Members, and Defense Entities.” *U.S. Department of State*, March 24, 2022. <https://www.state.gov/sanctioning-additional-members-of-russias-duma-russian-elites-bank-board-members-and-defense-entities/>.

84 “Additional Sanctions on Russia’s Technology Companies and Cyber Actors.” *U.S. Department of State*, March 31, 2022. <https://www.state.gov/additional-sanctions-on-russias-technology-companies-and-cyber-actors/>.

ransom payments," April 5, 2022⁸⁵

- "To ensure the Government of Russia pays a severe price for causing such death and destruction in Ukraine, and particularly for the horrors in Bucha and elsewhere," April 6, 2022⁸⁶
- "To raise the economic cost on President Putin," April 7, 2022⁸⁷
- "To promote accountability for human rights abuses and violations/.../, " to target those who take part in or facilitate sanctions evasion for sanctioned Russian entities," April 20, 2022⁸⁸
- "To hold President Putin accountable for his utter disregard for human rights and fundamental freedoms/.../ hold to account those involved in his war of choice, including those suspected of taking part in atrocities and human rights abuses against civilians," May 8, 2022⁸⁹
- "To impose severe costs on the Government of the Russian Federation for its aggression against Ukraine and utter disregard for human rights and fundamental freedoms," June 2, 2022⁹⁰
- "To hold President Putin to account for his war against Ukraine, restrict Russia's access to critical technology it needs to fund its war machine, and turn Russia into a global financial pariah," June 2, 2022⁹¹
- To "cut off Russia's access to critical technology for its defense sector," June 28, 2022
- "To expose and disrupt Russia's persistent election interference and destabilization efforts against Ukraine/.../to deter and disrupt these efforts to safeguard our democracy, as well as help protect the democracies of our allies and partners," July 29, 2022⁹²
- "To ensure that the Kremlin and its enablers feel the compounding effects of our response to the Kremlin's unconscionable war of aggression," August 2, 2022⁹³
- To " hold those who support Russia's unprovoked war against Ukraine to account/.../to prevent, deter, and dismantle the procurement networks that supply UAV-related material and technology to

85 "Sanctions on Darknet Market and Ransomware-Enabling Virtual Currency Exchange." *U.S. Department of State*, April 5, 2022. <https://www.state.gov/sanctions-on-darknet-market-and-ransomware-enabling-virtual-currency-exchange/>.

86 "Targeting Additional Russian Financial Institutions, Officials, and Other Individuals." *U.S. Department of State*, April 6, 2022. <https://www.state.gov/targeting-additional-russian-financial-institutions-officials-and-other-individuals/>.

87 "Further Targeting Russian State-Owned Enterprises." *U.S. Department of State*, April 7, 2022. <https://www.state.gov/further-targeting-russian-state-owned-enterprises/>.

88 "Promoting Accountability for Human Rights Abuses in Russia and Belarus and Taking Action Against Sanctions Evaders." *U.S. Department of State*, April 20, 2022. <https://www.state.gov/promoting-accountability-for-human-rights-abuses-in-russia-and-belarus-and-taking-action-against-sanctions-evaders/>.

89 "Targeting Russia's Financial, Defense, and Marine Sectors and Promoting Accountability for Russian and Belarusian Military Officials." *U.S. Department of State*, May 8, 2022. <https://www.state.gov/targeting-russias-financial-defense-and-marine-sectors-and-promoting-accountability-for-russian-and-belarusian-military-officials/>.

90 "Targeting Russia's Oligarchs and Vessels." *U.S. Department of State*, June 2, 2022. <https://www.state.gov/targeting-russias-oligarchs-and-vessels/>.

91 "Fact Sheet: United States Takes Further Actions to Counter Sanctions Evasion by Russia." *White House*, June 2, 2022. <https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/02/fact-sheet-united-states-takes-further-actions-to-counter-sanctions-evasion-by-russia/>.

92 "Targeting Russia's Global Malign Influence Operations and Election Interference Activities." *U.S. Department of State*, July 29, 2022. <https://www.state.gov/targeting-russias-global-malign-influence-operations-and-election-interference-activities/>.

93 "Imposing Additional Costs on Russia for Its Continued War Against Ukraine." *U.S. Department of State*, August 2, 2022. <https://www.state.gov/imposing-additional-costs-on-russia-for-its-continued-war-against-ukraine-3/>.

Iran/.../ warn any third country that seeks to purchase these drones from Iran that doing so implicates multiple U.S. sanction authorities," September 8, 2022⁹⁴

- "To ensure the Russian Federation and the Lukashenka regime in Belarus pay a severe economic and diplomatic price for Russia's aggression against Ukraine." September 15, 2022⁹⁵
- "To further constrain Russia's advanced technology industries and their contribution to Russia's defense industrial base," September 15, 2022⁹⁶
- "To further weaken Russia's already degraded military industrial complex and undermine its ability to wage its illegal war /.../to hold Putin and his enablers accountable for his unprovoked invasion, and limit their ability to prop up their economy," September 30, 2022⁹⁷
- To "hold to account any individual, entity, or country that provides political or economic support for Russia's illegal attempts to change the status of Ukrainian territory," September 30, 2022⁹⁸
- "to target Russia's revenues in order to reduce the amount that they would have to prop up their economy and fund their illegitimate war in Ukraine/.../ going after Russia's military industrial complex./.../ to make sure that we could target Russia's supply chains/.../ targeting new supply chain vulnerabilities that had been created because Russia had designed new supply chains to get around the export controls and sanctions/.../," October 7, 2022⁹⁹
- "To impose an unprecedented range of sanctions and export controls on Russia for its brutal aggression/.../ to impose costs on the Kremlin for as long as its war of aggression continues," October 20, 2022¹⁰⁰
- "To address human rights violations and abuses globally/.../ to disrupt illicit activity and networks, promote accountability, and impose costs for egregious behavior/.../, December 9, 2022¹⁰¹

The full impact of some of these sanctions, it has been argued by President Biden, while powerful and expanding, will take time,¹⁰² perhaps months, or even years to show the desired impact. This optimistic

94 "Designating Iranian Proliferators of Shipping Unmanned Aerial Vehicle Technology to Russia for Use in Ukraine." U.S. Department of State, September 8, 2022. <https://www.state.gov/designating-iranian-proliferators-of-shipping-unmanned-aerial-vehicle-technology-to-russia-for-use-in-ukraine/>.

95 "How the United States is Holding Russia and Belarus to Account." U.S. Department of State, September 15, 2022. <https://www.state.gov/holding-russia-and-belarus-to-account/>.

96 "Targeting Russia's Senior Officials, Defense Industrial Base, Financial Infrastructure Leaders, and Human Rights Abusers." U.S. Department of State, September 15, 2022. <https://www.state.gov/targeting-senior-russian-officials-defense-industrial-base-financial-infrastructure-leaders-and-human-rights-abusers/>.

97 "Treasury Imposes Swift and Severe Costs on Russia for Putin's Purported Annexation of Regions of Ukraine." U.S. Department of The Treasury, September 30, 2022. <https://home.treasury.gov/news/press-releases/jy0981>.

98 "Imposing Swift and Severe Costs in Response to Russia's Violations of Ukraine's Sovereignty." U.S. Department of State, September 30, 2022. <https://www.state.gov/imposing-swift-and-severe-costs-in-response-to-russias-violations-of-ukraines-sovereignty/>.

99 Ravi Agrawal, "How the White House Plans to Hurt Putin: US Deputy Treasury Secretary Wally Adeyemo on the Preparations that go into Sanctioning Russia." *Foreign Policy*, October 7, 2022. <https://foreignpolicy.com/2022/10/07/adeyemo-russia-sanctions-ukraine-fplive/>.

100 "The Impact of Sanctions and Export Controls on the Russian Federation." U.S. Department of State, October 20, 2022 available at <https://www.state.gov/the-impact-of-sanctions-and-export-controls-on-the-russian-federation/>.

101 Combating Global Corruption and Human Rights Abuses, U.S. Department of State, December 9, 2022. <https://www.state.gov/combating-global-corruption-and-human-rights-abuses/>.

102 Brett Samuels, "Biden says Sanctions Will Take Time to Impact Russian Economy." *The Hill*, February 24, 2022. <https://thehill.com/homenews/administration/595729-biden-says-sanctions-will-take-time-to-impact-russian-economy/>.

assertion has been echoed by the Head of the Office of Sanctions Coordination Ambassador O'Brien.¹⁰³ In his December 15, 2022 briefing, Amb. O'Brien expressed confidence that some of the sanctions had already "hurt Russia on the battlefield" by depriving its military of "modern communications, optics, precision material, and drones"; "that because of sanctions, Russia has much less money"; "they have lost their most valuable resource – maybe as many as 900,000 Russians have fled the country in response to the mobilization, the sanctions, and the war. And in general they're much less able to produce at home what they need in order to fight the war most effectively. They also cannot import what they most need."

Therefore, as very broadly framed by these numerous, diverse and unprioritized objectives and indicators, sanctions, individually and in the aggregate, do not readily lend themselves to an accurate quantitative assessment.

Putin is Hiding Economic Data. The task of sanctions analysis is further complicated by the paucity of publicly-available data, especially involving financial transactions which are not published by either Russia nor the West.

Putin's government has gone to great lengths to hide the economic downturn related to sanctions and the war, having restricted access to all foreign trade statistics, including those relating to exports, imports, and trade within the Eurasian Economic Union (EAEU).¹⁰⁴ In spring 2022, Russian authorities also stopped publishing data on government expenditures, debt and oil production.¹⁰⁵

In her July 2022 report, Yulia Starostina hypothesizes that such data would disclose "structural deficits resulting from the exodus of foreign component suppliers and the breakdown of technical and production chains," as well as unearth "new channels for shadow imports."¹⁰⁶ In other words, this increased secrecy helps the Kremlin shape public opinion at home and abroad — to placate Russian citizens' worries about economic costs of war and thusly preclude a large scale anti-war movement from threatening Putin's hold on power; and to sow doubt within the transatlantic community on the efficacy of sanctions, the prospects of Ukrainian victory, and the asymmetry of costs borne by Russia and the West.

103 Special Online Briefing with Ambassador James O'Brien, Head of the Office of Sanctions Coordination, U.S. Department of State, December 15, 2022. <https://www.state.gov/special-online-briefing-with-ambassador-james-obrien-head-of-the-office-of-sanctions-coordination/>.

104 Yulia Starostina, "Secret Economy: What Hiding the Stats Does for Russia." *Carnegie Endowment for International Peace*, June 7, 2022. <https://carnegieendowment.org/politika/87432>.

105 Georgi Kantchev, "Russia Blocks Economic Data, Hiding Effect of Western Sanctions." *Wall Street Journal*, April 23, 2022. <https://www.wsj.com/articles/russia-blocks-economic-data-hiding-effect-of-western-sanctions-11650677765>.

106 Yulia Starostina, "Secret Economy, What Hiding the Stats Does for Russia." *Carnegie Endowment for International Peace*, July 1, 2022. <https://carnegieendowment.org/politika/87432>.

FRF Approach to Sanctions Analysis

Free Russia Foundation (FRF) acquired a unique database containing detailed trade data—millions of import and export records compiled by the Russian Customs between January 2021 and September 2022¹⁰⁷.

A group of distinguished economists, including Elina Ribakova, Oleg Itskhoki, Maxim Mironov, Vladimir Milov, and Sergey Aleksashenko, have examined the data and confirmed its overall validity and congruence with other verified macroeconomic data related to Russia (with some limitations discussed later in the paper). They have also determined that this data can be useful in providing real-life cases for evaluating the impact of US sanctions targeting Russia, against at least some of the stated objectives — such as disrupting logistical networks, targeting supply chains, denying access of Russian defense industrial base to critical commodities and raising financial costs to the Russian economy.

This report contains the key insights from FRF's data analysis effort, preliminary conclusions on the US's ability to achieve its stated sanctions objectives, and recommendations for enhancing the effectiveness, implementation and enforcement of sanctions.

Data Validation

The data obtained by the FRF is a comprehensive customs-level dataset staggering in its level of detail and aggregation. It consists of 40 million entries spanning 21 months (from January 2021

to September 2022) and organized in 90 fields, including countries and companies of origin and destination, goods codes and descriptions, total and per-unit trade values, sender and receiver company name and address.

For purposes of this analysis, we use the total US\$ values as recorded in our database. We have tested the utility of substituting those with the market exchange rates and found that they tend to be less accurate in the reconciliation process.

We have tested two approaches to aggregating data indicating the origin of exports with Russia as destination. The first one used the G 15A field (country of shipment) and the second approach used field G 11 (trading country). As result of this exercise, we have determined that using G 15A as the default, and G 11 to impute when G 15A is missing, aligns better with the country allocation according to the statistics reported by respective Russia's trade partners for 2021.

Comparison to the Official RF Data.

Economic indicators that would normally be used to validate a dataset like this include official breakdown of imports, exports, reserves, and financial account breakdowns released by Russia's government.

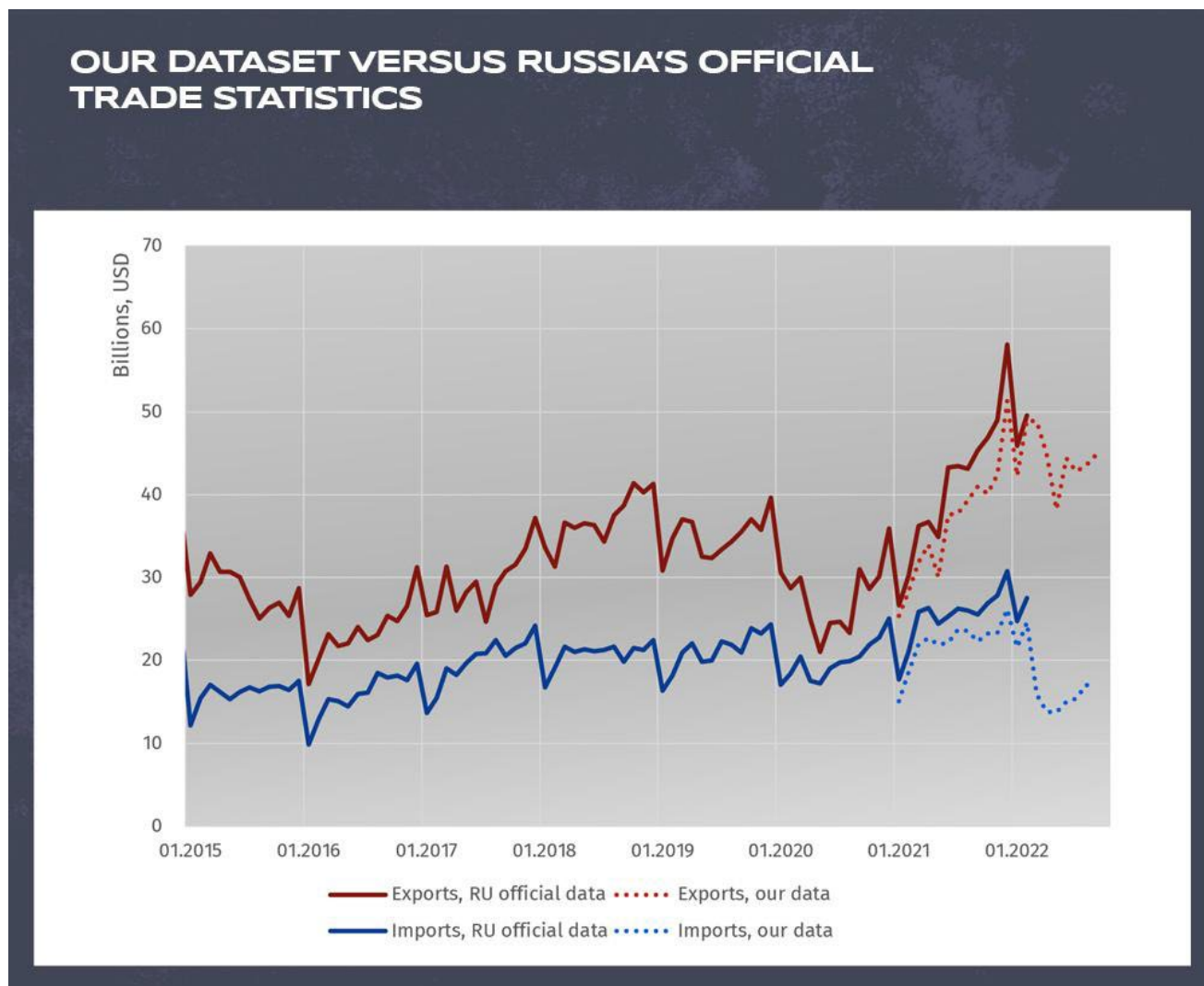
Russia's official trade statistics are only available up to February 2022, the start of Russia's full-scale invasion of Ukraine. Since our dataset begins in January 2021, we compared it to the official statistics reported before February 2022. The 2021 data on imports and exports closely track the Bank of Russia's official statistics (Figure 1). In the data reconciliation process, we have adjusted for outliers, but our data generally aligns with that of government statistics.¹⁰⁸

107 Late in the analysis process, we have also been able to acquire the data for the fourth quarter of 2022, and it was difficult to refrain from interspersing it throughout this report despite our best efforts

108 Outlier for aluminum exports: total export in 2021 and 9 months in 2022 (except for July 2022) was \$11 billion. In July 2021 alone, the aluminum export in our database appears to be \$33 billion. Looking at the detailed breakdown, we see that almost all large invoices are from July 2021 and the export comes from АО "РУСАЛ КРАСНОЯРСКИЙ

Our data is likely to underestimate Russia’s imports, as sensitive categories of goods and imports from certain countries are redacted.

Figure 1: FRF Dataset versus Russia’s Official Trade Statistics



Source: *The Bank of Russia, Russia customs data.*

Comparison to Trade Partners’ Statistics. After the start of the full-scale invasion of Ukraine, a large share of Russia’s economic data became classified.¹⁰⁹ Therefore, for validation of 2022 data, we instead used the corresponding data released by Russia’s trade partners at the maximum available level of

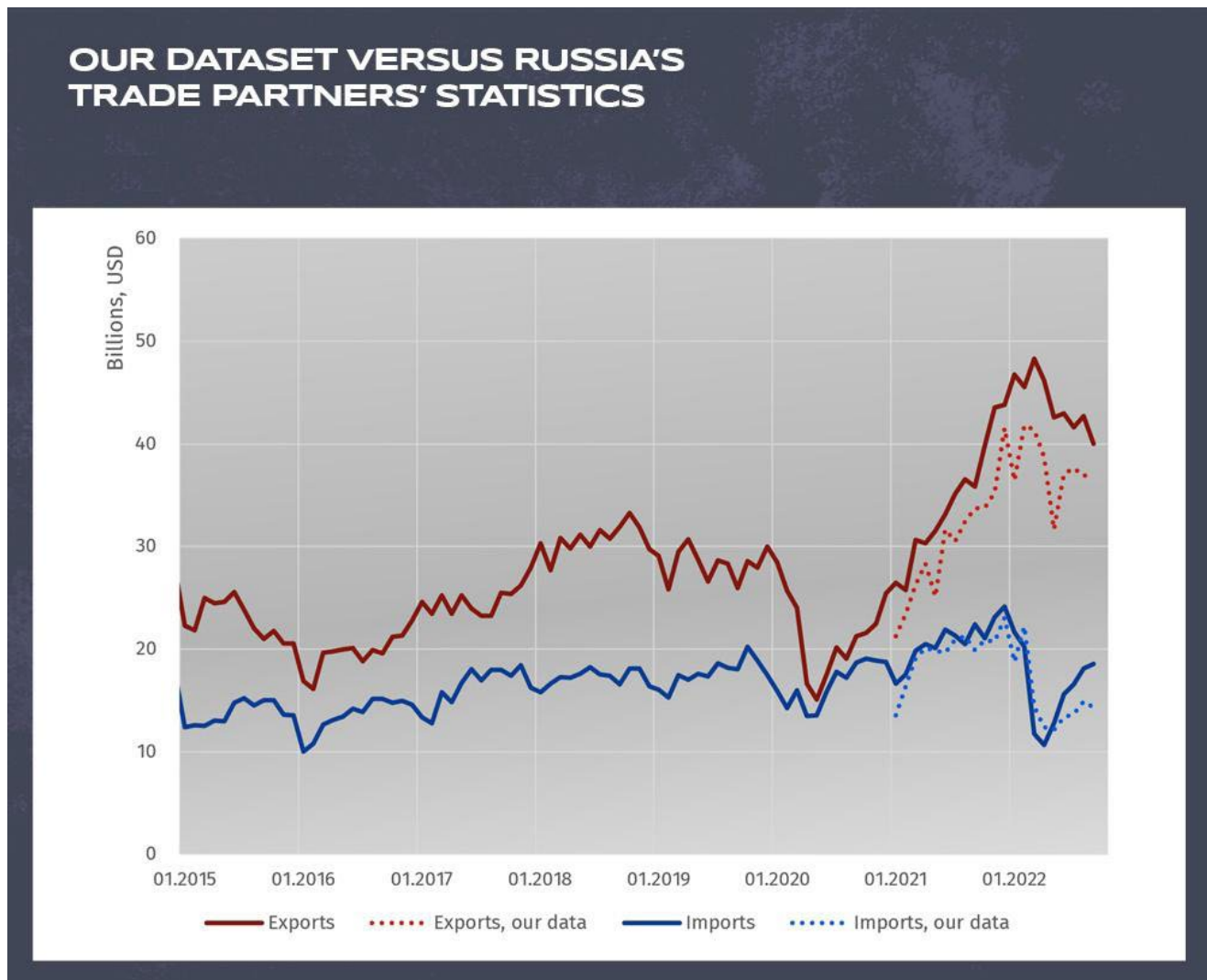
АЛЮМИНИЕВЫЙ ЗАВОД” to RTI LIMITED. For Ireland, we saw a one-off increase in Russia’s imports from Ireland to \$1.18 billion in April 2022 from average \$60 million in 2022 in the month prior and immediately after April, we decided to remove that outlier and impute the average of the month before and the month after equaling \$83 million.

109 Yulia Starostina, “Secret Economy: What Hiding the Stats Does for Russia.” *Carnegie Endowment for International Peace*, June 7, 2022. <https://carnegieendowment.org/politika/87432>

disaggregation.

We find that both exports and imports closely track those of the national authorities' statistics (Figure 2). The trend is close for exports, but the level appears somewhat off. For imports, the data align closely until diverting starting from June, with our data marginally underestimating Russia's imports compared to the data reported by our trade partners. It is also possible that there are inconsistencies due to under- and over-invoicing by one of the countries for capital flight or illicit financing.¹¹⁰

Figure 2: FRF Dataset versus Russia's Trade Partners' Statistics



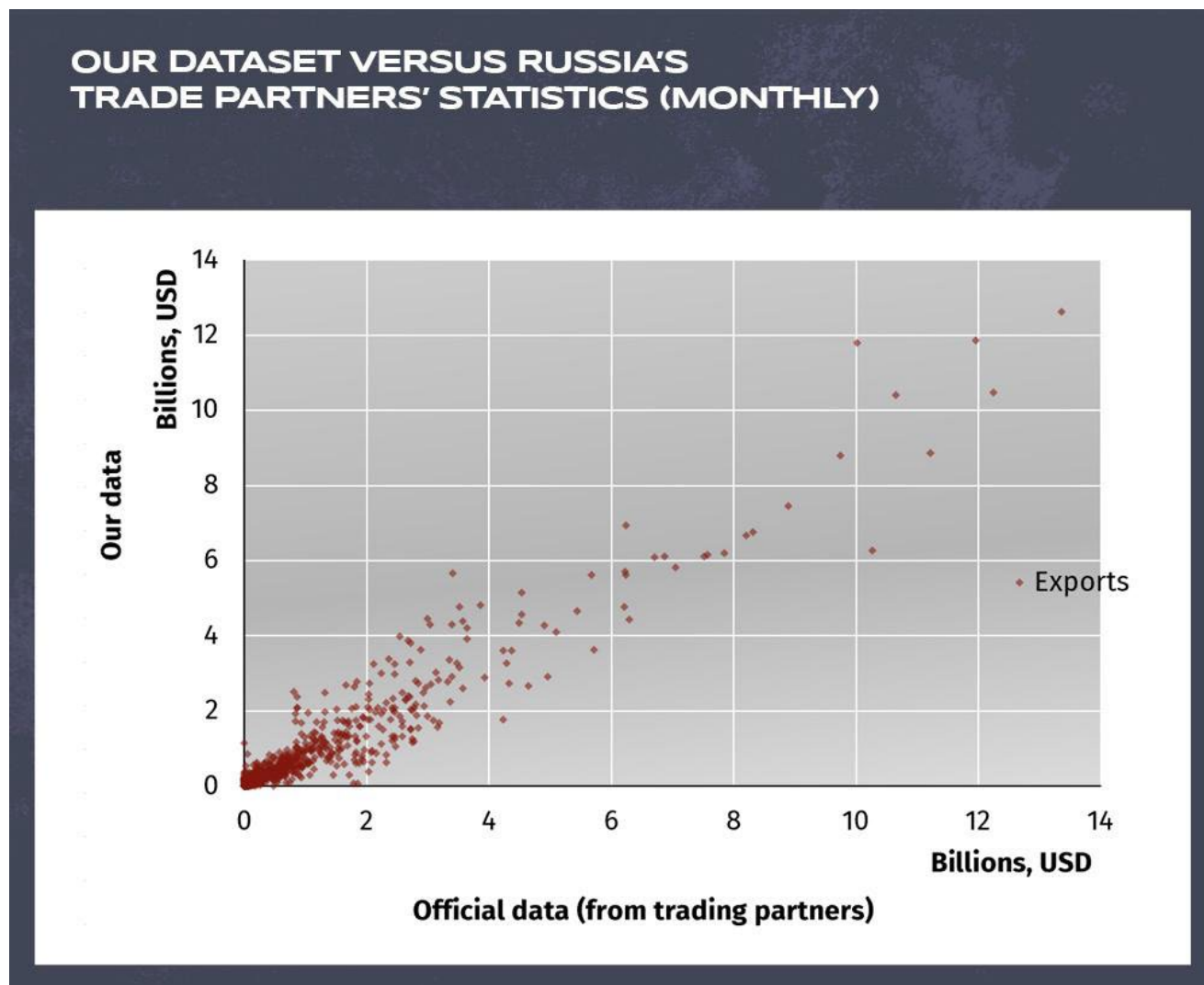
Source: The Bank of Russia, Russia customs data, National authorities.

We also look at a comparison between data from Russia's trading partners (x-axes) and our aggregation (y-axes) for exports and imports separately (Figures 3 and 4), with every marker representing a specific

110 "Trade-Related Illicit Financial Flows in 134 Developing Countries 2009-2018." Global Financial Integrity, December 16, 2021. <https://gfintegrity.org/report/trade-related-illicit-financial-flows-in-134-developing-countries-2009-2018/>

country-month combination. This captures roughly 40 countries trading with Russia since January 2021 — all EU members plus the most important trading partners, including China, Turkey, India, and the U.S. Here, the exports side appears to align closer, and the imports chart points to transactions potentially being assigned to countries differently between our dataset and those published by national authorities. This is possibly due to misreporting by companies in some countries, including Cyprus and Ireland.

Figure 3: Russia's Exports: FRF Dataset vs Russia's Trade Partners' Statistics (monthly)



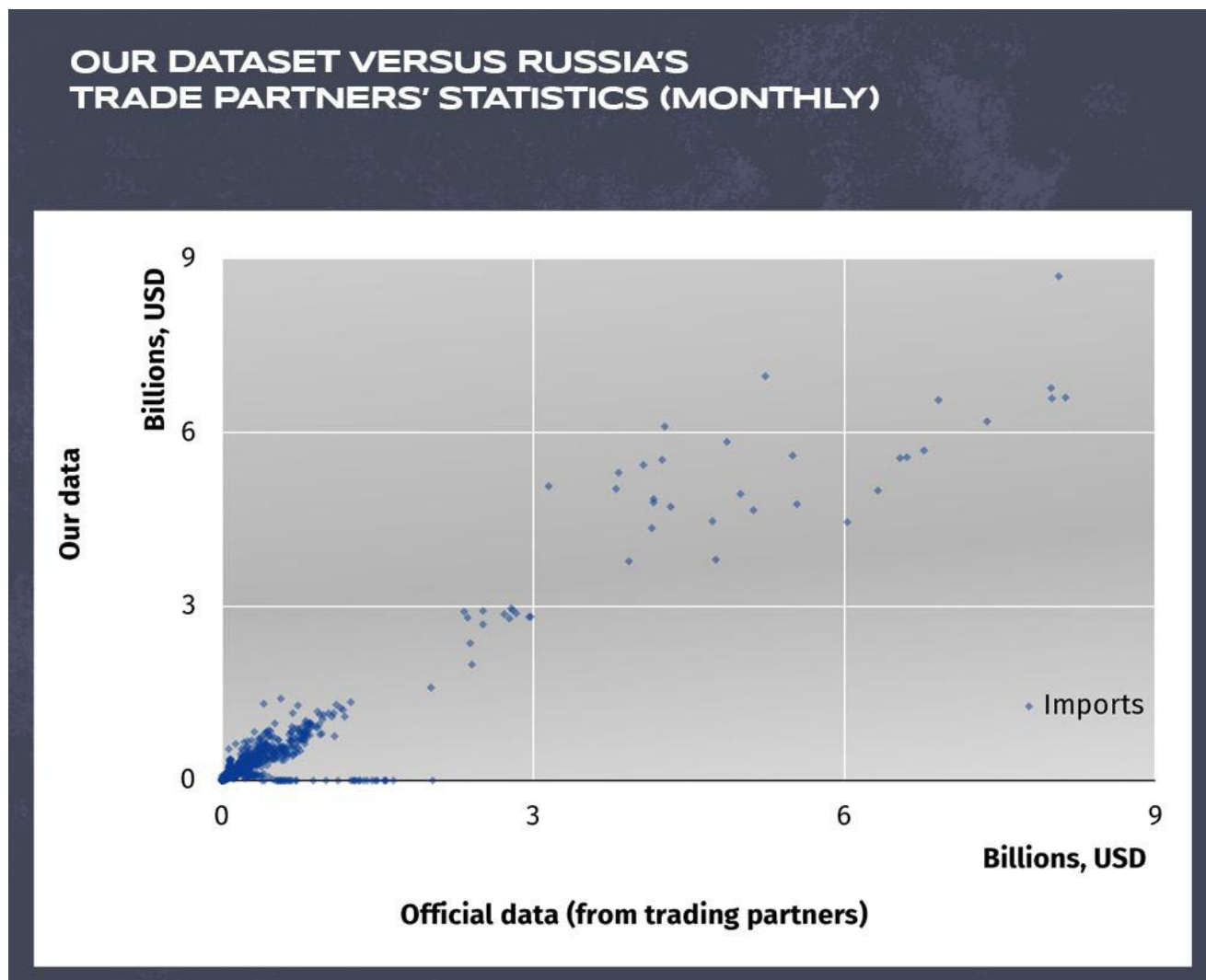
Source: The Bank of Russia, Russia customs data, National authorities.

This is actually a well-known phenomenon in the economics of misreporting trade for tax or capital control evasion.¹¹¹ Furthermore, some country data might be redacted from our database as we can see

111 Forstater, Maya. "Illicit Financial Flows, Trade Misinvoicing, and Multinational Tax Avoidance: The Same or Different?" Center for Global Development. Center for Global Development. Accessed January 11, 2023. <https://www.cgdev.org/sites/default/files/illicit-financial-flows-trade-misinvoicing-and-multinational-tax-avoidance.pdf> Setser, Brad. "Tax Avoidance and the Irish Balance of Payments." Council on Foreign Relations. Council on Foreign Relations, April 25, 2018.

in Figure 4 on Russia's imports where our aggregation shows zero values as opposed to trading partner statistics.

Figure 4: Russia's Imports: FRF Dataset vs Russia's Trade Partners' Statistics (monthly)



Source: *The Bank of Russia, Russia customs data, National authorities.*

Finally, we analyzed data for a select group of Russia's most important trade partners (Figures 5-8). Specifically, we separately examined trade with the EU, China, the U.S., India, Turkey, Japan, Korea, and the UK.

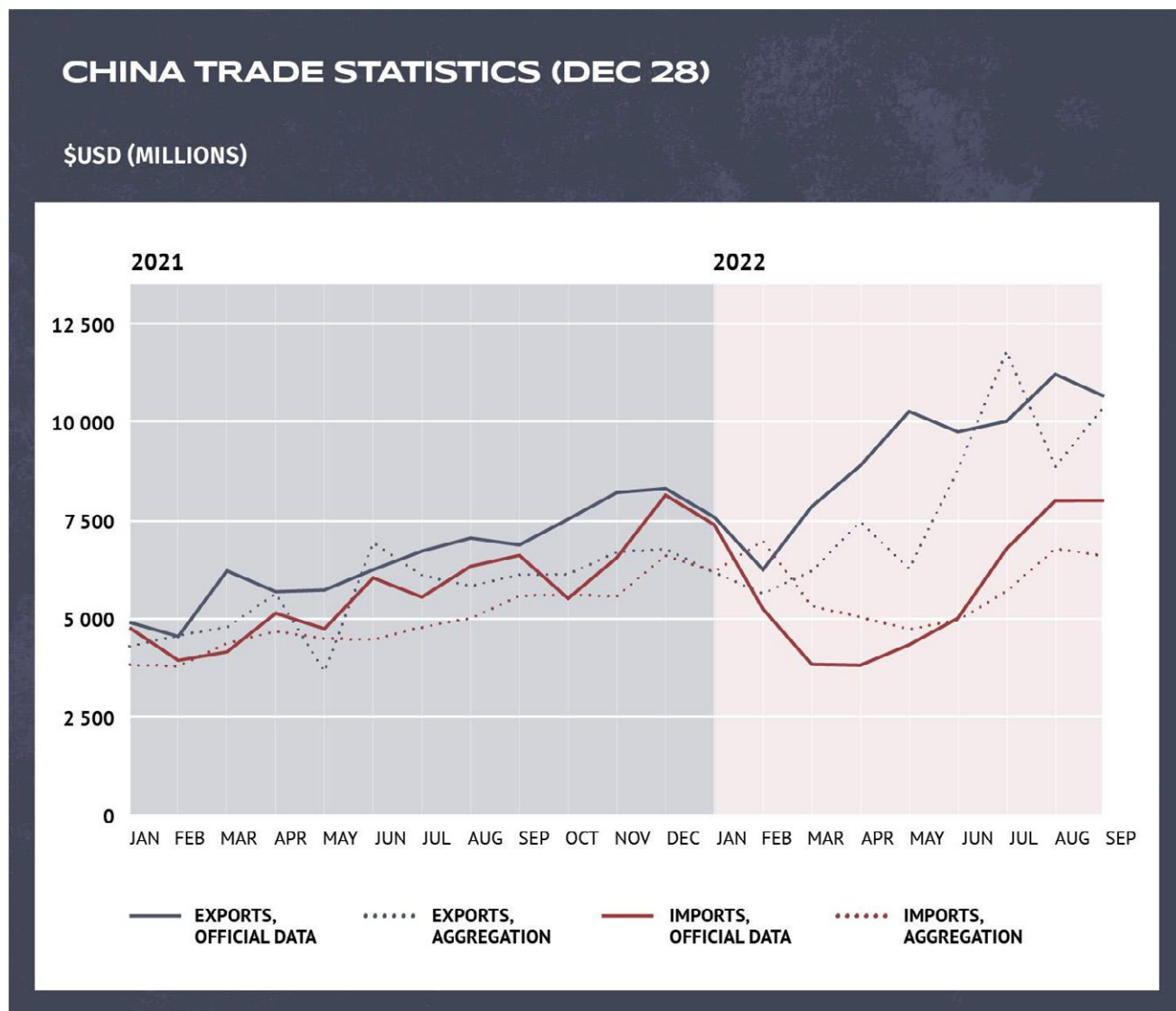
We find that while, cumulatively, imports from Russia's trade partners appear to match well that of our database, it is not always the case for individual countries. Trade with the EU recorded in our database closely matches that of the national authorities. In most countries' cases, Russia's imports align closer than exports. For the US, there appears to be a persistent level difference for Russia's exports that we plan to

<https://www.cfr.org/blog/tax-avoidance-and-irish-balance-payments>.

investigate further. For China, there appear to be differences in how data gets allocated among months or quarters, but overall the fit is close. Similarly, for Turkey, the fit of Russia’s imports is strong, while on Russia’s exports side, there might be some lag in timing.

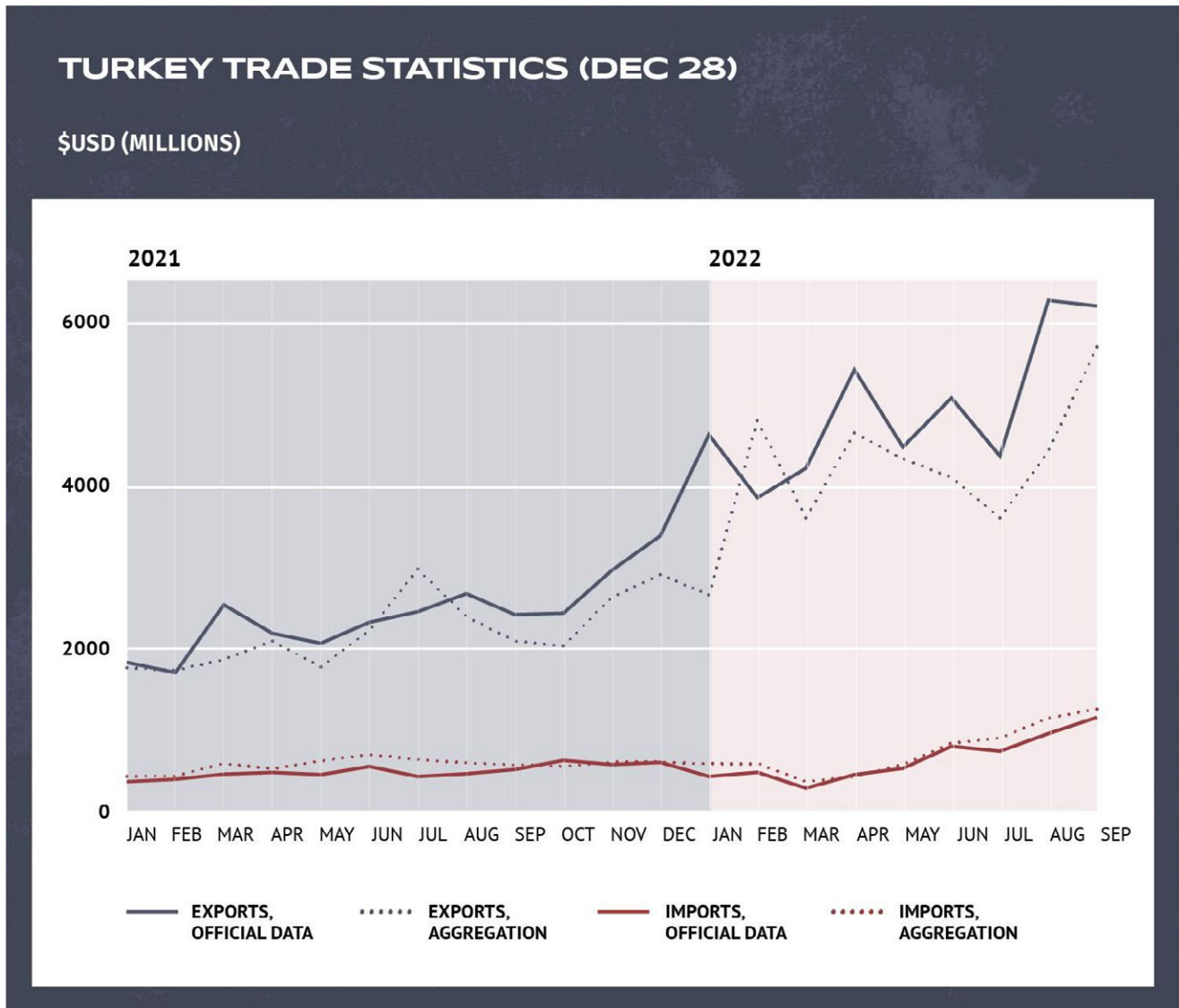
Overall we find that China and Turkey have meaningfully increased trade with Russia, to a large degree compensating the collapse in trade relationship between Russia and the US and the EU (Figures 5 through 8).

Figure 5: China Trade Statistics



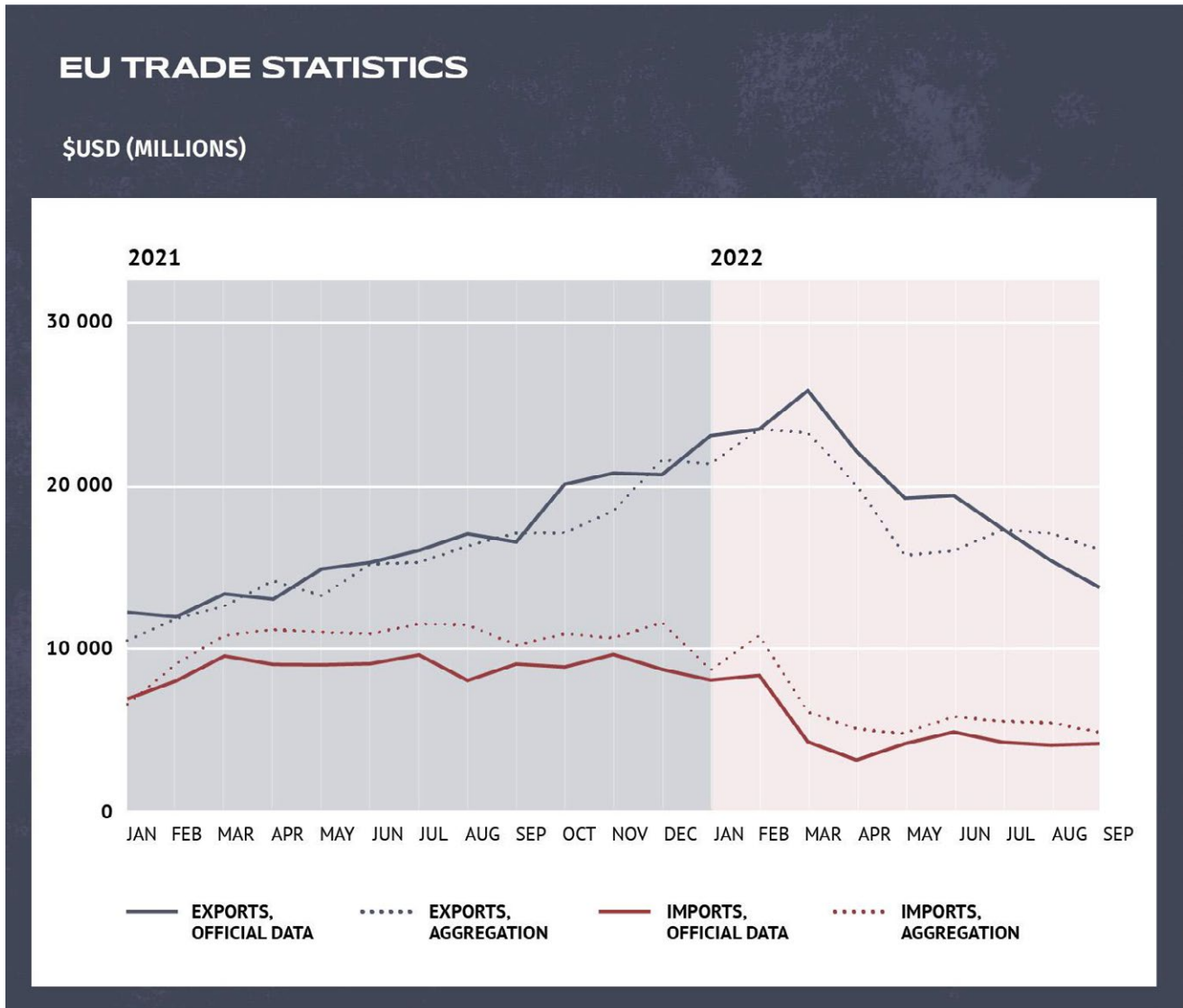
Source: The Bank of Russia, Russia customs data, National authorities.

Figure 6: Turkey Trade Statistics



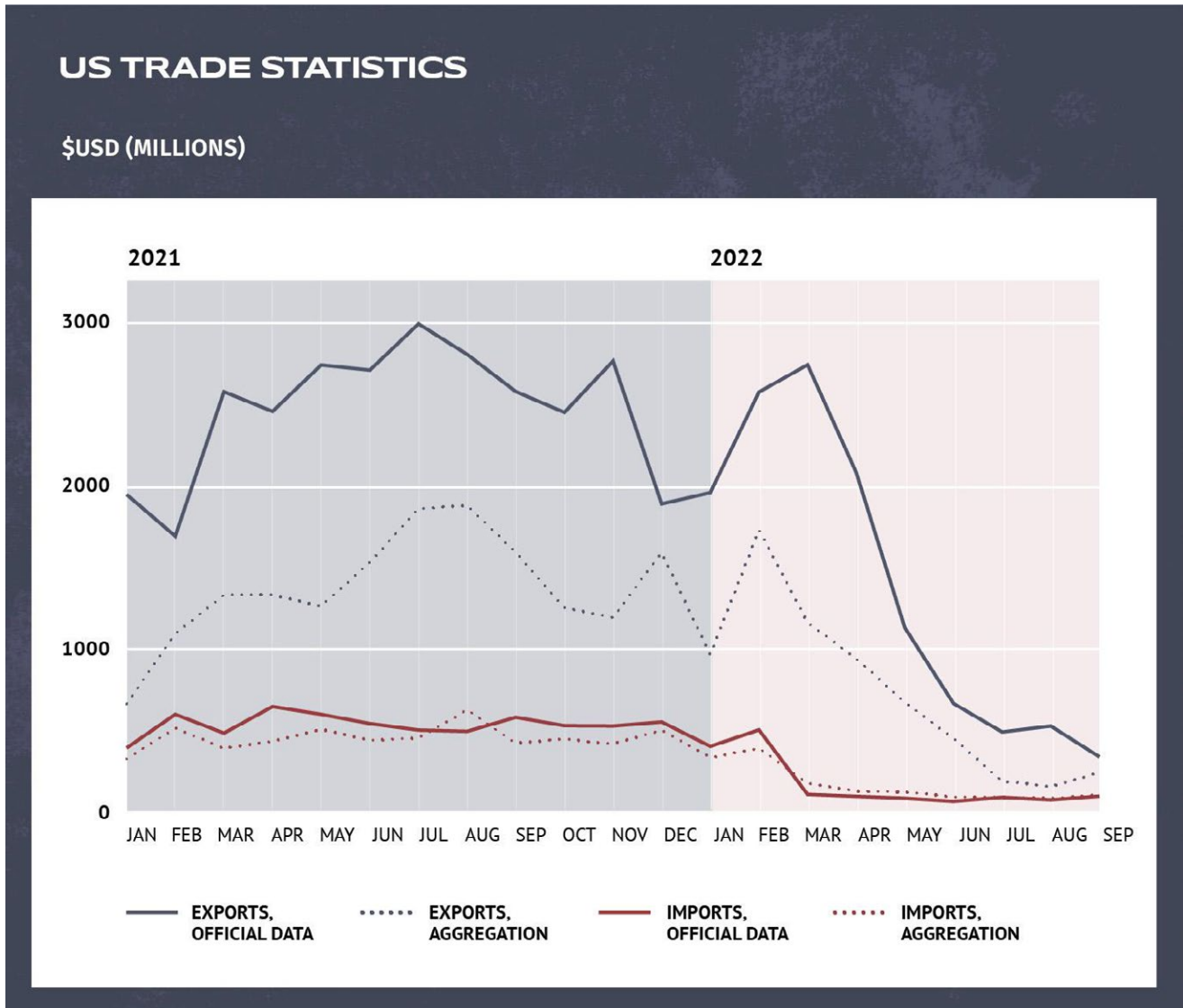
Source: The Bank of Russia, Russia customs data, National authorities.

Figure 7: EU Trade Statistics



Source: The Bank of Russia, Russia customs data, National authorities.

Figure 8: US Trade Statistics



Source: The Bank of Russia, Russia customs data, National authorities.

Several other studies have attempted to map Russia’s trade using official partner statistics. A paper published by European economic think-tank Bruegel found that Russia’s account improved significantly in 2022 due to a combination of extraordinarily high exports and a contraction in imports.¹¹² The authors estimate that Russia’s imports fell by \$8.5 billion in

March 2022 compared to the previous month, or by over 40% year-on-year. This decline continued into April, with imports falling by 48% year-on-year. However, imports began to recover, particularly for imports from China, Belarus, and Turkey. The Bank of Finland Institute for Emerging Economies (BOFIT) also found that imports initially declined, but began

112 Maria Demertzis, Benjamin Hilgenstock, Ben McWilliams, Elina Ribakova, and Simone Tagliapietra. “How Have Sanctions Impacted Russia?” Bruegel, December 16, 2022. <https://www.bruegel.org/policy-brief/how-have-sanctions-impacted-russia>.

to recover in 2Q2022, with China, Turkey, and the CIS taking the lead.¹¹³ Another paper by Bruegel looks into the specifics of Russia's trade flows with its key partners, with similar conclusions.¹¹⁴

Counterfactual analyses that extrapolate what Russia's trade would have been had the war and related sanctions not occurred reach conclusions similar to our findings.¹¹⁵

Recent Investigations. For validation purposes, we have also compared company and product-level data from recent published studies and investigations, including one focused on the microchip exports via Turkey¹¹⁶ and another on tracking the supply chains of UAVs.¹¹⁷ Having conducted thorough cross-checks, we conclude the data to be sufficiently reliable for our analysis and the formulation of preliminary policy recommendations¹¹⁸ with the caveat that they may have been based on the same dataset as ours.

For example, while Reuters reported¹¹⁹ that "OOO Fortap based in St. Petersburg was set up by a Russian businessman in April and has since imported at least \$138 million." In our database, based on the description that matches that of OOO Fortap, the company imported at least \$111 million.

The Reuters investigation has also discovered

that: "Another Russian importer, OOO Titan-Micro, registered an address that's a house in a forest on the northern edge of Moscow. It, too, has imported Western computer components since the invasion, according to the customs records." We found the said company in our records. The company moved from Ryazan to Moscow in 2022. Its imports appear to contain only the categories we consider as semiconductors and integrated circuits in our study (HS classification codes 8541 and 8542 (similar to Fortap above)). Our data shows that OOO Titan-Micro's imports increased dramatically in 2022. Titan-Micro imported \$12.5 million in 9 months of 2022 versus \$3.3 million for the whole of 2021.

A joint investigation by RUSI, Reuters, and iStories¹²⁰ found that, since February 2022, Russian companies have increased imports of critical Western-manufactured components necessary for producing the UAVs used to attack Ukraine.

The investigation uses 'Altana Atlas' data platform,¹²¹ among other sources, to track trade in semiconductors and microelectronic goods. They find that "western-manufactured imports are likely being procured by a St Petersburg-based company named SMT-iLogic3 on behalf of STC, which was first sanctioned by the U.S. government in December 2016 for supporting Russia's interference in the 2016

113 Simola, Heli. "Can Russia Reorient Its Trade and Financial Flows?" BOFIT. Bank of Finland, December 5, 2022. <https://publications.bof.fi/bitstream/handle/10024/52330/bpb2207.pdf>.

114 Darvas, Zsolt, and Catarina Martins. "Russia's Huge Trade Surplus Is Not a Sign of Economic Strength." Bruegel. Bruegel, December 8, 2022. <https://www.bruegel.org/blog-post/russias-huge-trade-surplus-not-sign-economic-strength>

115 Borin, Alessandro, Francesco Paolo Conteduca, and Michele Mancini. "The Real-Time Impact of the War on Russian Imports: A Synthetic Control Method Approach." EconStor. Kiel, Hamburg: ZBW - Leibniz Information Centre for Economics, November 17, 2022. <https://www.econstor.eu/handle/10419/266330>.

116 Steve Stecklow, David Gauthier-Villars and Maurice Tamman, "The Supply Chain that Keeps Tech Flowing to Russia." Reuters, December 13, 2022. <https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-tech-middlemen/>

117 James Byrne, Dr Jack Watling, Dr Justin Bronk, Gary Somerville, Joe Byrne, Jack Crawford and Jane Baker, "The Orlan Complex: Tracking the Supply Chains of Russia's Most Successful UAV." RUSI, December 15, 2022. <https://rusi.org/explore-our-research/publications/special-resources/orlan-complex-tracking-supply-chains-russias-most-successful-uav>

118 It might be the case that these studies are using the same underlying data as ours.

119 Steve Stecklow, David Gauthier-Villars and Maurice Tamman, "The Supply Chain that Keeps Tech Flowing to Russia", Reuters, December 13, 2022. <https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-tech-middlemen/>

120 James Byrne, Dr Jack Watling, Dr Justin Bronk, Gary Somerville, Joe Byrne, Jack Crawford and Jane Baker, "The Orlan Complex: Tracking the Supply Chains of Russia's Most Successful UAV." RUSI, December 15, 2022. <https://rusi.org/explore-our-research/publications/special-resources/orlan-complex-tracking-supply-chains-russias-most-successful-uav>

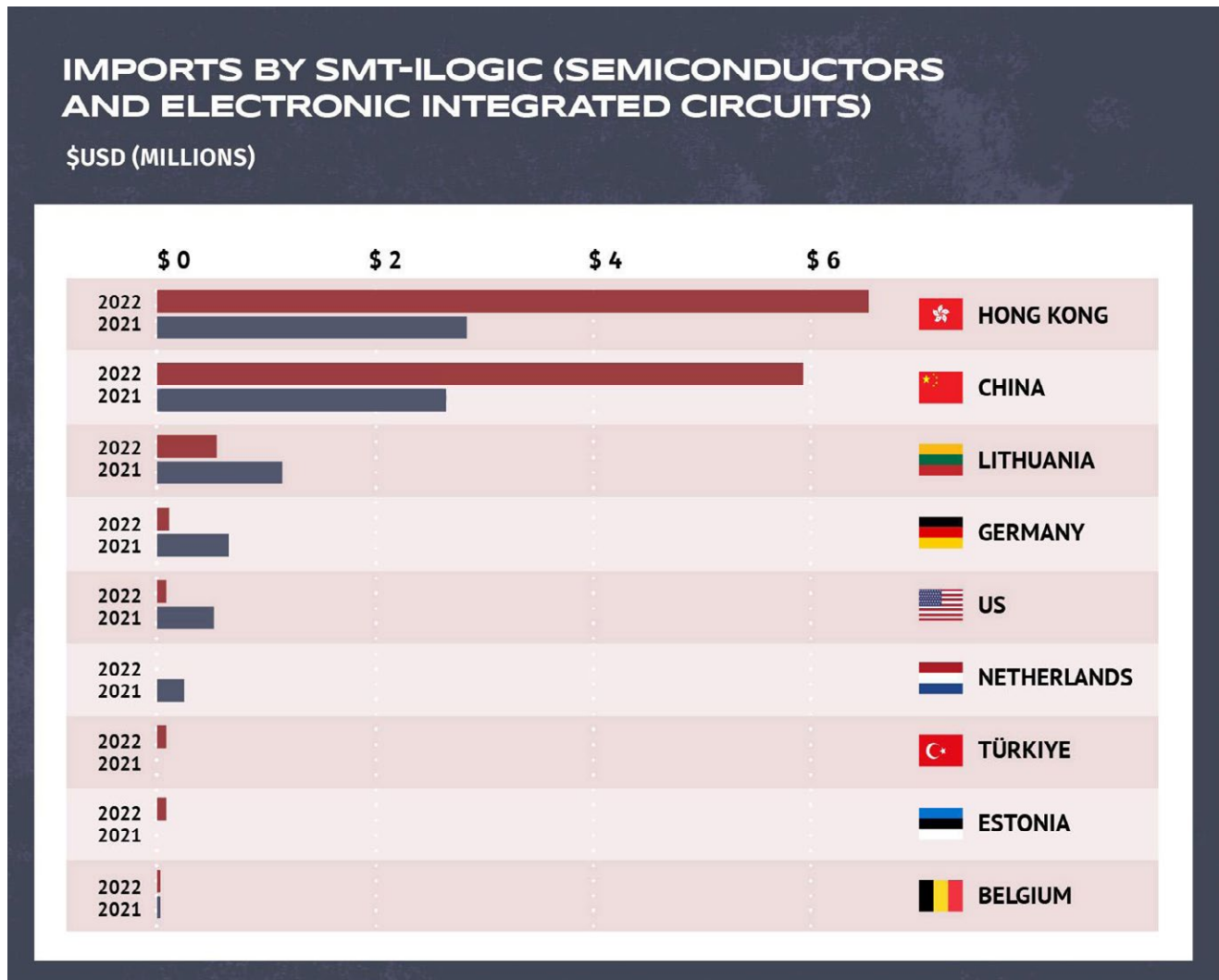
121 Provided by the Economic Security Council of Ukraine and Altana Technologies.

U.S. Presidential election.”

We have been able to identify this company in our database by its tax registration number (INN 780455230) and found that the company significantly increased its purchases of semiconductors and electronic circuits, particularly

from China and Hong Kong (Figure 9). In addition, we have discovered that in 2022, the company imported internal combustion engines with spark ignition for radio-controlled aircraft models from China.

Figure 9: Imports of Semiconductors and Electronic Integrated Circuits by SMT-ILOGIC



Source: Russia Customs data.

Data Limitations

Our dataset passes validation cross-checks based on the publicly available data by Russian authorities, Russia's trade partners and recent investigations. However, we have unearthed several limitations.

The records seem to be partially redacted for transactions for the needs of the Russian Ministry of Defense. Querying for Rosoboronexport (the Russian government defense export agency) and Rostec (a state export corporation) turned about 415 transactions including both imports and exports totalling about \$8mln in 2021 and \$54 mln in the first three quarters of 2022. These amounts are unrealistically low for Russia, which annually exports several billion dollars worth of weapons.

Curiously, out of 173 military-related transactions remaining in the database after the start of the war in Ukraine in February 2022, only 4 are exports from Russia (to Myanmar); only 5 are imports from China to Russia; about 114 transactions are military imports from Algeria to Russia (including electronics, radiolocation equipment, heat sensors, engines); 16 from Malaysia; 6 transactions of military imports from Turkey; and 8 from Uganda.

We assume that, despite the redaction, the database still contains defense imports and exports obfuscated for the purposes of sanctions evasion.

Redactions in the database seem to involve entire countries. When we searched the database for Iran, the search returned zero records. Meanwhile, the IMF reports¹²² that Russia imported \$975 million worth of goods from Iran in 2021 alone. Some of this trade is military-related. The Center of National Resistance, for example, has uncovered that Iran has been supplying Russia with drones leading up to the

full-scale invasion of Ukraine.¹²³

We hypothesize that either the database had been redacted prior to being leaked, or that there are special regulations in Russia exempting certain military transactions and those related to some countries that waive customs record requirements, or prescribing to use the intentionally inadequate information on country of origin and custom codes (as it is practiced in domestic statistics on military production).

There may be other broad categories/entries redacted from this database, however, since the macro-indicators align with those of international trade partners, the database remains useful.

We have identified (and removed from the analysis) two anomalous outliers within the dataset. The first one relates to Russia's aluminum exports. According to the database, the combined export of aluminum from Russia in 2021 and 9 months in 2022 (excluding July 2021) was \$11 billion. In July 2021 alone, however, the database is showing \$33 billion worth of aluminum exports. Looking at the detailed breakdown, we see that almost all large invoices are from July 2021 and the exports originate from the Krasnoyarsk Aluminum Factory Rusal (АО "РУСАЛ КРАСНОЯРСКИЙ АЛЮМИНИЕВЫЙ ЗАВОД") to RTI LIMITED.

Another unexplained outlier is a one-time spike in Russia's imports from Ireland in April 2022 (\$1.18 billion) from the 2022 monthly average of \$60 million. We decided to impute for May the number of \$83 million, equivalent to the average for March and June.

Finally, an obvious limitation of our data is the exclusion of the pre-COVID period, which would be a more appropriate baseline for assessment of trade dynamics, a limitation we plan to address in our future work as more data becomes available.

122 "IMF Data." IMF. IMF. Accessed January 11, 2023. <https://www.imf.org/en/Data>.

123 "Iran supplies Russia with drones by air, by sea." *Euromaidan Press*, November 3, 2022. <https://euromaidanpress.com/2022/11/03/iran-supplies-russia-with-drones-by-air-by-sea/>; "Як Іран Транспортує Зброю до РФ." *National Resistance Center*, December 3, 2022. <https://sprotyv.mod.gov.ua/2022/11/03/yak-iran-transportuye-zbroyu-do-rf/>.

Russia—Still Open for Business

In 2022, neither the war nor the sanctions have precluded Russia from hitting the highest current account surplus in history¹²⁴. The surplus in 2022 reached \$227 billion, more than two times higher than for the same period in 2021 and more than double the previous record.¹²⁵ This surplus was mainly due to the sky-high commodity prices and the contraction of Russia's import, particularly in the early days following the full-fledged invasion. Nevertheless, for the entire year of 2022, Russia's import volumes contracted by only 16% yoy, as announced by First Deputy Head of the Customs Office¹²⁶.

In 2022, wartime sanctions froze about \$300 billion in reserves from the Bank of Russia¹²⁷. However, because Russia continues earning FX from their current account surplus, it is accumulating new reserves with commercial banks that are not yet sanctioned. Therefore, it is likely that in about a year, Russia will be able to make it back. This continued access by Russia to vast amounts of foreign exchange is critical to its ability to continue its war on Ukraine.

Overall Exports. Russia's total exports increased by more than 10% in January-September 2022 over the corresponding period in 2021, driven mostly by oil and gas exports.

Russian earnings from oil exports continued to rise through 2022, reaching \$171 billion over January-September. This is a 35% increase over the corresponding period of the previous year, with

crude oil 41% higher and petroleum products 26% higher, respectively, than in 2021. A decomposition shows that higher prices were responsible for most of the change, with crude oil volumes also playing a role, while product export volumes declined. Examining Russia's trade between June - September, 2022, we see that China, India, and Turkey made up more than half of crude oil exports— up from one-third in 2021. The share of G7 is down from 53% to 41% (Figures 10 and 11).

In 2021, top destinations of Russian exports (by dollar value) included: China, Netherlands, Germany, Turkey, the US, the UK and South Korea. During the first three quarters of 2022, the top buyers list included China, Turkey (which moved up to the second position), Netherlands, Germany, Italy and India. From among the top ten 2021-exporters, only the US and the UK have significantly scaled back their purchases from Russia when measured in dollar values.

With regards to the US sanctions,¹²⁸ we can observe that from March 2022 (immediately after Russia's full-fledged invasion of Ukraine) to September 2022, Russia received about \$7 bln less from the US for its exports, compared to the corresponding period in 2021. This is to a large degree due to the fast implementation of the oil embargo by the US. During the same period, we also see a \$2.5 bln decline in US exports to Russia.

Netherlands, Italy, and France are the European states whose purchases from Russia in dollar value

124 Current account surplus is the excess of dollar revenues Russia gets from exports over what it spends on imports.

125 Tatiana Babina, Oleg Itskhoki, Benjamin Hilgenstock, Maxim Mironov, and Elina Ribakova, "Who is Paying for Russia's War on Ukraine." January 2023, forthcoming.

126 "Физический объем российского импорта сократился на 16% по итогам 2022 года." January 19, 2023, Tass. <https://tass.ru/ekonomika/16842409>.

127 "Sanctions Have Frozen around \$300 Bln of Russian Reserves, Finmin Says." Reuters. March 13, 2022. <https://www.reuters.com/article/ukraine-crisis-russia-reserves/sanctions-have-frozen-around-300-bln-of-russian-reserves-finmin-says-idUSL5N2VG0BU>.

128 For the US, we are using trade data from the Census Bureau, U.S. Trade by Country Totals as provided by HAVER to validate our dataset.

have meaningfully increased in 2022. This could be explained by the high energy prices, as well due to the delayed EU oil embargo that only came into effect in December 2022.

Figure 10: In 2022, many countries continued to import from Russia

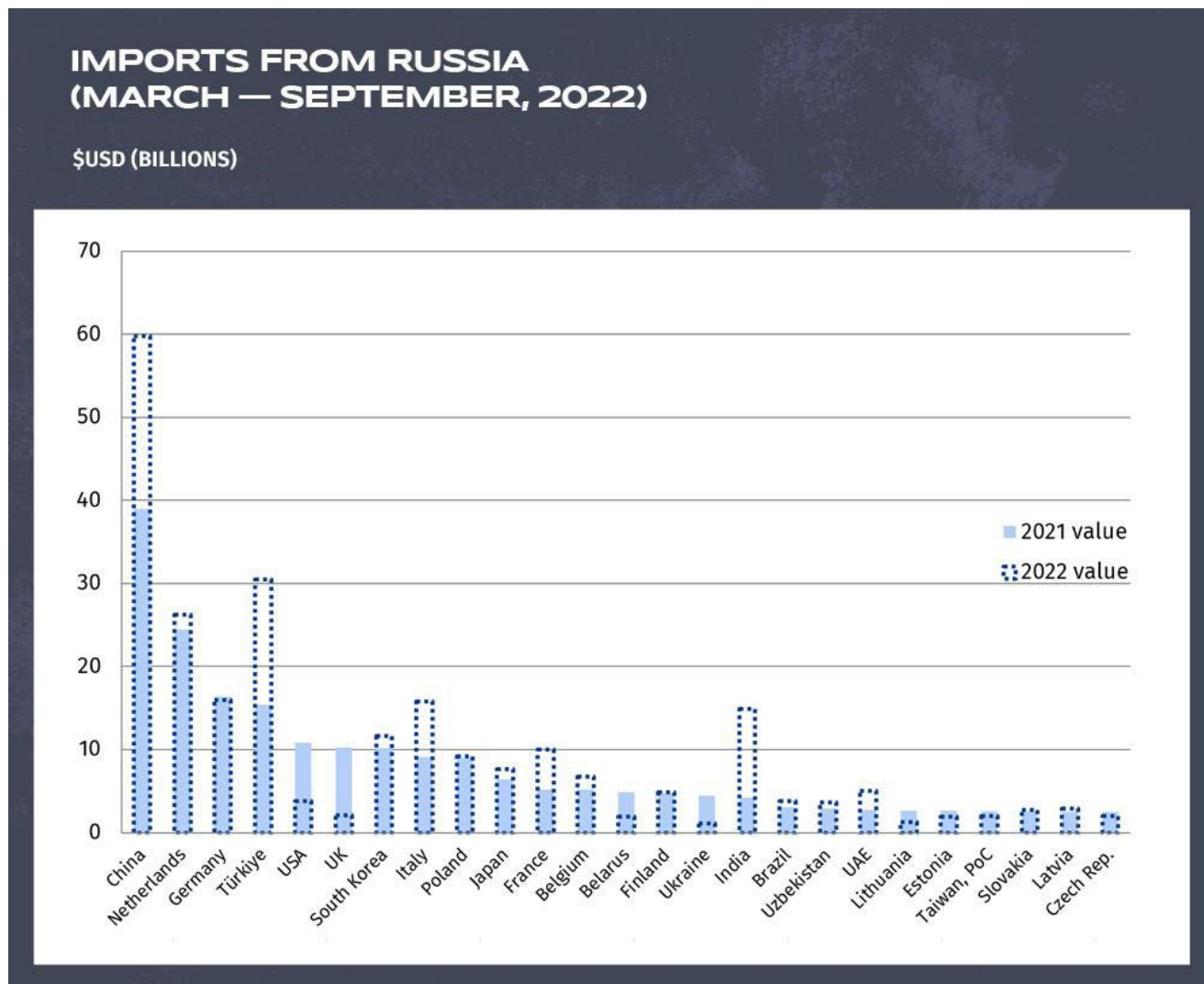
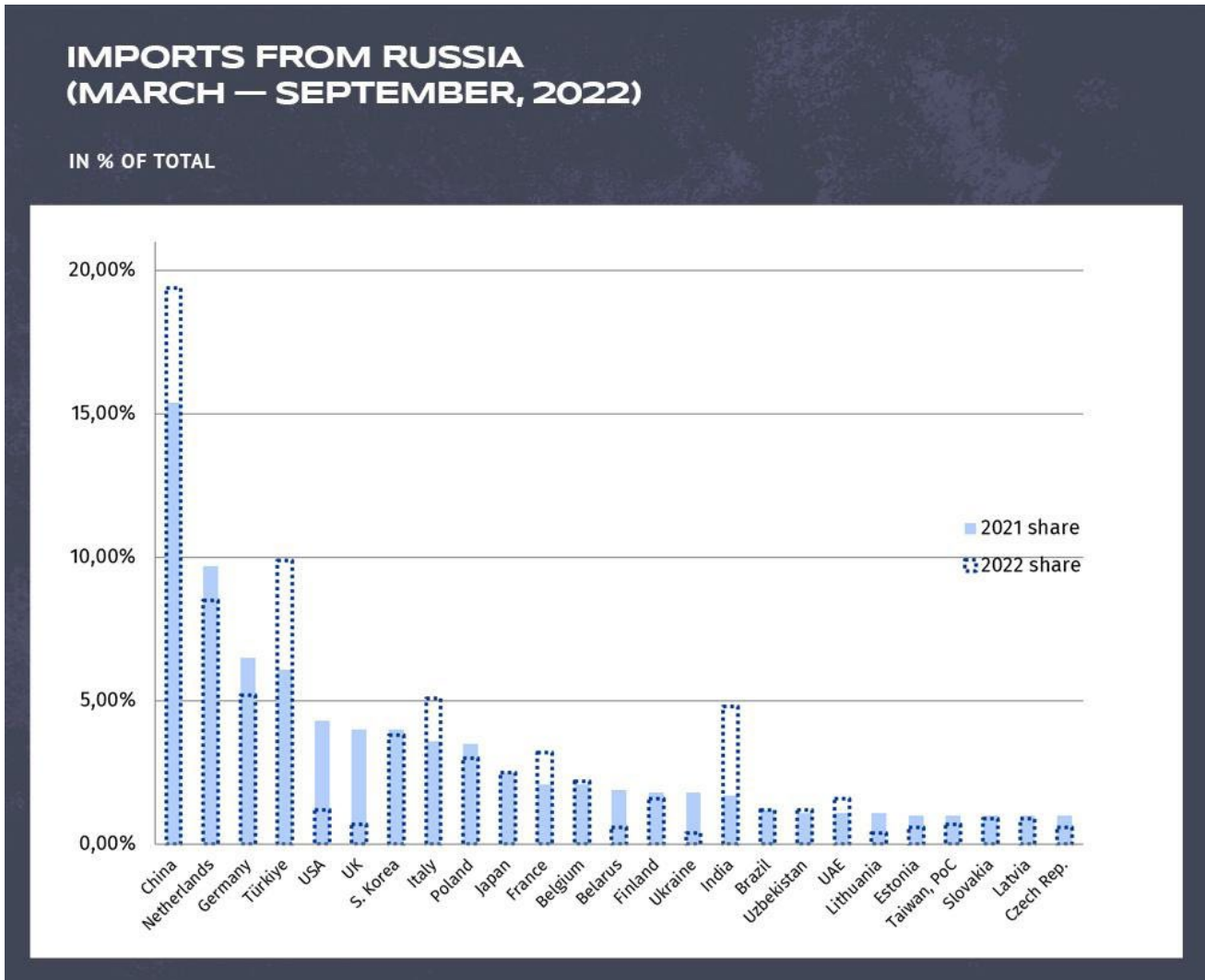


Figure 11: In 2022, many countries continued to import from Russia (% total)



Source: The Bank of Russia, Russia customs data, National authorities.

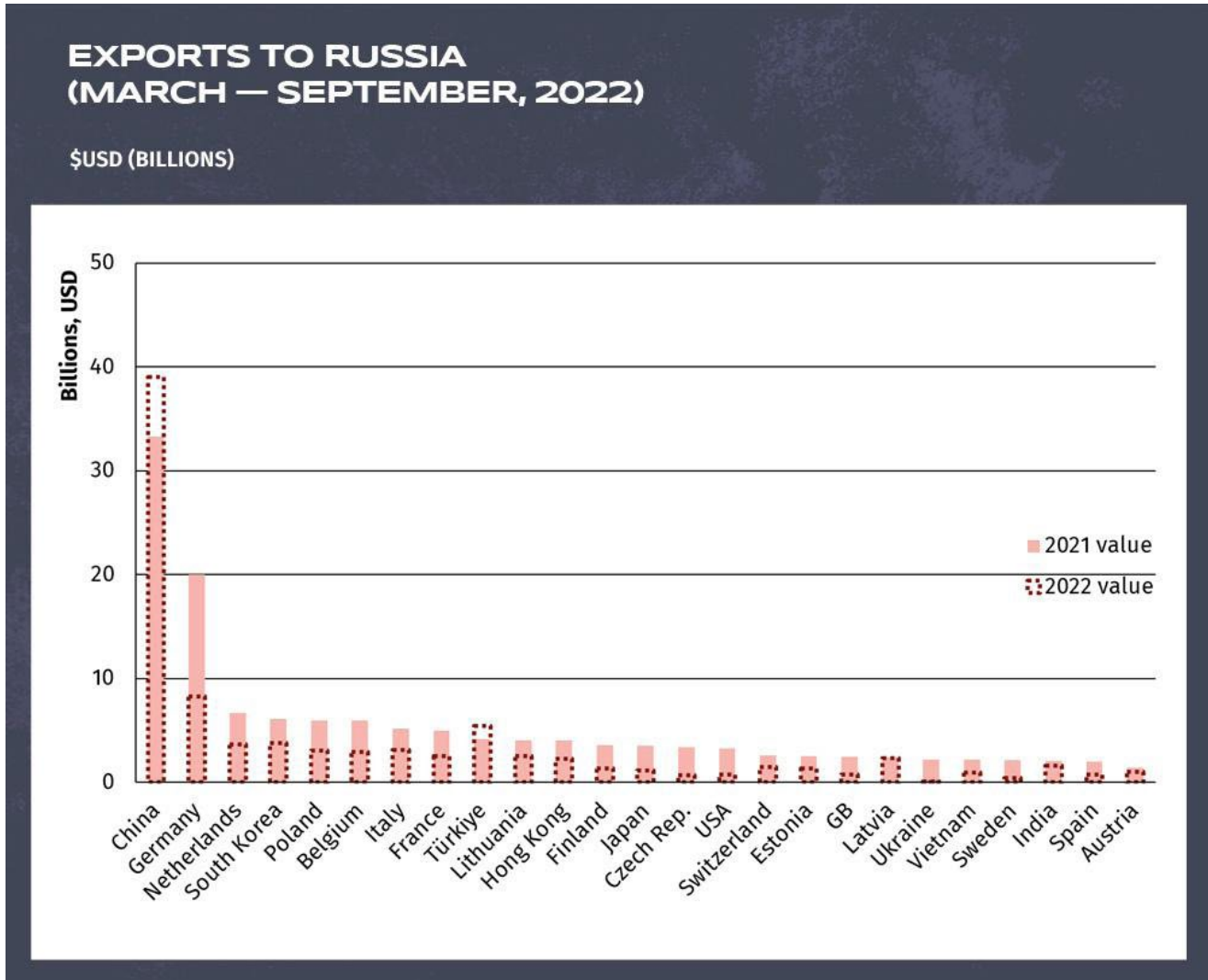
Overall Imports. Our data shows that Russia’s total imports for the period from March-September 2022 in dollar value was 30% below the corresponding period in 2021. When seasonality is added, monthly June-September imports were 35% below each of the corresponding months of 2021. We expect that during the last quarter of 2022 and throughout 2023, Russia’s imports will recover.

composition of Russia’s top importers changed (Figures 12 and 13). Prior to the war, the list was led by China, Germany, the Netherlands, South Korea, and Poland. Today, four countries supply over 50% of Russia’s total imports: China, Germany, Turkey, and South Korea,¹²⁹ with the Netherlands still remaining a part of the top 5.

During the first three quarters of 2022, the

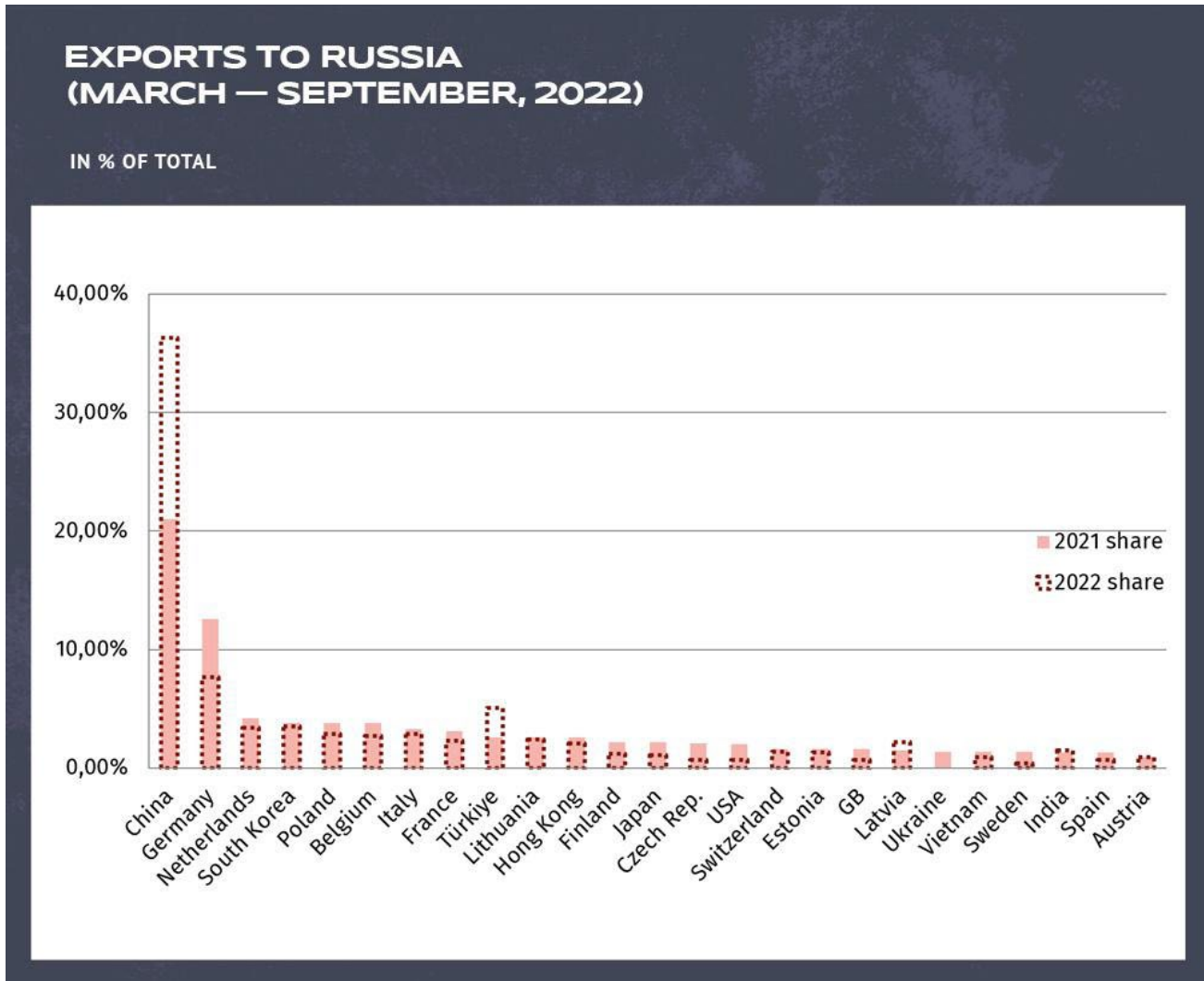
129 Depending on the country code we used from our database, we had more trade from Hong Kong and less from China, but the final aggregation aligns better with China’s official statistics. Similarly, in Europe, certain countries change depending on the codes used, particularly Switzerland, Ireland, and Cyprus.

Figure 12: Exports to Russia in USD



Source: The Bank of Russia, Russia customs data, National authorities.

Figure 13: Shares of Exports to Russia in % of total



Source: The Bank of Russia, Russia customs data, National authorities.

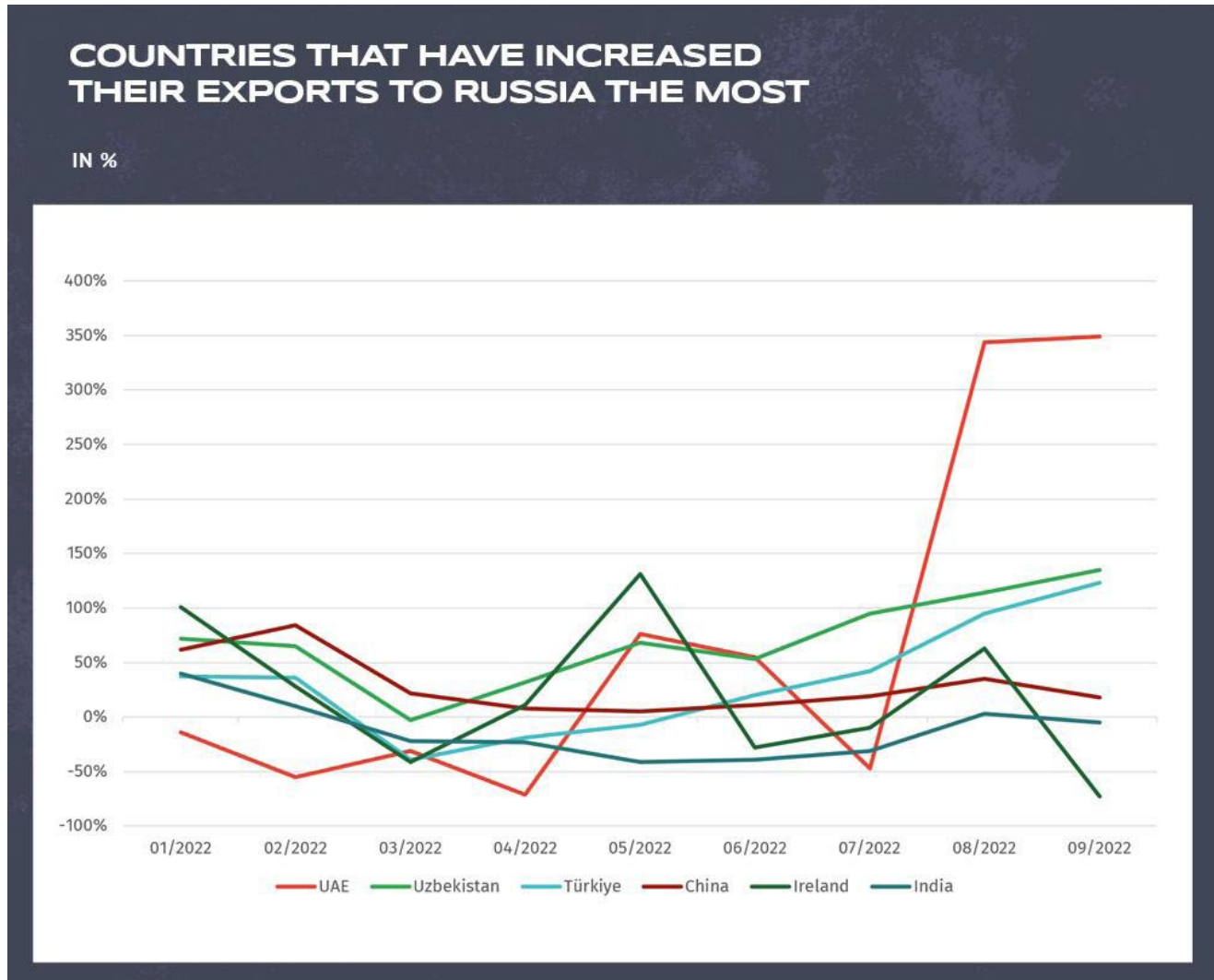
Countries that have reduced their trade with Russia most drastically include the U.S., the UK, Japan, Singapore, and a number of European countries. (Figure 12). While Germany is in this group as well, it continues to be the source of a large share of Russia’s imports.

The US, which held the position of #15 importer (in dollar value) to Russia in the first three quarters of

2021, in 2022 more than halved that trade, and is no longer among the top 20.

The Biggest Winner. As the U.S., EU, the UK have all scaled back operations with Russia, China has emerged, by a wide margin, Russia’s most important trade partner. It now receives about 20% of Russia’s total exports and is the source of over 35% of Russia’s total imports(Figure 13).

Figure 14: Countries that have increased their exports to Russia the most (yoy % change)



Source: The Bank of Russia, Russia customs data, National authorities.

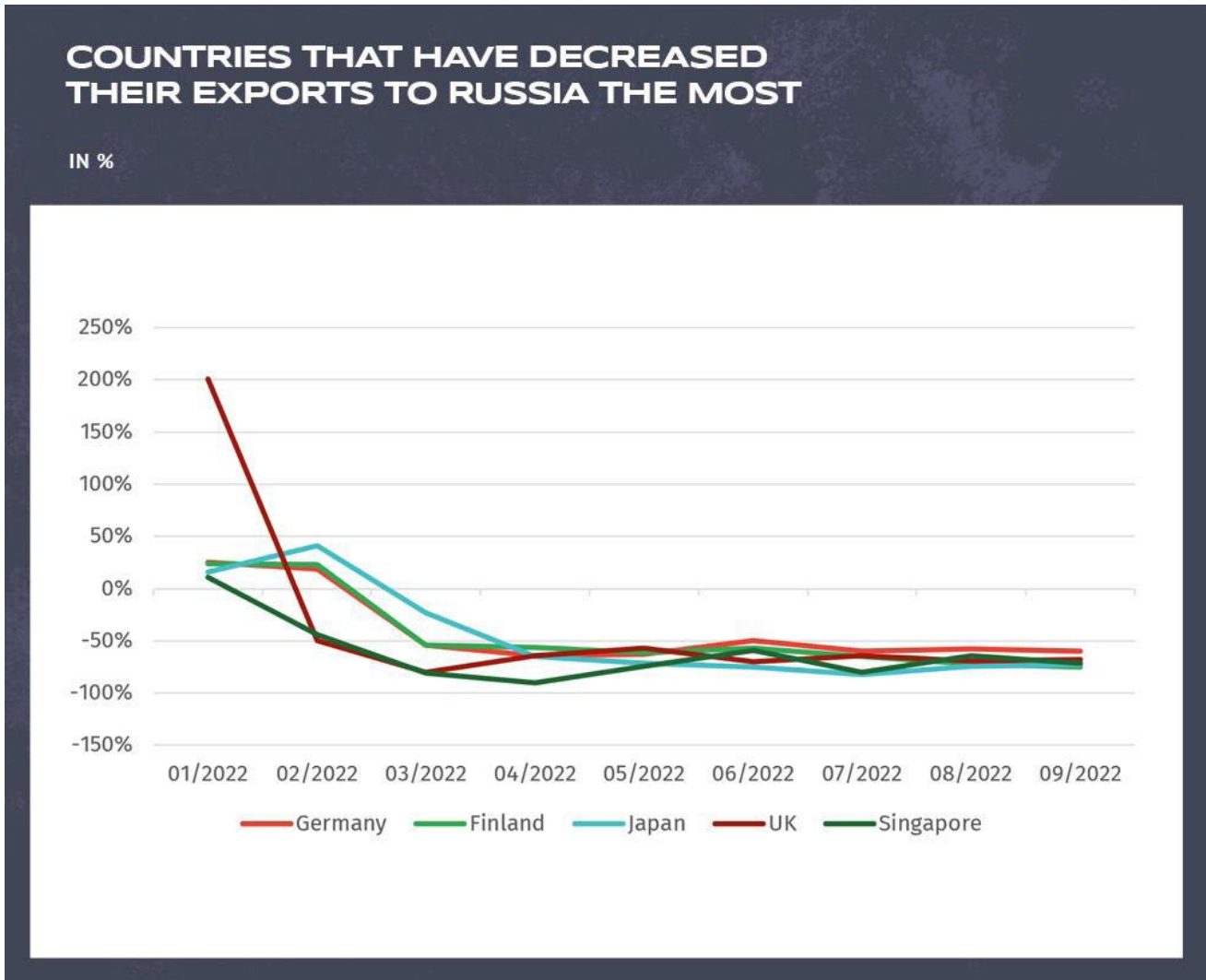
The Mavericks. Notably, during the first three quarters of 2022, **some countries have actually dramatically expanded their exports to Russia.** They include China, Turkey (a NATO member), Cyprus (an EU member), UAE, and Uzbekistan (Figure 14).

Imports via Kazakhstan and Belarus were also sharply up in 2022, from very low levels pre-war. Belarus, Kazakhstan, Kyrgyzstan, and Armenia are

all members of the Eurasian Economic Union with Russia, so it is hard to draw reliable conclusions from the aggregated numbers, as members of this trade union account for their transactions differently in the trade statistics.

Countries whose exports to Russia are showing a steep increase following the start of the war are logical suspects for facilitating circumvention of sanctions.

Figure 15: Countries that have decreased their exports to Russia the most



Source: The Bank of Russia, Russia customs data, National authorities.

Case Study: 22 US-sanctioned Companies Trading in 2021-2022.

Cross-referencing Russian customs records with a comprehensive list of U.S. Russia-focused sanctions produced by the Free Russia Foundation¹³⁰ yielded a list of 22 companies sanctioned by the US:

- Russian Aircraft Corporation Mig
- The Planar Company
- Joint Stock Company Kazan Helicopters
- Joint Stock Company Helicopter Service Company
- Joint Stock Company National Helicopter Center Mil And Kamov
- Public Joint Stock Company Alrosa
- Joint Stock Company United Shipbuilding Corporation
- Pao "Tantk Im. G.M. Berieva"
- Irkut Corporation Joint Stock Company
- Rapart Servisez Ooo
- Joint Stock Company Mikron
- Open Joint Stock Company Ilyushin Aviation Complex
- Joint Stock Company Voronezhsky Factory Poluprovodnikovykh Priborov-Sborka
- Federal State Budgetary Scientific Institution Research And Production Complex Technology Center
- Lebedev Physical Institute Of The Russian Academy Of Sciences
- Baikal Electronics Jsc
- Elvees Research And Development Center Jsc
- Jsc Moscow Center Of Sparc Technologies
- International Center For Quantum Optics And Quantum Technologies Limited Liability Company
- Sinno Electronics Co., Limited
- Novastream Ltd
- Cjsc Stc Modul

These companies specialize in the industries supporting Russia's military, such as mining, the production of manned and unmanned aircraft, military vehicles, and microchips.

The list has been compiled by running separate queries for sanctioned companies using their INNs, names, and addresses.

It is important to note, however, that alternative transliteration into Cyrillic alphabet or change in word orders of the company names may have eliminated some entries from this sample. Examining companies' records individually would likely uncover additional information on sanctioned companies that continue international trade.

Furthermore, as noted under the *Data Limitation* portion of the *Validation* section of this report, all military sales and information concerning trade with Iran are absent from the database— either classified, and have been redacted or have not passed through Russian customs at all. As such, there are likely more companies transacting with Russia and supporting the Russian military-industrial complex in violation of U.S. sanctions.

The information provided in this dataset also does not account for possible licenses granted by the U.S. Department of Commerce, as information

130 Russian Individuals & Entities Sanctioned by the U.S., database by Free Russia Foundation. <https://sanctions.4freerussia.org/consolidated/>.

about these licenses is generally not made public. According to the Department of Commerce's 2022 Guidance, however, most non-humanitarian licenses for exports to Russia are currently denied¹³¹, and, therefore, it is highly unlikely that any of the companies identified here received any kind of exemption.

All but one of the 22 companies identified by our analytic effort are sanctioned by the US pursuant to the Executive Order 14024.

The Executive Order 14024 – “Blocking Property With Respect To Specified Harmful Foreign Activities of the Government of the Russian Federation” – was issued on April 19, 2021. It relates to the Russian government's attempts to “undermine the conduct of free and fair democratic elections and democratic institutions in the United States and its allies and partners; to engage in and facilitate malicious cyber-enabled activities against the United States and its allies and partners; to foster and use transnational corruption to influence foreign governments; to pursue extraterritorial activities targeting dissidents or journalists; to undermine security in countries and regions important to United States national security; and to violate well-established principles of international law, including respect for the territorial integrity of states.”¹³²

The JSC United Shipbuilding Corporation is sanctioned under EO 13661. The Executive Order 13661 – “Blocking Property of Additional Persons Contributing to the Situation in Ukraine” – was issued on March 16, 2014 in response to “the actions and policies of the Government of the Russian Federation with respect to Ukraine—including the deployment

of Russian Federation military forces in the Crimea region of Ukraine— that undermine democratic processes and institutions in Ukraine; threaten its peace, security, stability, sovereignty, and territorial integrity; and contribute to the misappropriation of its assets, and thereby constitute an unusual and extraordinary threat to the national security and foreign policy of the United State.”¹³³

The companies in the dataset were added to the OFAC's SDN List over the span of several months following the invasion of Ukraine from the end of February to September 2022.

Upon the introduction of US sanctions, there has been a significant decrease in the monetary value of global transactions of the sanctioned companies. The total volume of cross-border transactions by these companies in the first three quarters of 2021 was \$ 148.4 mln and in the corresponding period of 2022 it dropped to \$88,2 mln—a 40% reduction.

For instance, the Planar Company, a Russian technology company that specializes in procurement of foreign technology for Russia's military programs, including Russia's military space programs, averaged \$1,740,143 in global transactions per month prior to being sanctioned.¹³⁴ In the seven months following the imposition of sanctions in early March 2022, its average global transactions amounted to just \$399,316 with some months recording no transactions at all – a 77% decrease.

Helicopter Service Company¹³⁵ that conducts maintenance and after-sales service of Russian-made helicopters averaged \$82,000 in monthly transactions in 2019, \$282,000 in 2020, \$96,000 in 2021, and \$89,000 in 2022. There are no

131 “The Federal Register.” Federal Register. Bureau of Industry and Security, U.S. Department of Commerce, June 6, 2022.

132 “The Federal Register.” Federal Register. Executive Office of the President, April 19, 2021. <https://home.treasury.gov/system/files/126/14024.pdf>.

133 “The Federal Register.” Federal Register. Executive Office of the President, March 16, 2014. <https://www.federalregister.gov/documents/2014/03/19/2014-06141/blocking-property-of-additional-persons-contributing-to-the-situation-in-ukraine>.

134 “Targeting Russian Elites and Defense Enterprises of Russian Federation”. U.S. Department of State. U.S. Department of State, March 4, 2022. <https://www.state.gov/targeting-russian-elites-and-defense-enterprises-of-russian-federation/>.

135 “U.S. Treasury Sanctions Russia's Defense-Industrial Base, the Russian Duma and Its Members, and Sberbank CEO,” U.S. Department of the Treasury, March 24, 2022, <https://home.treasury.gov/news/press-releases/jy0677>.

transactions by HSC recorded between April and August 2022. In August the sanctioned company's transactions sharply rose to \$347,146. Despite sanctions, Helicopter Service Company continued its transborder trade throughout 2022, with \$34,000 recorded for December.

A number of the companies in the dataset, such as Sinno Electronics Co. (a Chinese supplier of the Russian company Radioavtomatika), Lebedev Physical Institute of The Russian Academy of Sciences, Baikal Electronics JSC (which produces computer processors for the Russian military), and five others were sanctioned in September 2022.¹³⁶ In December 2022, the database records show 111 transactions by Sinno Electronics for a total value of \$828,648.

Although the initial decrease in global transactions is evident and significant, many of the

Russian companies supporting the Kremlin's war machine and sanctioned by the US continued their international operations through the end of 2022. It is worthwhile to examine their transactions in 2023 to determine whether the volume and value of their trade recovers in the following months.

As part of this analysis, we ran queries on transactions by the 22 sanctioned companies involving semiconductors and UAVs/UAV parts. We have uncovered over 60 transactions involving UAV/parts in January and the beginning of February 2022. However, all of them took place before the invasion and there are no UAV imports by sanctioned companies after February 7, 2022. The last chip-related transaction by a sanctioned company that we have been able to locate in our database occurred on January 26, 2022.

Imported Commodities Critical to Putin's Ability to Wage War

Cutting off Russia's access to critical technology for its defense sector is among the sanctions objectives articulated by the U.S. Government. Therefore, assessing how Russia's ability to acquire this technology has changed since the start of its full-scale war in Ukraine provides a useful measure of sanctions effectiveness.

For purposes of our analysis, we have selected two categories of controlled commodities critical to Russia's war effort: microchips and UAVs/UAV components.

While Putin's regime has worked hard to increase the self-sufficiency of Russia's military industrial base, thereby insulating it from the impact

136 "Targeting Russia's Senior Officials, Defense Industrial Base, and Human Rights Abusers." U.S. Department of State, U.S. Department of State, September 15, 2022. <https://www.state.gov/targeting-russias-senior-officials-defense-industrial-base-and-human-rights-abusers/>.

of U.S. sanctions,¹³⁷ microchips and UAVs critical to the Russian military are still largely imported.^{138, 139, 140} Russia depends on Western technology for many of its key military systems, such as the Orlan-10 UAV,¹⁴¹ the KUB-BLA 'kamikaze' UAV, and cruise missiles such as the KH-101.¹⁴²

UAVs and aerial drones are the tip of the spear in the Russian invasion of Ukraine.

Uncrewed aerial vehicles provide intelligence, surveillance and reconnaissance (ISR) capabilities to ground forces, including recon and intel squads, assault units, and artillery, mortar and multiple-launch rocket system formations. Russian military-grade drones can reconnoiter, survey and monitor potential targets at distances of up to 120 km, helping to direct strikes against Ukrainian positions, weapons, and personnel.¹⁴³ Throughout the Russian military campaign in Ukraine, aerial drones have been an indispensable part of operations, and their absence or paucity at various Ukrainian fronts in and around Kyiv, Donbas, Kharkiv, and Kherson regions

have contributed to Russian losses and retreats.¹⁴⁴

Likewise, the Russian military has used loitering munitions (commonly referred to as 'suicide drones') like its own KUB and Lancet drones and Iranian-provided Shahed-136 (Geran-2) and Shahed-131 (Geran-1) drones to target Ukrainian civilian energy infrastructure and military targets.¹⁴⁵ Though Ukrainian defenders typically shoot down up to 80% of Shahed/Geran drones, the few drones that have made it past Ukrainian defenses have caused significant damage to the energy infrastructure around large cities like Kyiv, plunging millions into cold and darkness in mid-winter. The Russian military intends to increase the use of these drones in 2023, as Iranian technology gives the Kremlin the ability to strike targets hundreds of kilometers inside Ukrainian territory at a relatively low cost per drone.¹⁴⁶

This war is characterized by the unprecedented use of commercial drones like Chinese-made quadcopters for tactical situational awareness,

137 "Putin Wants Russian Defense Industry to Be Self-Sufficient." Reuters. Reuters, May 14, 2014. <https://www.reuters.com/article/us-ukraine-russia-putin-defence/putin-wants-russian-defense-industry-to-be-self-sufficient-idUSBREA4DOBR20140514>.

138 Sheftalovich, Zoya, and Laurens Cerulus. "The Chips Are down: Putin Scrambles for High-Tech Parts as His Arsenal Goes up in Smoke." Politico. Politico, September 5, 2022. <https://www.politico.eu/article/the-chips-are-down-russia-hunts-western-parts-to-run-its-war-machines/>.

139 Danylov, Oleg. "Russian UAVs Are Almost Entirely Made of Imported Components ." Mezha Media. Mezha Media, March 29, 2022. <https://mezha.media/en/2022/03/29/russian-uavs-are-almost-entirely-made-of-imported-components/>.

140 Savina, Sonya. "Сможет Ли Россия Воевать Без Западного Импорта." Важные истории, May 12, 2022. <https://stories.media/opinions/2022/05/12/smozhet-li-rossiya-voevat-bez-zapadnogo-importa/>.

141 "Russian drone Orlan-10 consists of parts produced in the USA and other countries – photo evidence." InformNapalm, June 2, 2018. <https://informnapalm.org/en/russian-drone-orlan-10-consists-of-parts-produced-in-the-usa-and-other-countries-photo-evidence/>.

142 James Byrne, Gary Somerville, Joe Byrne, Dr Jack Watling , Nick Reynolds and Jane Baker, "Silicon Lifeline: Western Electronics at the Heart of Russia's War Machine." Royal United Services Institute, August 8, 2022, 25, 45-46. https://static.rusi.org/RUSI-Silicon-Lifeline-final-updated-web_1.pdf.

143 "Orlan-10 Unmanned Aerial Vehicle (UAV)." Airforce Technology, March 15, 2021. <https://www.airforce-technology.com/projects/orlan-10-unmanned-aerial-vehicle-uav/>.

144 Mari Saito, Maria Tsvetkova and Anton Zverev, "Abandoned Russian base holds secrets of retreat in Ukraine." Reuters, October 26, 2022. <https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-base/>.

145 Andrew E. Kramer and Marc Santora, "Russia Launches a Wave of Iranian-Made Drones at Kyiv After a Lull." New York Times, December 16, 2022. <https://www.nytimes.com/2022/12/14/world/europe/ukraine-russia-iranian-drones.html>

146 Joby Warrick, Souad Mekhennet and Ellen Nakashima, "Iran will help Russia build drones for Ukraine war." The Washington Post, November 19, 2022. <https://www.washingtonpost.com/national-security/2022/11/19/russia-iran-drones-secret-deal/>.

artillery correction, and combat missions.¹⁴⁷ The small quadcopter was recognized as a significant contribution to the battlefield by the U.S. and its allies, and was called a revolutionary element in modern war by the Russian military establishment. The continuous reliance of the Russian military, Donbas militias, Rosgvardia, and other formations on the Chinese-made DJI and Autel drones has created a massive supply pipeline facilitated by volunteers who seek out these technologies across global physical and online marketplaces.¹⁴⁸ Growing demand for small, cheap, and expendable products able to deliver ISR capacity from ground forces, artillery brigades, and assault units has prompted Russia's defense industry to provide alternative domestic quadcopter solutions.

All of the above-mentioned UAV types require microchips and microprocessors for command and

control, GPS, data collection and transmission, and other key functions. Recent studies of captured Russian drones and openly available data on commercial UAVs demonstrate that these vehicles rely on various microchips and microelectronic components manufactured in the U.S., Western Europe, East Asia, and China.¹⁴⁹ The Orlan-10 military drone—Russia's go-to ISR UAV—relies on these imported components, as do Iranian-made loitering munitions,¹⁵⁰ and even Russia's own attempts to develop quadcopters rely on Chinese-made parts including microchips.¹⁵¹ Given that there is no scalable domestic substitute available, the Russian defense industry's reliance on these imports will only grow in the near term. Therefore, continued acquisition of key microchip and microelectronic components will be crucial to Russia's war effort for the foreseeable future.

147 Samuel Bendett and Jeffrey Edmonds, "Russian Military Autonomy in Ukraine: Four Months In." CNA, July 6, 2022. <https://www.cna.org/reports/2022/07/russian-military-autonomy-in-ukraine-four-months-in>.

148 Amos Chapple, "The Drones Of The Ukraine War." Reuters, November 17, 2022. <https://www.rferl.org/a/ukraine-russia-invasion-drones-war-types-list/32132833.html>.

149 Emily Youers, "Dissecting Iranian drones employed by Russia in Ukraine." Conflict Armament Research Ltd, November 2022. <https://storymaps.arcgis.com/stories/7a394153c87947d8a602c3927609f572>.

150 James Byrne, Dr Jack Watling, Dr Justin Bronk, Gary Somerville, Joe Byrne, Jack Crawford and Jane Baker, "The Orlan Complex: Tracking the Supply Chains of Russia's Most Successful UAV." RUSI, December 15, 2022. <https://rusi.org/explore-our-research/publications/special-resources/orlan-complex-tracking-supply-chains-russias-most-successful-uav>.

151 Mark Bowden, "The Tiny and Nightmarishly Efficient Future of Drone Warfare." The Atlantic, November 22, 2022. <https://www.theatlantic.com/technology/archive/2022/11/russia-ukraine-war-drones-future-of-warfare/672241/>.

Russia's ability to import UAVs

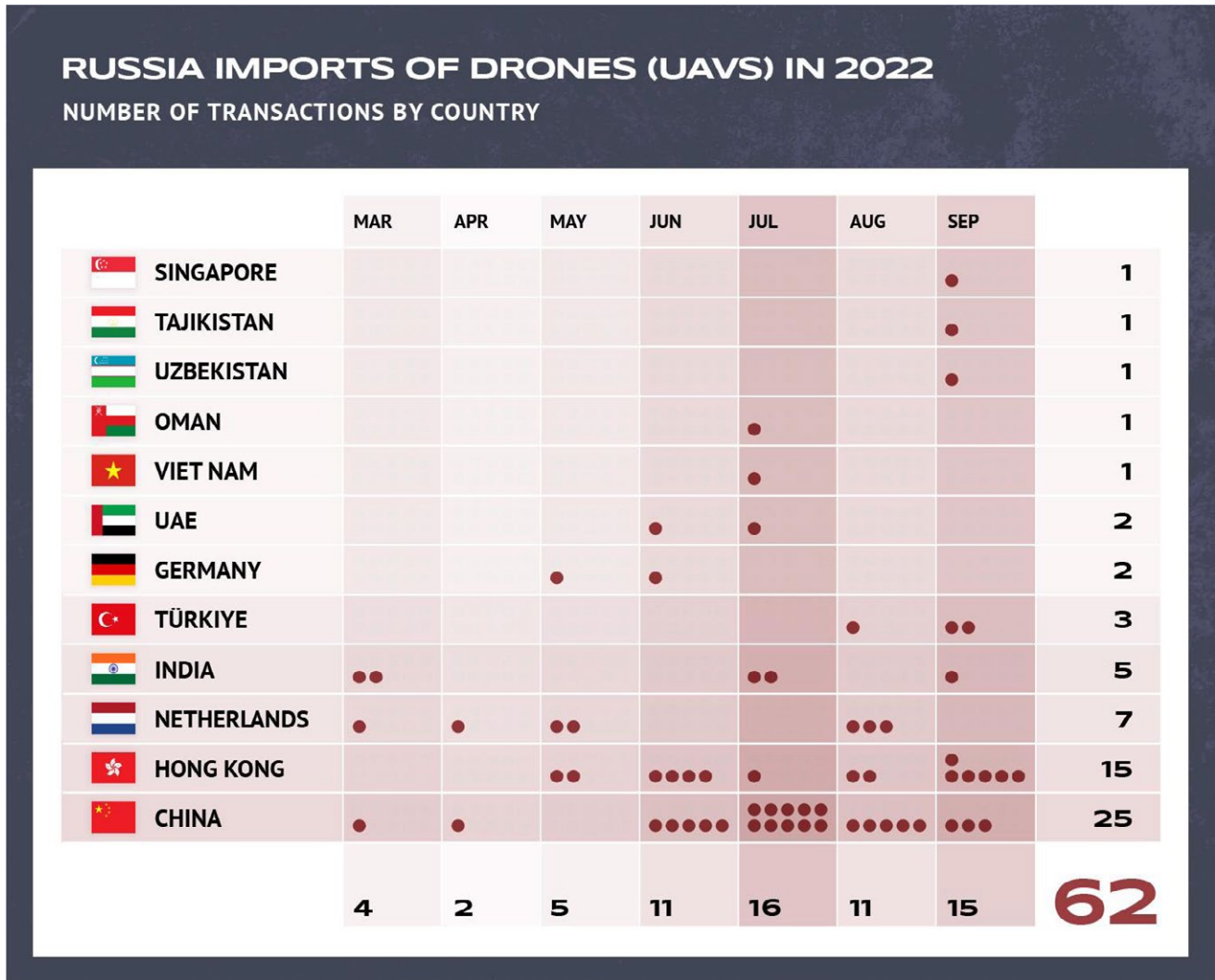
As reflected by the customs database, Russia continued to import UAVs and parts in 2022, despite sanctions (Figure 16).

We queried the database for all UAVs and UAV components according to their general HS codes: 8806 for unmanned aircraft and 8807 for parts of aircraft and spacecraft. No records were found containing HS code 8807.

For 2022, we found a number of customs records involving UAV imports from China (for the total value of \$3,280,120 for the 12 months of 2022), Hong Kong (for the total value of \$1,617,813), India, Turkey, and surprisingly the Netherlands and Germany.

There are no UAV imports recorded in the database in 2021. It is possible that UAV imports are redacted from this dataset or mischaracterized in invoices. For example, we have located records for a St Petersburg-based company named SMT-iLogic3 who may be importing engines from China on behalf of STC, which was sanctioned by the U.S. government in December 2016 (see also section Data Validation). When we look at Rostec and Rosoboronexport-tied imports from Algeria, many entries are missing a meaningful description of the commodity crossing the border. It bears repeating here that the database excludes all military purchases by the Russian government.

Figure 16: Number of customs transactions in UAVs/parts, Russia's imports



Source: Russia Customs Data.

Throughout 2022, Russian companies have been actively importing UAVs, UAV parts, and engines from China. While our dataset covers mostly commercial goods (as described under Data Limitation), many of these imports can be repurposed for military use. Specifically, we found imports from companies that produce strategically important drones, such as:

- Jonson
- Sz Dji Technology Co., Ltd
- Autel Robotics Co., Ltd.
- Shenzhen Ryze Tech Co., Ltd

- Guangzhou Xaircraft Technology Co.ltd
- Shandong Joyance Intelligence Technology Co., Ltd
- Qingdao Zhongfei Intelligent Technology Co., Ltd
- Suzhou Dandelion Electronic Co., Ltd.

Russia's Ability to Import Semiconductors

Despite sanctions, Russia has not only continued to import semiconductors and integrated electronic circuits, it dramatically expanded such imports.

Much confusion exists even among industry experts and association representatives on whether all chips (and if not, exactly what types of chips) are banned by the US from export to Russia. However, considering the BIS Final Rule on September 15, 2022 and the publicized sanctions objectives, it is logical to infer that it has been the intent of the United States government to stop the flow of all types of chips to Russia as a response to its military aggression on Ukraine. In the Appendix to this report, we discuss the technical aspects of matching various categories of goods.

We searched the database for semiconductor imports using HS codes 8541, for semiconductor devices "e.g. diodes, transistors, semiconductor-based transducers"; photosensitive semiconductor devices, incl. photovoltaic cells whether or not assembled in modules or made up into panels (excl. photovoltaic generators); light emitting diodes "LED", whether or not assembled with other light-emitting diodes "LED"; mounted piezoelectric crystals; parts

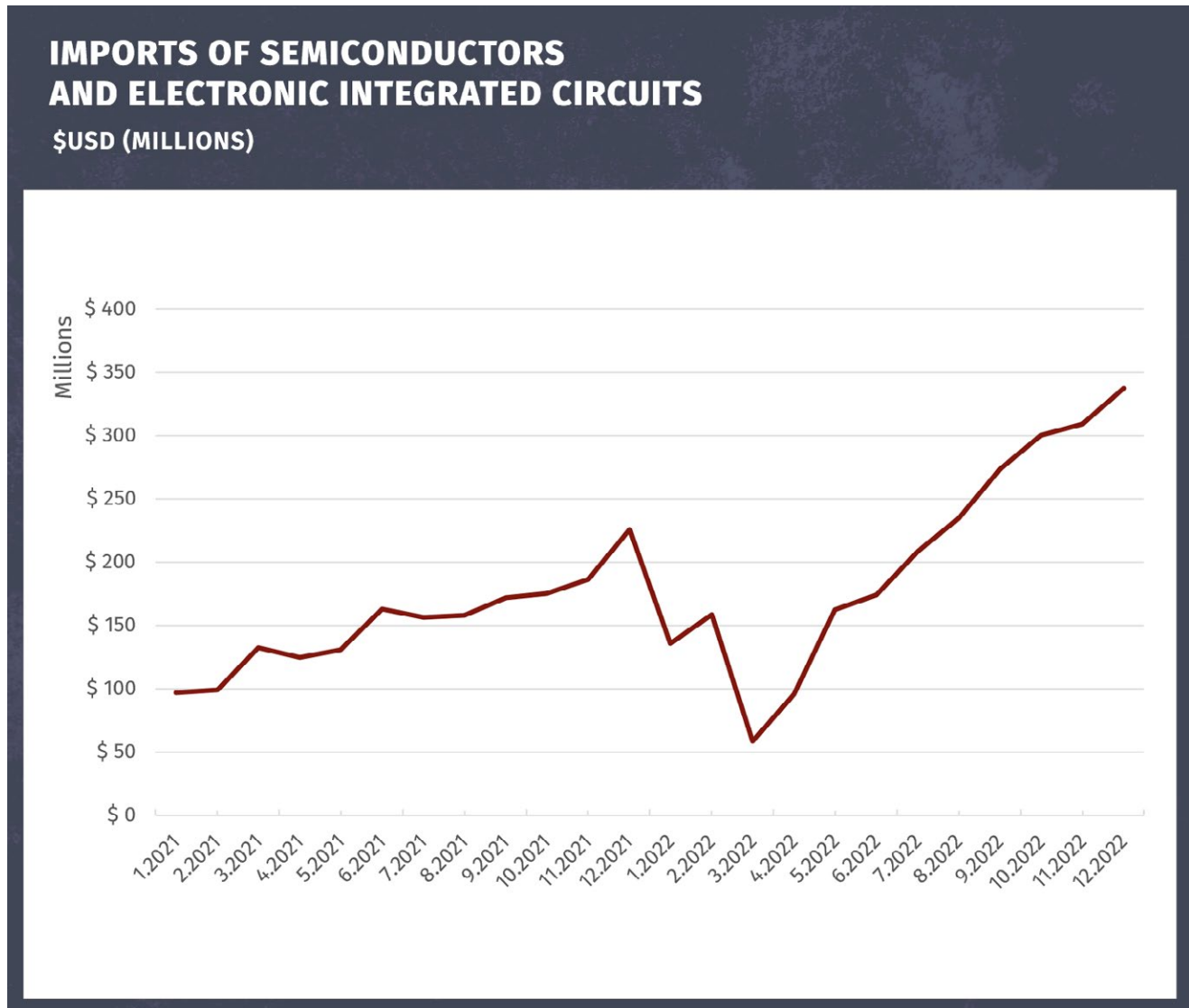
thereof and 8542, for electronic integrated circuits; parts thereof.

Sanctioned products and trade nomenclature do not always align, and the absence of specific codes that match sanctioned products has presented a challenge in this analysis (see Appendix). Nevertheless, drastic changes in the provenance and routes of goods in select categories heading to Russia in the months immediately following the invasion of Ukraine suggest possible sanction evasion schemes.

Our analysis shows an increase in value of transactions involving categories 8541 and 8542 from \$1,8 bln recorded for Jan-Sept 2021 to \$2,45 bln in Jan-Sept 2022 (Figure 17).

Even prior to Russia's full-scale invasion of Ukraine, China had been an important supplier of microchips and electronic integrated circuits to Russia. In 2022, however, as some of Russia's traditional suppliers scaled back their shipments, imports from China exploded. The value of Chinese semiconductor exports to Russia jumped from \$200 million in 2021 to well over \$500 million in 2022.

Figure 17: Imports of Semiconductors and electronic integrated circuits (monthly flows, in \$ millions)



Source: Russia Customs Data.

In September 2022 alone, the database records over 19,000 transactions with Chinese semiconductor suppliers, the goods often making their way to Russia by way of Turkey. More troublesome, the dataset records a total of 63 acquisitions of chips with likely military end uses from Chinese companies since January 2022, with a total value of \$240,417.

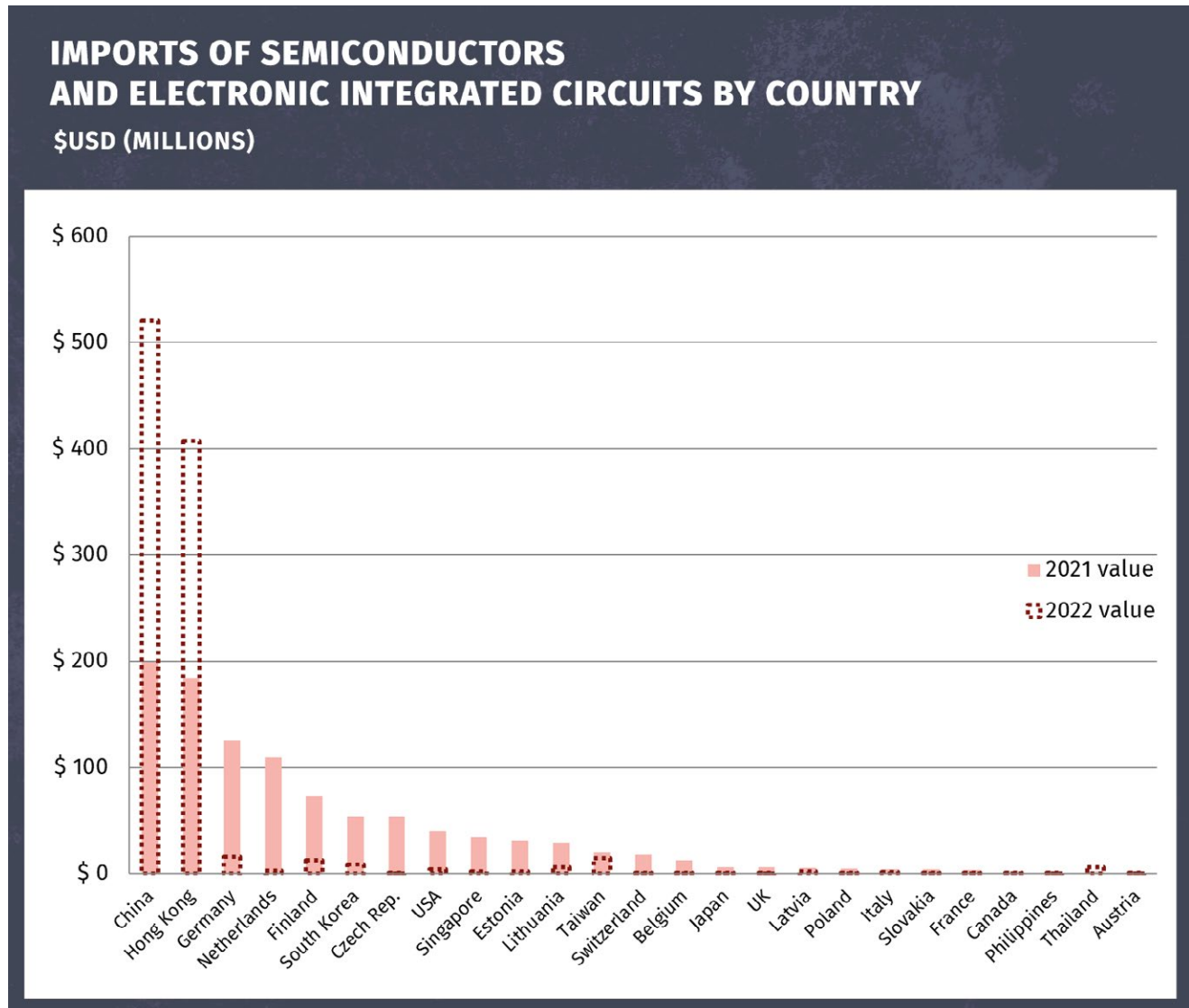
In seeking compliance from China with its sanctions regime, the US will need to cultivate a predictable policy process, well-defined concepts of what constitutes national security risk, and

private sector buy-in. Specifically, Emily Kilcrease recommends that the US strengthen enforcement of export control authorities, create new authorities to regulate out-bound investment, enhance coordination with the EU Trade and Technology Council, and work to develop a new multilateral investment and export control regime with like-minded allies.¹⁵²

In addition, Russia's reliance on semiconductor imports from Turkey, Kazakhstan, Kyrgyzstan, and, more surprisingly, Estonia grew in 2022 (Figure 19).

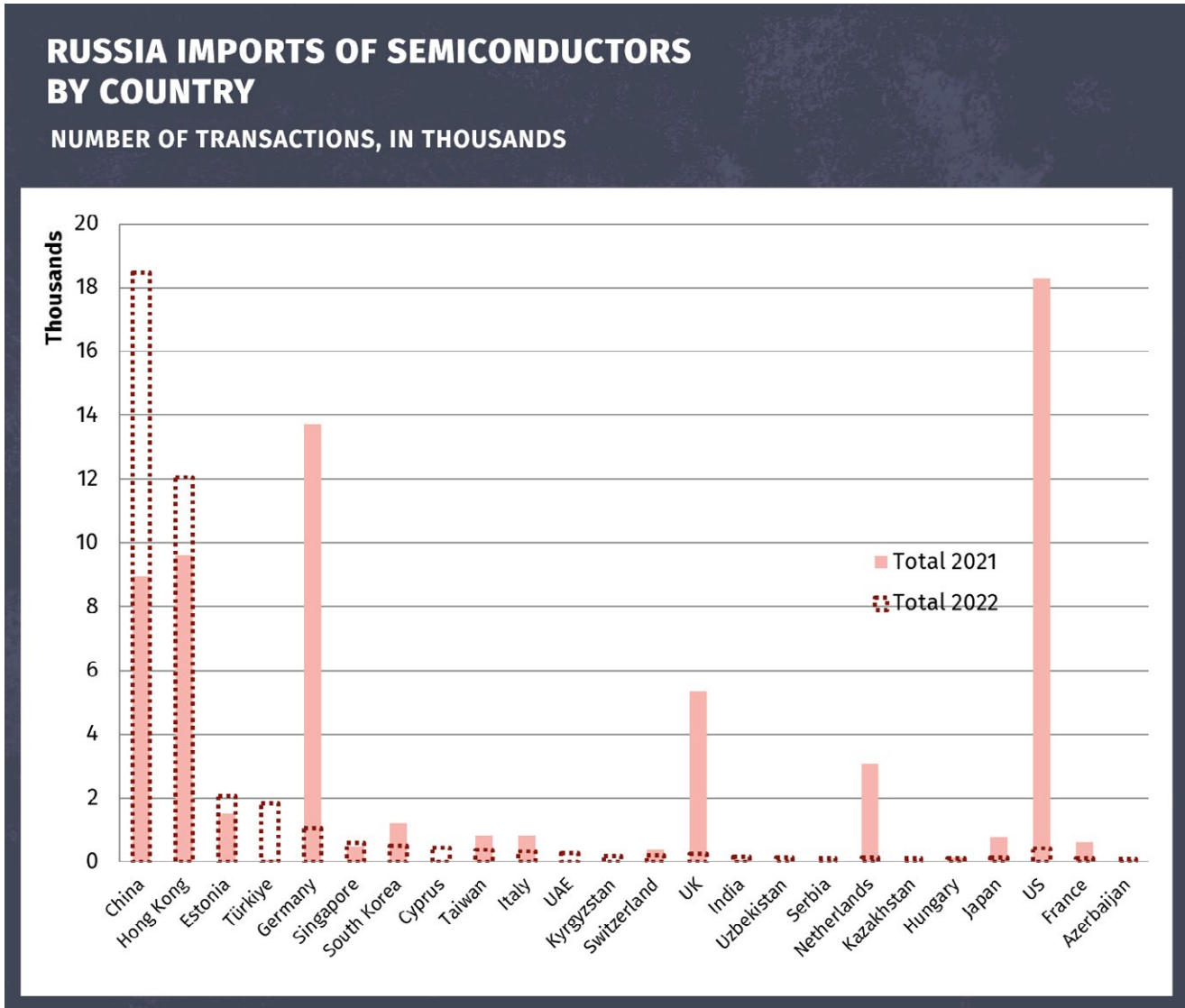
152 Emily Kilcrease, "Challenging China's Trade Practices," CNAS, April 14, 2022. <https://www.cnas.org/publications/congressional-testimony/challenging-chinas-trade-practices>.

Figure 18: Imports of Semiconductors and electronic integrated circuits by country (in \$)



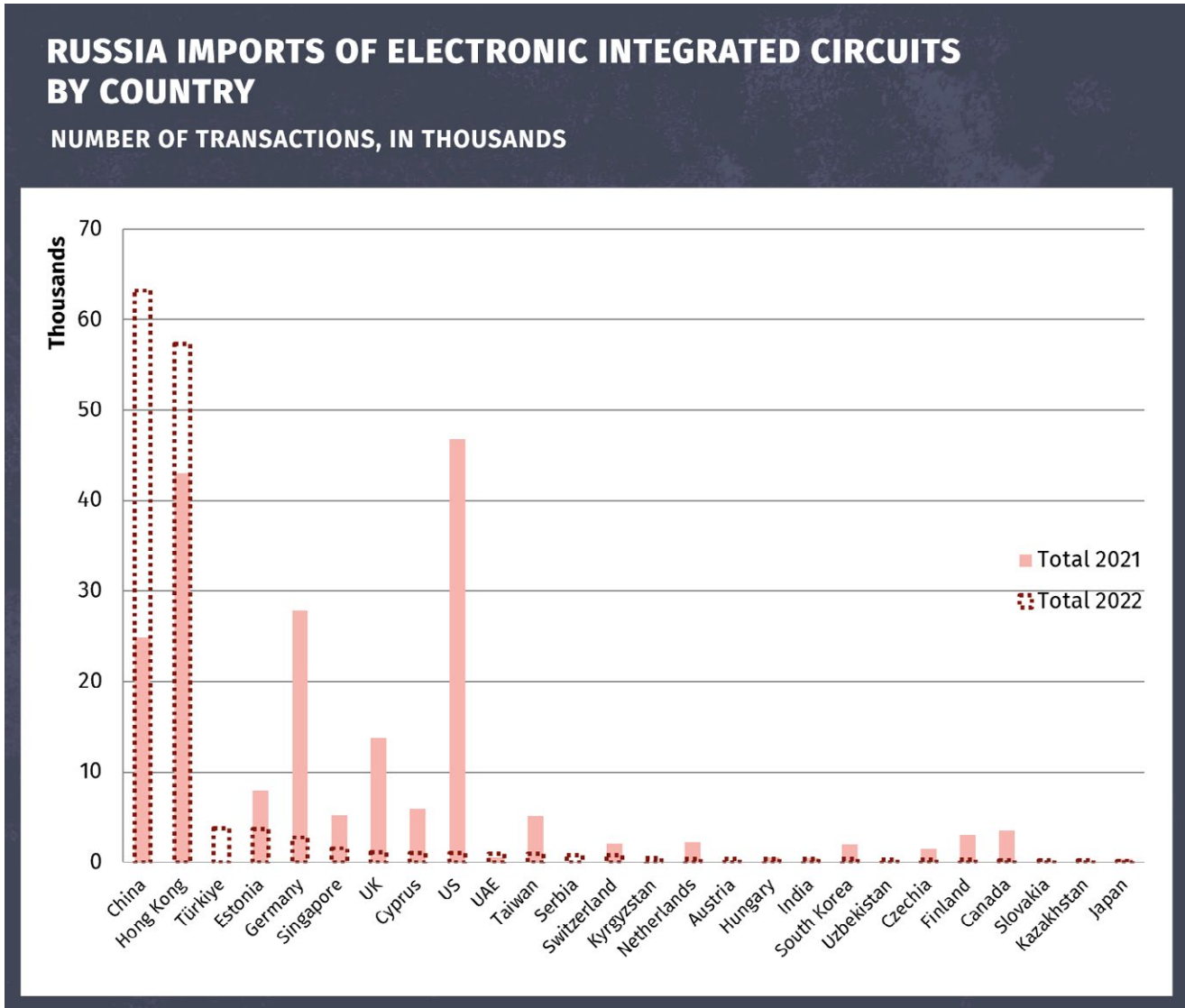
Source: Russia Customs Data.

Figure 19: Imports of semiconductors (by the number of transactions)



Source: Russia Customs Data.

Figure 20: Imports of electronic integrated circuits (by the number of transactions)



Source: Russia Customs Data.

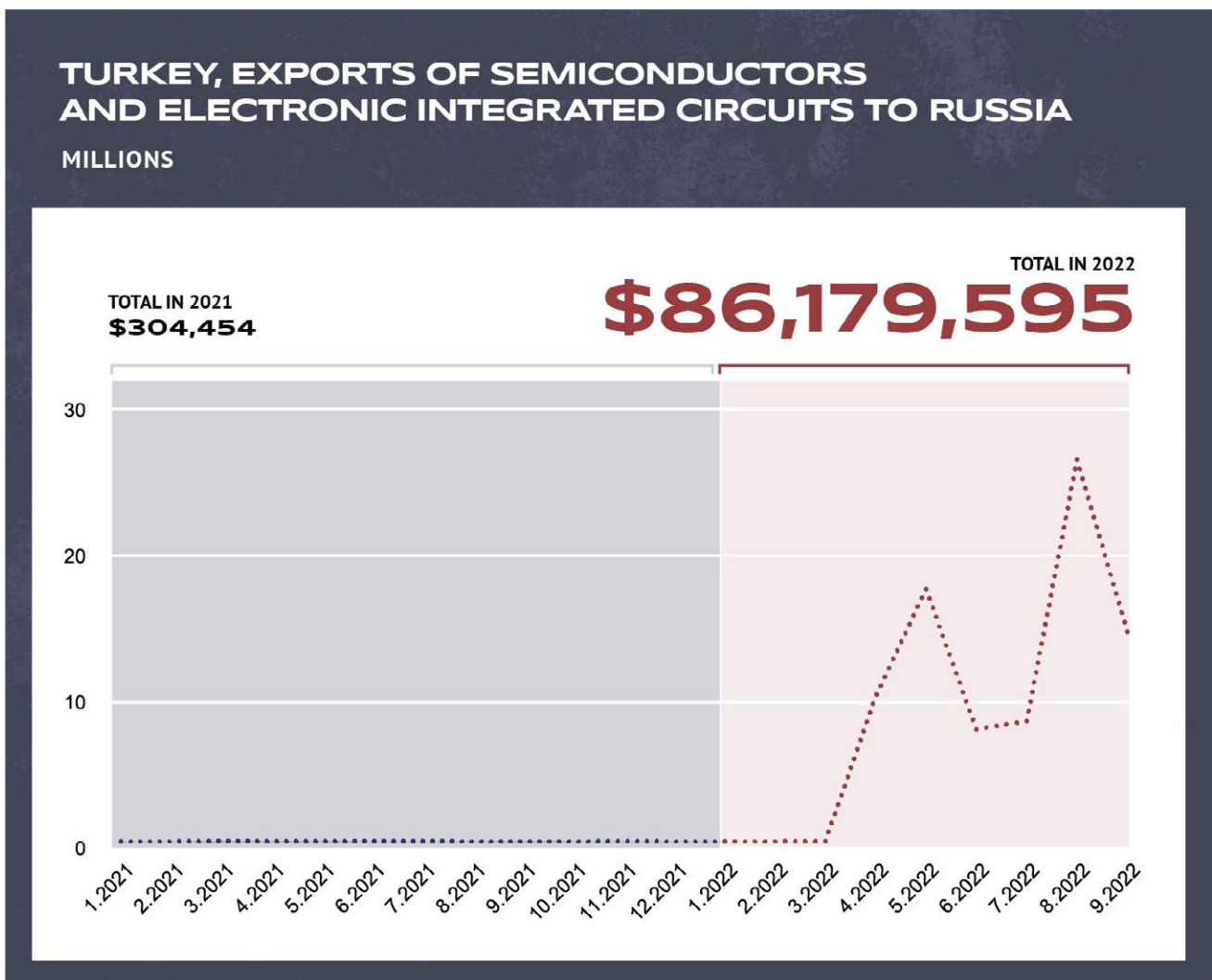
Country Case Study: Turkey

Turkey stands out as the country with one of the most significant increases in its wartime exports to Russia. From March to September 2022, Turkey's exports to Russia were up by over 30% yoy. According to the Kyiv School of Economics data, Turkey is also among the countries whose companies are the least likely to withdraw from Russia.¹⁵³

Turkey, which had not been an important source of Russia's microchip imports prior to the war,

continuously increased the exports of semiconductors and integrated circuits starting with March 2022, with two dramatic spikes in deliveries—in May and August 2022 (Figures 21 and 22). The value of such transactions as recorded by our database for the entire 2021 was \$304,454 and in the first three quarters of 2022 it ballooned into over \$86m— a staggering 28,000-fold increase.

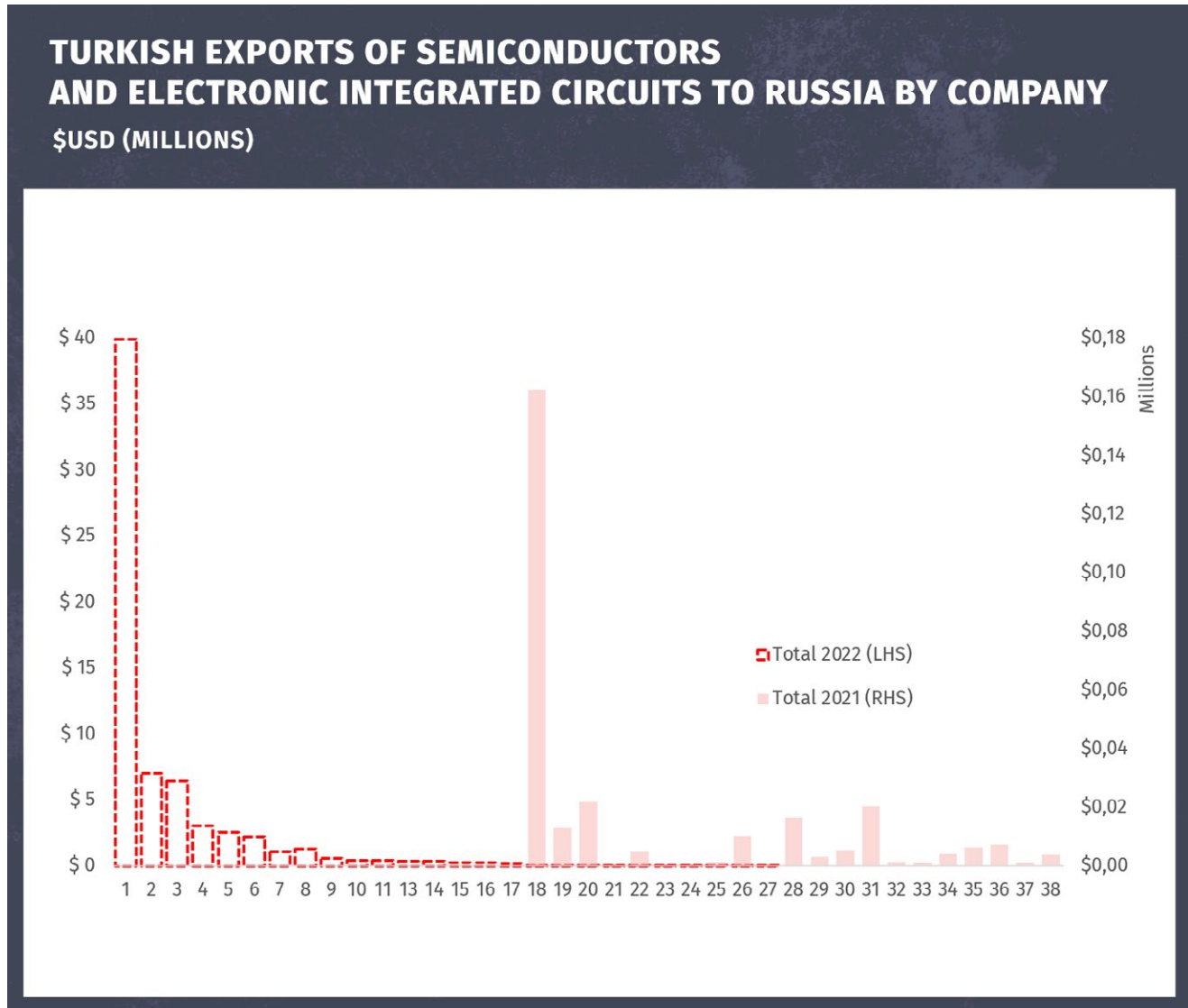
Figure 21: Turkish exports of Semiconductors and electronic integrated circuits to Russia



Source: Russia Customs Data.

153 "31st Issue of the Weekly Digest on Impact of Foreign Companies' Exit on RF Economy." KSE, November 5, 2022. https://kse.ua/wp-content/uploads/2022/12/Leave-Russia_weekly-digest_11_12_22_EN.pdf

Figure 22. Turkish exports of Semiconductors and electronic integrated circuits to Russia by company



Source: Russia Customs Data.

In 2022, Turkey has also nearly doubled its exports of heavy machinery and parts to Russia and nearly tripled exports of consumer electronics. Turkey modestly increased exports of steel products

and fruit and decreased by about a quarter its export of vehicles and automotive parts (Figure 23). Fruit, motor vehicles and parts are traditionally Turkey’s top exports to Russia¹⁵⁴.

154 OEC, Turkey and Russia Trade, <https://oec.world/en/profile/bilateral-country/tur/partner/rus>.

Figure 23: Turkey's Top 6 Export Categories to Russia 2021-2022



Policy Context. When it comes to Turkey's foreign policy, helping Russia evade Western sanctions is an intentional and very public stance; a feature, not a bug. President Recep Erdogan has repeatedly condemned Western sanctions targeting Russia,¹⁵⁵ and consistently pursued expansion of

Türkiye's economic ties with Russia despite the war in Ukraine. The flow of Russian energy, tourists and capital are helping the Erdogan's government to weather the current economic downturn and boost his domestic political ratings.^{156, 157}

155 Nicholas Danforth, How much multipolarity does a strongman need?: Why Erdogan has benefited from Russia's failure in Ukraine. War on the Rocks, September 7, 2022, <https://warontherocks.com/2022/09/how-much-multipolarity-does-a-strongman-need-why-erdogan-has-benefited-from-russias-failure-in-ukraine/>.

156 As Russia's war in Ukraine drags on, Turkey's role expands, Al Jazeera, November 15, 2022, <https://www.aljazeera.com/news/2022/11/15/how-turkey-positions-itself-during-the-war-in-ukraine>.

157 Jared Malsin, Russia and Turkey's Deepening Ties Prompt Concern in West Over Sanctions Compliance, Wall Street Journal, August 23, 2022, <https://www.wsj.com/articles/russia-and-turkeys-deepening-ties-prompt-concern-in-west-over>

Such a stance raises serious concerns regarding the erratic role that Turkey is playing in NATO's response to the Ukrainian crisis. NATO's webpage dedicated to the war in Ukraine proclaims that "NATO condemns in the strongest possible terms Russia's brutal and unprovoked war of aggression against Ukraine;" and, when describing NATO response, asserts that "NATO Allies and partners have imposed unprecedented costs on Russia, including severe sanctions that are helping starve the Kremlin's war machine of resources. Allies continue to refine the sanctions in order to increase the pressure on Moscow/.../ make it harder for Russia to rebuild its tanks, manufacture missiles and finance its war."¹⁵⁸ Turkey, clearly, is not on board with these efforts. In an odd statement, Erdogan's advisor Mesut Casin opined that "Turkey's neutrality policy over Ukraine is to the benefit of NATO."¹⁵⁹

Erdogan cherishes his position as a powerful intermediary, and boasts about his frequent interactions with both President Zelensky and Putin¹⁶⁰. He has attempted to leverage the war to advance

Turkey's economic, political and security agenda and extract concessions from allies. Throughout 2022, Erdogan threatened to block Sweden's bid to join NATO demanding a change in its position on the Kurdish YPG militia¹⁶¹. At the same time, Turkey is de-facto conducting proxy wars with Russia in Syria, as part of the Libyan civil war and in the Nagorno-Karabakh, and has supplied Ukraine with weapons, including the Bayraktar TB2 drones.¹⁶²

This balancing act by Turkey is not limited to the ongoing war in Ukraine,¹⁶³ is driven by persistent geopolitical and domestic realities, and therefore, is likely to persist into the foreseeable future. However, while one should not expect Turkey to sign on to the Western sanctions targeting Russia wholesale, exacting the enforcement and compliance with specific measures, most critical to the Western objectives, is realistic, as we can see from the suspension of Mir payment system.¹⁶⁴ This, in turn, requires tightening and prioritizing the list of sanctions objectives.

[sanctions-compliance-11661249222?mod=article_inline.](#)

158 NATO's response to Russia's invasion of Ukraine, updated December 9, 2022, accessed at https://www.nato.int/cps/en/natohq/topics_192648.htm.

159 Erdogan Works to Deepen Ties With Putin Amid Allies' Concerns, October 7, 2022, Voice of America, <https://www.voanews.com/a/erdogan-works-to-deepen-ties-with-putin-amid-allies-concerns/6780312.html>.

160 Iliya Kusa, From Ally to Mediator: How Russia's Invasion Has Changed Ukraine-Turkey Relations, Carnegie Politika, October 7, 2022, <https://carnegieendowment.org/politika/88097>.

161 Sweden to distance itself from Kurdish groups in bid to join NATO, Reuters, November 5, 2022, <https://www.reuters.com/world/europe/sweden-distance-itself-kurdish-groups-bid-join-nato-swedish-radio-2022-11-05/>.

162 Ukraine War Gives Turkey's Erdogan Opportunity to Extend His Influence, Wall Street Journal, November 5, 2022 <https://www.wsj.com/articles/ukraine-war-gives-turkeys-erdogan-opportunity-to-extend-his-influence-11667640601>.

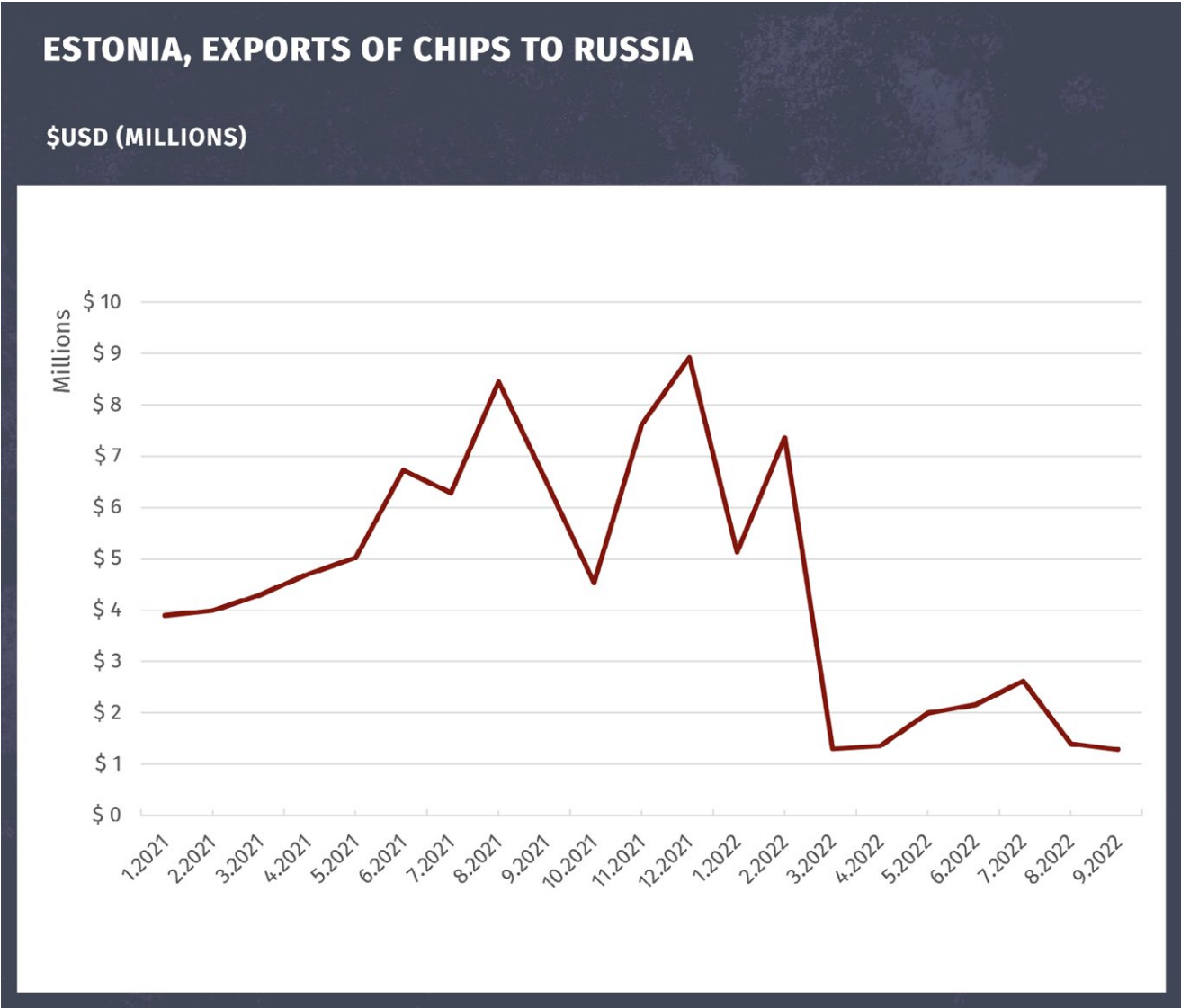
163 US Sanctions Friend of Turkish President for Helping Iran Evade Sanctions, Foundation for Defense of Democracies, published on December 16, 2022, accessed at <https://www.fdd.org/analysis/2022/12/16/us-sanctions-friend-of-turkish-president-for-helping-iran-evade-sanctions/>.

164 Asli Kandemir, Turkey's Isbank Suspends Use of Russian Mir Cards After US Warning, Bloomberg, September 19, 2022, <https://www.bloomberg.com/news/articles/2022-09-19/turkey-s-iskbank-stops-using-russian-mir-cards-after-us-warning?leadSource=verify%20wall>.

Country Case Study: Estonia

In 2021, Estonia was the source of only about 1% of total Russia’s imports and there was a nearly- 50% yoy decrease in its exports to Russia in dollar value between March-September 2022 (as compared to the respective three quarters of the previous year, Figure 24).

Figure 24: Estonia, exports of chips to Russia, millions of US\$



However, the country has been featured in a number of recent investigations¹⁶⁵ as well as in several announcements by the U.S. Treasury in connection to sanctions evasion networks and Russian technology companies enabling Putin's War.¹⁶⁶

Our analysis of the customs data shows that in 2022, Estonia grew in importance as a source of semiconductors and electronic integrated circuits imported to Russia, placing #4 by number of transactions behind China, Hong Kong and Turkey (Figures 18 and 19).

Examining the data at the company level, we have noticed that all but one of entities that had supplied Russia with chips prior to the start of the war via Estonia, stopped using this route by April 2022.

The companies actively trafficking electronics to Russia via Estonia seem to be primarily obtaining these goods from China and India. A search on Google for many of these companies shows information on offices located in India and China. It is not possible to determine their status and registration in Estonia from our data, but Estonian addresses associated

with these companies can be vetted by Estonian and EU authorities responsible for enforcing sanctions.

Around the same time, however, a number of new companies popped up (Figure 25). The top company in Figure 25 (where axis X features individual companies) was mentioned by the recent Reuters investigation.¹⁶⁷ One can hypothesize that this reflects a logical response of law-obedient companies that terminated exports of sanctioned goods, while illicit groups have responded to a new gap between supply and demand by launching new operations. Conversely, this may be featuring the same exact groups that have "rebranded" and continued the same operations under different registrations.

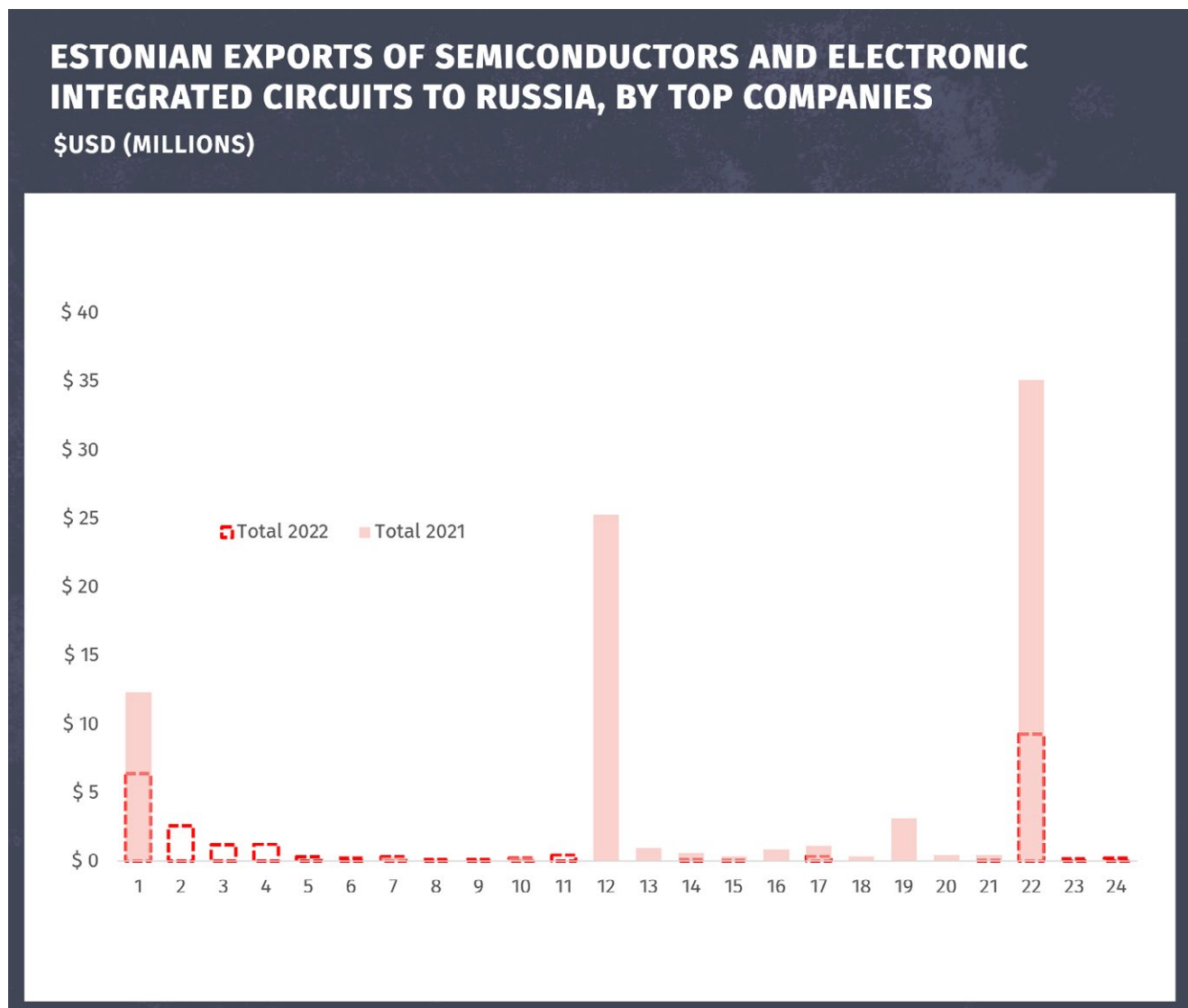
Another explanation could be that some companies have continued the trade, but altered their supply routes. For example, we have established that Company 12 in Figure 25, that in 2021 was the second most prolific supplier of semiconductors and integrated electronic circuits to Russia via Estonia, now appears to have moved to trade via Turkey (company number 5 in Figure 22).

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167 Steve Stecklow, David Gauthier-Villars, and Maurice Tamman. "The Supply Chain That Keeps Tech Flowing to Russia." Reuters. Reuters, December 13, 2022. <https://www.reuters.com/investigates/special-report/ukraine-crisis-russia-tech-middlemen/>.

Figure 25: Estonian exports of semiconductors and electronic integrated circuits to Russia, by top companies



Policy Context. Estonia's position is unequivocally and firmly supportive of Western sanctions targeting Russia—both, at the level of the government policy and as a reflection of widely held societal attitude toward Russia. In 2022 alone, Estonia provided Ukraine with military aid equivalent to 30% of its defense budget¹⁶⁸, received over 100,000 Ukrainian refugees¹⁶⁹ (with about 42,000 of them applying for temporary protection status), and has consistently advocated for harsher sanctions against Russia^{170, 171}. This stance comes at a heavy economic cost and significant security risk, since Estonia shares a 200-mile border with Russia, has a sizable ethnic Russian population (90,000 of whom hold Russian citizenship and tens of thousands do not have Estonian citizenship), and despite its NATO membership, has received numerous overt threats from Putin's government.

Nevertheless, as our analysis has demonstrated, Estonia has spiked in its importance as a key route for Russia's imports, including sanctioned goods such as microchips (becoming #3 most important route for their imports for Russia, after China and Turkey).

At least some sanctions circumvention schemes involving Estonia have been directed by the Russian government. Since the early 1990's, Russian

intelligence (including the SVR, GRU and FSB) has been aggressively recruiting insiders through bribes and blackmail in the Estonian banking sector, customs, military and intelligence^{172, 173, 174}.

In the most recent case, publicized on December 2022, the US Department of Justice indicted 7 Russians (one with a US citizenship and one with an US green card). The defendants, under the direction of Russian intelligence services, sought to acquire advanced electronics and sophisticated testing equipment for Russia's military sector. Relying on a network of shell companies and bank accounts worldwide, including in the US, the defendants created a scheme to acquire sensitive items in the US, including dual-use electronics, military-grade tactical ammunition and other export-controlled items, ship them to Estonia and then smuggle them to Russia.

In the immediate term, beefing up Estonian customs and border control at its three border crossings into Russia will increase the interdiction of sanctioned goods and deter new attempts at circumvention.

While the EU criminalized sanctions evasion in November 2022,¹⁷⁵ it has left the enforcement up to the individual member states¹⁷⁶. Since within

168 Maria Sahuquillo, Estonia's Defense Minister: 'The border separating Russia from Estonia and other countries is the border of civilization', El Pais, November 17, 2022, accessed at <https://english.elpais.com/international/2022-11-17/estonias-defense-minister-the-border-separating-russia-from-estonia-and-other-countries-is-the-border-of-civilization.html>.

169 Over 115,000 Ukrainian refugees entered Estonia since February, ERR News, November 17, 2022, <https://news.err.ee/1608792319/over-115-000-ukrainian-refugees-entered-estonia-since-february>.

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the context of Putin’s war on Ukraine, sanctions have emerged as a strategically important policy instrument aimed at stopping aggression, the EU and the US may consider providing financial and advisory support to critical states such as Estonia. In the near-term, the US and the EU authorities may also provide training to customs employees of key border countries to improve the detection and interdiction of priority categories of sanctioned goods — such as semiconductors and UAV parts. From our review of recent investigations, discussions with Estonian officials, and attempts to match the goods recorded in the database with export control designations, it is apparent that distinguishing between sanctioned and legitimately exported goods poses significant difficulties to even the most vigilant and earnest customs officers.

Most uncovered Estonian cases of espionage,

smuggling and corruption do feature insiders as enablers. Insiders can be Estonian citizens, dual nationals (Estonian and Russian, for example), or persons with no citizenship in Estonia. A major source of vulnerability is Estonia’s e-residency program that in a few minutes provides a status enabling virtually anyone to “start an EU-based company and manage business from anywhere, entirely online”.¹⁷⁷ Criminal background checks for applicants have only been introduced in 2020, and the capacity of the Estonian government to conduct proper vetting raises serious questions.¹⁷⁸

The Estonian government may need to revisit the efficacy of the program within the current context of the existential threat posed by Russian military aggression. A moratorium and an overhaul of e-residency program are likely required to close off this avenue for illicit activities.

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Conclusions and Recommendations

Our analysis shows that the US sanctions have been effective in reducing its trade with Russia. Russia's exports to the US had fallen by nearly 65% March to September 2022 compared to the corresponding period of 2021 and US exports to Russia declined by about 77% yoy.

Examining the various sanctions, we find that continued reduction of price caps on Russian energy exports holds the biggest potential for decisively reducing the Kremlin's access to resources it needs to continue military aggression in Ukraine.

US sanctions designating specific Russian companies have resulted in a significant decline in the monetary value of their global transactions, but did not completely eliminate them.

Coordinated US-EU sanctions resulted in a 30% contraction of Russia's total imports, with recovery expected throughout 2023. However, Russia's total exports increased in 2022 due to European reliance on its oil and gas. Therefore, despite sanctions, in 2022, Russia hit a \$227 billion account surplus, highest in history and double that of 2021. Thusly, Russia has retained its access to vast amounts of foreign exchange—key to its ability to continue its war on Ukraine.

The wartime sanctions regime, closely coordinated by the US and EU, was able to temporarily disrupt the Kremlin's direct access to western technology. However, Russia has since managed to establish alternative import routes, with imports of select dual use and controlled commodities now exceeding pre-war levels. Countries that should be closely examined for their role in facilitating circumvention of wartime sanctions by Russia include: China, Turkey, Cyprus, UAE, Belarus, Kazakhstan and Uzbekistan.

Sanctions have not stopped Russia's import of UAV/parts and microprocessors/semiconductors. Moreover, Russia's imports of microprocessors/semiconductors increased by over 34% in 2022. China, Hong Kong, Germany, the Netherlands and Finland led by dollar value of microchip sales to Russia; China, Hong Kong, Estonia, Turkey and Germany led by the number of transactions.

The tasks of assessing effectiveness of sanctions against established objectives, coordination of policy with partners, detection of evasion schemes and enforcement of sanctions—can all be greatly facilitated by an increased availability and standardization of economic and financial data at macro- and micro-levels. This includes trade and financial data by Russia's trade partners; select and/or aggregated data on BIS electronic export information and licenses granted to Russian entities. As Putin's regime is classifying a growing array of economic data, the US and partners may consider establishing an alternative official source for gaging the state of Russia's economy.

Some sanctions evasion routes emerge as a reflection of a deliberate government policy. While wholesale adoption of the international sanctions regime targeting Russia by such states is highly unlikely, it is realistic to improve compliance on a limited list of priority sanctions. Existing multilateral venues, such as EU and NATO should be leveraged to seek policy alignment on at least a few priority sanctions with non-compliant member states.

Compliance by competitor-states and non-aligned states can be incentivized through public enforcement of secondary financial sanctions against largest violators of priority sanctions, stronger export control enforcement, new regulations on out-bound investment, and improved coordination with the EU Trade and Technology Council.

Some states have been used as evasion routes by Russia despite their whole-of-society support of the sanctions policy. Providing additional financial resources, training, advisory support and expansion of intelligence-sharing with these states can reduce the illicit flow of sanctioned goods into Russia during war. Such efforts can be established at the EU, NATO or as bilateral initiatives with the US.

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Appendix

In this appendix we describe the process of matching export controls to the U.S. export codes and international trade codes.

This research focuses on the following categories of goods: UAVs, parts of UAVs, semiconductors, and electronic integrated circuits. These items are subject to different export and import regulations and can be identified according to several customs classification systems:

1. Harmonized System (HS) Code.¹⁷⁹ HS is a multipurpose international product classification system developed by the World Customs Organization. The first two digits of the code indicate the product category. The next four to six digits indicate the subcategories the product fits into. Codes can differ from one country to another in their ending digits.
2. TN VED EAEU (TN VED), the Eurasian Economic Union's Combined Nomenclature of Foreign Economic Activity includes the codes used in Russia, Kazakhstan, Belarus, Armenia, and Kyrgyzstan.¹⁸⁰
3. Harmonized Tariff Schedule (HTS). HTS codes are product classification codes between 8-10 digits and are administered by the U.S. International Trade Commission.¹⁸¹

4. Export Control Classification Number (ECCN). ECCN is an alphanumeric identifier the U.S. Department of Commerce uses to categorize items subject to export control restrictions in the Commerce Control List (CCL).¹⁸²

Matching export controls to the U.S. export codes (ECCNs) and international trade codes (HS, HTS, TN VED) can be very complex and requires collaboration between the export compliance and engineering experts.

While HS, HTS, and TN VED codes can differ, the core classification idea is set in the first 6 digits of the code, which determines the product type, industry, destination, etc. The ending digits of HS, HTS, and TN VED codes can differ to provide additional, and at times not matching, classification.

ECCNs are considered independent from HS, HTS, and TN VED codes. While HS codes determine the duties and taxes associated with that product, ECCNs dictate what licensing is required. Numerous factors influence the ECCN number and licensing requirements of a particular product. One HS code may have several ECCNs and vice versa.

This means that the alignment of HS, HTS, and TN VED codes between each other and with ECCNs requires the identification of exported/imported items according to their most universally recognized characteristics.

179 On Harmonized System Codes <https://www.trade.gov/harmonized-system-hs-codes>.

180 On TN VED Codes <https://customs.gov.ru/uchastnikam-ved/spravochnaya-informacziya/tovarnaya-nomenklatura>.

181 On HTS <https://ustr.gov/callout/us-harmonized-tariff-schedule-hts>.

182 On ECCN <https://www.bis.doc.gov/index.php/licensing/commerce-control-list-classification/export-control-classification-number-eccn>.

| HS Code | HS Description ¹⁸³ | TN VED code | TN-VED Description ¹⁸⁴ |
|---------|---|-------------|--|
| 8806 | Unmanned aircraft | 8806 | Беспилотные летательные аппараты |
| 8807 | Parts of aircraft and spacecraft of heading 8801, 8802 or 8806, n.e.s. | 8807 | Части летательных аппаратов товарной позиции 8801, 8802 или 8806 |
| 8541 | Semiconductor devices "e.g. diodes, transistors, semiconductor-based transducers"; photosensitive semiconductor devices, incl. photovoltaic cells whether or not assembled in modules or made up into panels (excl. photovoltaic generators); light emitting diodes "LED", whether or not assembled with other light-emitting diodes "LED"; mounted piezoelectric crystals; parts thereof | 8541 | Приборы полупроводниковые (например, диоды, транзисторы, преобразователи на основе полупроводников); фоточувствительные полупроводниковые приборы, включая фотогальванические элементы, собранные или не собранные в модули, вмонтированные или не вмонтированные в панели; светодиоды (LED), собранные или не собранные с другими светодиодами (LED); пьезоэлектрические кристаллы в сборе/[по 31.12.21] Диоды, транзисторы и аналогичные полупроводниковые приборы; фоточувствительные полупроводниковые приборы, включая фотогальванические элементы, собранные или не собранные в модули, вмонтированные или не вмонтированные в панели; светоизлучающие диоды (LED); пьезоэлектрические кристаллы в сборе |
| 8542 | Electronic integrated circuits; parts thereof | 8542 | Схемы электронные интегральные |

These categories of goods are subject to several BIS export license requirements relating to Russia and Belarus.

183 HS descriptions from <https://www.tariffnumber.com/2022>.

184 TN VED descriptions from <https://www.alt.ru/tved/>.

Export License Requirements Related to Semiconductor Devices and Electronic Integrated Circuits

Semiconductor devices and electronic integrated circuits may trigger a licensing requirement when they are exported, reexported, or transferred (in-country) to or within Russia according to one or several of the following regulations:

1) Export Administration Regulations Against Russia

On February 24, 2022, the BIS issued a final rule, effective immediately, that implemented a series of export control measures under the Export Administration Regulations (“EAR”) against Russia.¹⁸⁵

The principal changes to the EAR implemented by the Final Rule include:

License requirement for items in Commerce Control List (“CCL”) Categories 3-9;

Exports, reexports, and transfers (in-country) of all items subject to the EAR and classified in CCL Categories 3-9 now require a license to Russia (excluding deemed exports and reexports), subject to limited license exceptions and a licensing policy of denial (except in limited cases). CCL Categories 3-9 include many items that did not previously require a

license to Russia, such as telecommunications items and low-level encryption items.¹⁸⁶

Foreign-Direct Product (“FDP”) Rules for Russia

The FDP rules impose an EAR licensing requirement for reexports, export from abroad, or transfers of foreign-produced items not designated as EAR99 that are:

- the direct product of U.S.-origin technology or software subject to the EAR specified in any ECCN in product groups D (Software) and E (Technology) in CCL Categories 3-9; or
- produced by any plant or major component of a plant that itself is the direct product of U.S.-origin technology or software subject to the EAR specified in any ECCN in product groups D and E in CCL Categories 3-9.¹⁸⁷

The license requirement applies if there is “knowledge” that:

- the foreign-produced item is destined to Russia or will be incorporated into or used in the production or development of any part, component, or equipment not designated as EAR99 and produced in or destined to Russia;¹⁸⁸
- the foreign-produced item will be incorporated into, or used in the production or development

185 “Implementation of Sanctions Against Russia Under the Export Administration Regulations.” *Department of Commerce*. <https://public-inspection.federalregister.gov/2022-04300.pdf>.

186 Ibid.

187 Ibid.

188 “Implementation of Sanctions Against Russia Under the Export Administration Regulations.” *Department of Commerce*. <https://public-inspection.federalregister.gov/2022-04300.pdf>.

of any part, component, or equipment produced, purchased, or ordered by any entity with a footnote 3 designation in the Entity List (i.e., Russian military end-users, MEUs) or any entity with a footnote 3 designation is a party to any transaction involving the foreign-produced item, e.g., as a purchaser, intermediate consignee, ultimate consignee, or end-user.¹⁸⁹

The Russia FDP rule does not apply to foreign-produced items that would be designated as EAR99 (items that are subject to the EAR but not specifically described by an ECCN on the CCL). However, in some circumstances, the new controls apply even to EAR99 items subject to the EAR, such as with Entity List parties and transactions subject to one of the new foreign-direct product rules. Parties exporting EAR99 items subject to the EAR may also need to consider screening for military end users/end uses in Russia, given the Final Rule's expansion of the military end user/end use provisions of the EAR.¹⁹⁰

As such, semiconductor devices and integrated circuits can trigger a licensing requirement even if they are designated as EAR99.

Whether or not the authorization is required to export is determined by the following criteria in the transaction: 1) what is the ECCN of the item; 2) where it is going; 3) who is the end-user, and 4) what is the end use. Most controls of 'Semiconductor devices' and 'Electronic integrated circuits' are found in the following ECCNs of Category 3 of the CCL in the EAR but are not limited to 3A001, 3A101, 3A201, 3A991, 3B001, 3B090, 3B991.

2) Sector-Specific Items listed in Supplement no. 4 to Part 746 of the EAR

In response to the Russian Federation's (Russia's) ongoing aggression against Ukraine, the Department of Commerce expanded the scope of the Russian industry sector sanctions to add lower-level items potentially useful for Russia's chemical and biological weapons production capabilities and items needed for advanced production and development capabilities to enable advanced manufacturing across a number of industries.¹⁹¹

Under the Russian industry sector sanctions, all items identified in Supplement No. 4 to EAR Part 746 ("Supplement No. 4") that are subject to the EAR would trigger a licensing requirement when they are exported, reexported, or transferred (in-country) to or within Russia. License applications for items subject to these sanctions are reviewed under a policy of denial except when they are for items that may be necessary for health and safety reasons, which are reviewed under a case-by-case license review policy.

The Items listed in Supplement No. 4 are identified by Schedule B number, Schedule B description, Harmonized Tariff Schedule (HTS) code, and HTS description. The license requirement is based upon the HTS description.

On September 15, 2022, the BIS issued a Final Rule, which added 57 additional items to the existing Supplement No. 4, including a variety of industrial machinery and equipment, for purposes of further undermining the Russian industrial base.¹⁹²

189 "Implementation of Additional Sanctions Against Russia and Belarus Under the Export Administration Regulations (EAR) and Refinements to Existing Controls." *Department of Commerce*, September 15, 2022. <https://www.federalregister.gov/documents/2022/09/16/2022-19910/implementation-of-additional-sanctions-against-russia-and-belarus-under-the-export-administration>.

190 Ibid.

191 Ibid.

192 "Implementation of Additional Sanctions Against Russia and Belarus Under the Export Administration Regulations (EAR) and Refinements to Existing Controls." *Department of Commerce*, September 15, 2022. <https://www.federalregister.gov>.

The list of the additional items covered under the expanded controls includes several categories of 'Semiconductor devices' with the HTS codes 854110, 854151, 854159, 854160, 854190, and 'Electronic integrated circuits' with the HTS codes 854231, 854232, 854233, 854239, 854290.

Table 1: Semiconductor devices ¹⁹³

| Schedule B | Schedule B Description | HTS Code | HTS Description |
|------------|---|----------|--|
| 8541100040 | Unmounted Chips Dice Wafers For Diodes Other Than Photosensitive Or Light-Emitting Diodes | 854110 | Diodes, Other Than Photosensitive Or Light-Emitting Diodes |
| 8541100050 | Zener Diodes | 854110 | Diodes, Other Than Photosensitive Or Light-Emitting Diodes |
| 8541100060 | Microwave Diodes | 854110 | Diodes, Other Than Photosensitive Or Light-Emitting Diodes |
| 8541100070 | Diodes Other Than Photosensitive Or Led With A Maximum Current Of 05 A Or Less | 854110 | Diodes, Other Than Photosensitive Or Light-Emitting Diodes |
| 8541100080 | Diodes Other Than Photosensitive Or Led With A Current Greater Than 05 | 854110 | Diodes, Other Than Photosensitive Or Light-Emitting Diodes |
| 8541510000 | Semiconductor Based Transducers | 854151 | Semiconductor Based Transducers |
| 8541590040 | Unmounted Chips Dice Wafers For Semiconductor Devices Nesoi | 854159 | Semiconductor Devices, Nesoi |
| 8541590080 | Semiconductor Devices Nesoi | 854159 | Semiconductor Devices, Nesoi |
| 8541600025 | Mounted Piezoelectric Crystals Quartz Designed For Operating Frequencies Not Exceeding 20 Mhz | 854160 | Mounted Piezoelectric Crystals |

[gov/documents/2022/09/16/2022-19910/implementation-of-additional-sanctions-against-russia-and-belarus-under-the-export-administration#p-amd-37](https://www.federalregister.gov/documents/2022/09/16/2022-19910/implementation-of-additional-sanctions-against-russia-and-belarus-under-the-export-administration#p-amd-37).

193 Sources: Data from Implementation of Additional Sanctions Against Russia and Belarus Under the Export Administration Regulations (EAR) and Refinements to Existing Controls, *Department of Commerce*, September 15, 2022.

<https://www.federalregister.gov/documents/2022/09/16/2022-19910/implementation-of-additional-sanctions-against-russia-and-belarus-under-the-export-administration#p-amd-37>.

| | | | |
|------------|---|--------|--|
| 8541600060 | Mounted Piezoelectric Crystals Quartz Designed For Operating Frequencies Exceeding 20 Mhz | 854160 | Mounted Piezoelectric Crystals |
| 8541600080 | Mounted Piezoelectric Crystals Except Quartz | 854160 | Mounted Piezoelectric Crystals |
| 8541900000 | Diode Transistor Similar Semiconductor Device Parts | 854190 | Parts For Diodes, Transistors And Similar Semiconductor Devices; Parts For Photosensitive Semiconductor Devices And Mounted Piezoelectric Crystals |

Table 2: Electronic integrated circuits ¹⁹⁴

| Schedule B | Schedule B Description | HTS Code | HTS Description |
|------------|---|----------|--|
| 8542310000 | Electronic Integrated Circuits Processors Controllers Whnot Combined Wmemories Converters Logic Circuits Amplifiers Clock Etc | 854231 | Processors And Controllers, Electronic Integrated Circuits |
| 8542320015 | Electric Integrated Circuits Memory Dynamic Readwrite Random Access Not Over 1 Gigabit | 854232 | Memories, Electronic Integrated Circuits |
| 8542320023 | Electronic Integrated Circuits Memory Dynamic Readwrite Random Access Dram Over 1 Gigabit | 854232 | Memories, Electronic Integrated Circuits |
| 8542320040 | Electric Integrated Circuits Memory Static Readwrite Random Access Sram | 854232 | Memories, Electronic Integrated Circuits |
| 8542320050 | Electronic Integrated Circuits Electrically Erasable Programmable Readonly Memory Eeprom | 854232 | Memories, Electronic Integrated Circuits |

¹⁹⁴ Sources: Data from Implementation of Additional Sanctions Against Russia and Belarus Under the Export Administration Regulations (EAR) and Refinements to Existing Controls, *Department of Commerce*, September 15, 2022, available at <https://www.federalregister.gov/documents/2022/09/16/2022-19910/implementation-of-additional-sanctions-against-russia-and-belarus-under-the-export-administration#p-amd-37>.

| | | | |
|------------|--|--------|--|
| 8542320060 | Electric Integrated Circuiterasable Except Electrically Programmable Readonly Memory Eprom | 854232 | Memories, Electronic Integrated Circuits |
| 8542320070 | Electronic Integrated Circuits Memory Nesoi | 854232 | Memories, Electronic Integrated Circuits |
| 8542330000 | Electronic Integrated Circuits Amplifiers | 854233 | Amplifiers, Electronic Integrated Circuits |
| 8542390000 | Electronic Integrated Circuits Nesoi | 854239 | Electronic Integrated Circuits, Nesoi |
| 8542900000 | Electronic Integrated Circuits And Microassembly Parts | 854290 | Parts For Electronic Integrated Circuits And Microassemblies |

BIS Export License Requirements Related to UAVS. This analysis focuses on UAVs (HS code 8806) and parts of UAVs (HS code 8807). Most UAVs are subject to some form of export control under either the Export Administration Regulations (EAR) governed by the Department of Commerce or the International Traffic in Arms Regulations (ITAR) governed by the Department of State.¹⁹⁵ UAVs specifically designed for defense purposes will usually be controlled under the ITAR. UAVs that are civil by design intent but with capabilities that could inherently be useful for defense purposes will generally be controlled under the EAR.¹⁹⁶

¹⁹⁵ "Change to the License Review Policy for Unmanned Aerial Systems (UAS) To Reflect Revised United States UAS Export Policy ." Gov Info. Department of Commerce , January 12, 2021. <https://www.govinfo.gov/>.

¹⁹⁶ Ibid.

Analysis Team

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