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MAKING MOSCOW PAY

HOW MUCH EXTRA BITE WILL G7 & EU TRADE SANCTIONS HAVE?

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Following the revocation of MFN treatment of Russian goods, the members of the G7 and European Union (EU27) can raise import tariffs sharply. We outline three trade sanction scenarios in this computation-based brief and report their predicted effects on Russian GDP, on bilateral exports, and on Russian job losses. Once the Russian economy has adjusted, the most severe trade sanction scenario is expected to result in a permanent GDP reduction of 1.06%, in bilateral Russian exports to the G7 and EU27 nations falling by 70.9%, and in 522,000 job losses from the Russian energy sector. Losses on this scale for Russia amount to a third of the estimated GDP gain from its WTO accession. The same scenario is estimated to result in 206,000 job losses in the G7 and EU27 and to reduce their joint GDP by 0.06% permanently.

Following its invasion of Ukraine, the most severe financial sanctions on a G20 member were applied to Russia. That is not all. On 2 March 2022 Canada withdrew MFN tariff treatment on goods imported from Russia for a period of 180 days, imposing tariffs of 35% on virtually all imports.[4] Today, the G7 nations combined forces with the European Union (EU27) to revoke MFN tariff treatment on Russian exports. The purpose of this note is to present estimates of the likely GDP, trade, and job losses faced by Russia under alternative trade sanctions scenarios.[5]

[1] This is the first computational briefing note that our organisations have joined forces to prepare.
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[4] Ukraine has also introduced an economic blockage of Russia, effectively revoking MFN status on the Russian exports.
[5] Some governments are taking action against imports of oil and gas from Russia. The United Kingdom announced on 8 March 2022 that it will phase out its imports of Russian oil and gas during 2022. This followed the announcement of a complete United States ban on oil and gas purchases from Russia (see U.S. Executive Order.).

Revocation of MFN treatment allows a government to raise taxes on imports from Russia, potentially significantly. Such moves cause short term disruption—not least because of European dependence on Russian oil and gas—and reallocate resources in the sanctioning nations as well as in Russia. In turn, trade restrictions reduce national incomes and, given their cost for the G7 and EU 27, it is crucial to assess how much bite sanctions against Russian exports have on the Russian economy.

Beyond the immediate macroeconomic impact of sanctions on Russia, geopolitically-motivated trade sanctions can last for years. We therefore study the likely medium- to longer-term economic impact. Established models of international trade flows are well placed to answer this question and we deploy a cutting-edge model of the world trading system that incorporates 170 industries, including critically those in the energy sector (see the description in the Box at the end of this note). The model we employ specifically takes account of where firms source parts, components, and energy, thereby allowing for economy-wide knock-on effects from sanctions on particular goods.

Before considering trade sanction scenarios, it is useful to put key facts on the table. According to the latest WTO Trade Profiles publication, the GDP of the Russian Federation was $1.47 trillion in 2020. In the same year, total Russian exports amounted to $332 billion. Exports of fuels and mining products accounted for 59% of that total. Manufacturing exports account for a further 20%. The members of the G7 and EU27 together purchased 50.4% of Russian exports in 2019, before the pandemic hit. In the years before the Global Financial Crisis (2000 to 2008), the G7 and EU27 purchased just under 60% of Russian exports, implying that Russian export exposure to the sanctioning nations has diminished markedly over the past decade.

Three broad trade sanction scenarios against Russian goods exports

Anyone seeking to quantify the potential impact of trade sanctions must take a stand on how Russian exports will be treated by the G7 and EU after MFN treatment is revoked. The Canadian move mentioned earlier defines our first scenario—namely, the imposition of 35% import tariffs across the board on Russian goods.

A second scenario involves a ban on oil and gas imports from Russia. A third scenario combines the first two and is arguably the most severe considered here: a ban on oil and gas imports and 35% tariffs on non-energy goods imported from Russia. In each scenario we compute the impact on Russian GDP, on Russian exports to the G7 and EU27, on the Russian labour market, and on corresponding magnitudes for the sanctioning parties.

To highlight the consequences of the G7 and the EU27 banding together, we simulate the impact of each of the three scenarios for (a) the EU27 acting alone, (b) the USA acting alone, (c) Japan acting alone, (d) the G7 and EU27 imposing the same sanctions together and (e), given its first mover status, with Canada moving alone. In what follows the main findings are summarised in the main text and in three charts. We will make available the full set of simulation results for these sanction scenarios upon request.

The adverse impact on the Russian economy of trade sanctions that follow the Canadian model can be found in the Figure titled Scenario 1. The top panel shows that were the United States, Canada and Japan to act alone and impose 35% import tariffs across the board on Russian exports, their sanctions would have had little effect on Russian GDP. In contrast, as the EU is a major export destination for Russian fossil fuels, the former's decisions matter for economic outcomes in Russia. Should the EU27 adopt 35% import tariffs across the board then Russia's GDP is expected to fall 0.62%. The G7 and EU27 acting together raises the hit to Russian GDP to 0.9% (or just over

$13 billion). Collective sanctions of this nature would reduce total Russian exports to the G7 and EU27 by 55% and would cause just over 400,000 job losses in Russia.[6] We also predict that joint trade sanctions of this type would result in a fall of 0.05% of the combined GDP of the G7 and EU27 economies and in 191,680 job losses.

The second scenario involves simulating a ban on imports of Russian oil and gas.[7] To be clear, in Scenario 2 no additional import tariffs are imposed on imports of other goods from Russia. Again, the top panel of the chart for scenario 2 confirms that acting alone American, Canadian, and Japanese import bans would have had next to no impact on Russian GDP. Acting together, an import ban by the G7 and EU27 would reduce Russian GDP by 0.58%. Remember this is best thought of as a medium- to long-term prediction of the harm done by such trade sanctions to the Russian economy—the shorter-term macroeconomic hit may be more severe. The medium- to long-term impact of a joint G7-EU27 import ban on Russian oil and gas is expected to result in a 0.04% reduction in the combined GDP of the sanctioning nations.

The United States has already taken steps to ban new imports of Russian oil and gas. We estimate that this is likely to cause just over 31,500 job losses in Russia. Acting with G7 and EU27 allies, such an import ban would increase the job losses in Russia to over 574,000. Joint sanctions of this type are estimated to result in a total of 159,000 job losses in the G7 and EU27, with 116,000 of those job losses taking place in the European Union.

Our third trade sanction scenario combines an import ban on Russian oil and gas with a 35% import tariff on all other Russian imports. As the chart for Scenario 3 makes clear, joint G7 and EU27 action delivers the largest reduction in Russian GDP, amounting to an estimated loss of 1.06% (or $15.6 billion). Such sanctions would reduce Russian exports to the G7 and EU27 by 70% and would create over half a million job losses in Russia's export sector.

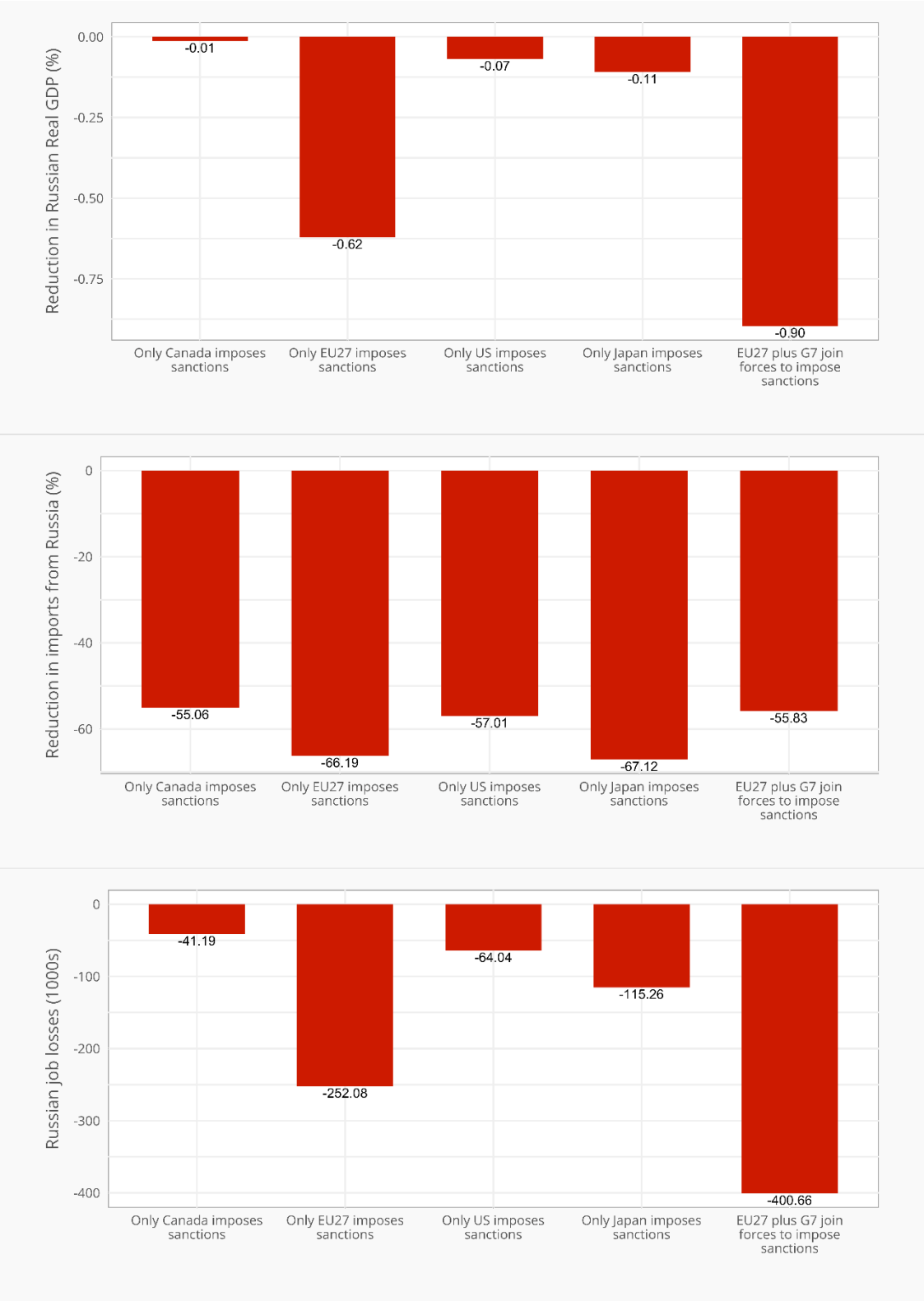
This third scenario would also cause slightly more harm to the economies of the sanctioning nations, reducing their combined GDP by 0.06%. In addition, their labour markets would be disrupted to the tune of 206,000 job separations; 174,000 of those job losses would be in the European Union.

Looking across the three scenarios, it is evident that the European Union's participation in any joint approach to sanctioning Russian trade is critical. Limited or no sanctions on the part of the European Union would significantly reduce the pain inflicted on the Russian economy. In each of the three scenarios considered here, the harm done to Russian GDP from the EU27 acting alone is at least eight times that of comparable actions by the United States alone. Likewise, the price paid by the European Union in terms of GDP and job losses is the largest, but considerably less than a complete ban of Russian oil and gas would be. Joint action packs the greatest punch, especially when includes the largest recipient of Russian exports.

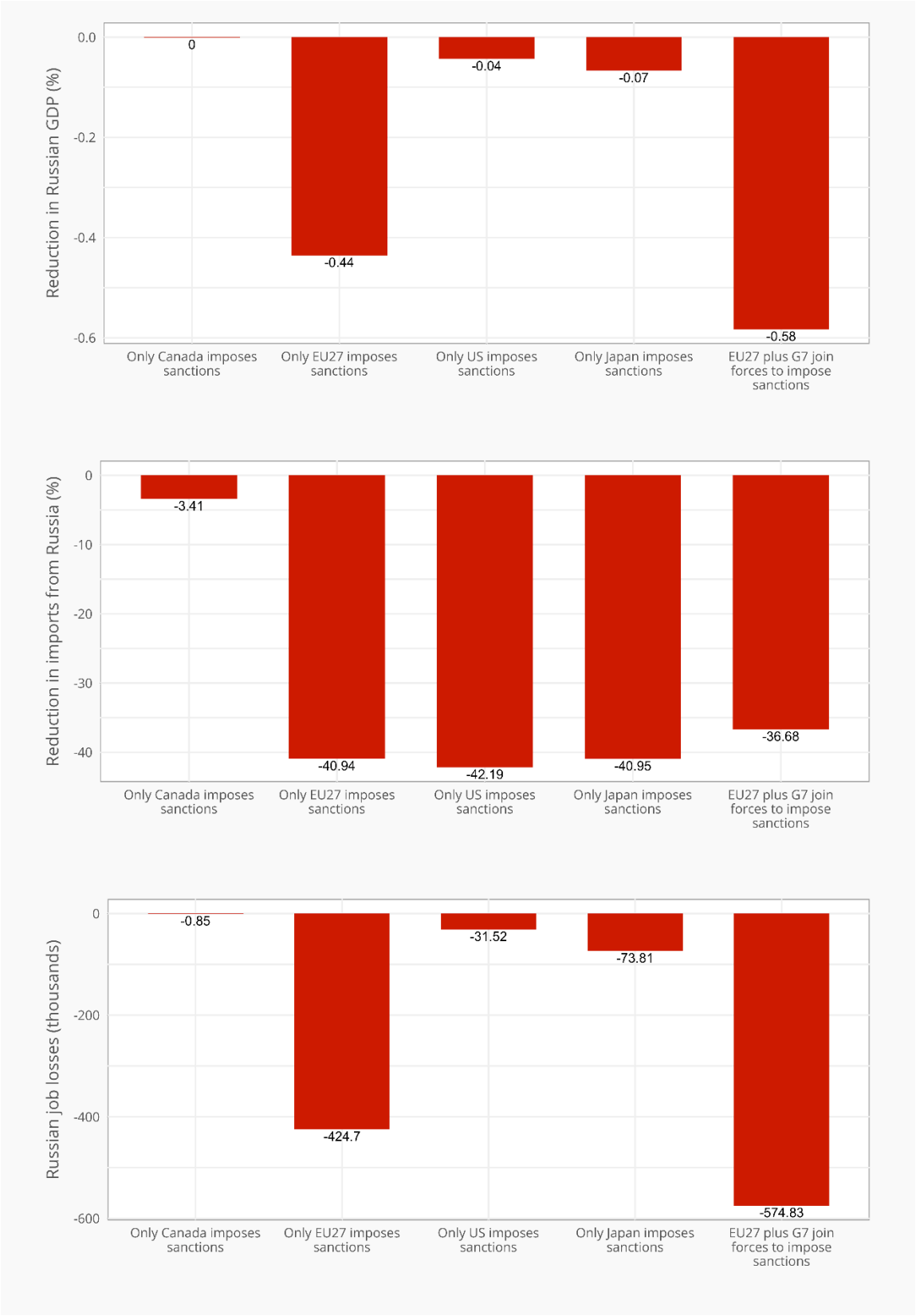
[6] Like many applied computable models of international trade, our model does not allow for overall changes in employment or unemployment after the labour market adjusts. The 400,000 figure reported in the main text should therefore be interpreted as job losses that are followed by rehires in expanding sectors. The figure provides a sense of the labour market disruption of potential joint G7 and EU27 trade sanctions.

[7] In our computational model, import bans are equivalent to an extremely large (inifinite) tariff. In scenarios involving bans on imports of oil and gas we imposed a 100% iimport tariff. A 100% import tariff on imported Russian oil and gas doubles their price for comparability to other countries' impacts, but the complete U.S. ban on oil and gas imports is more severe.

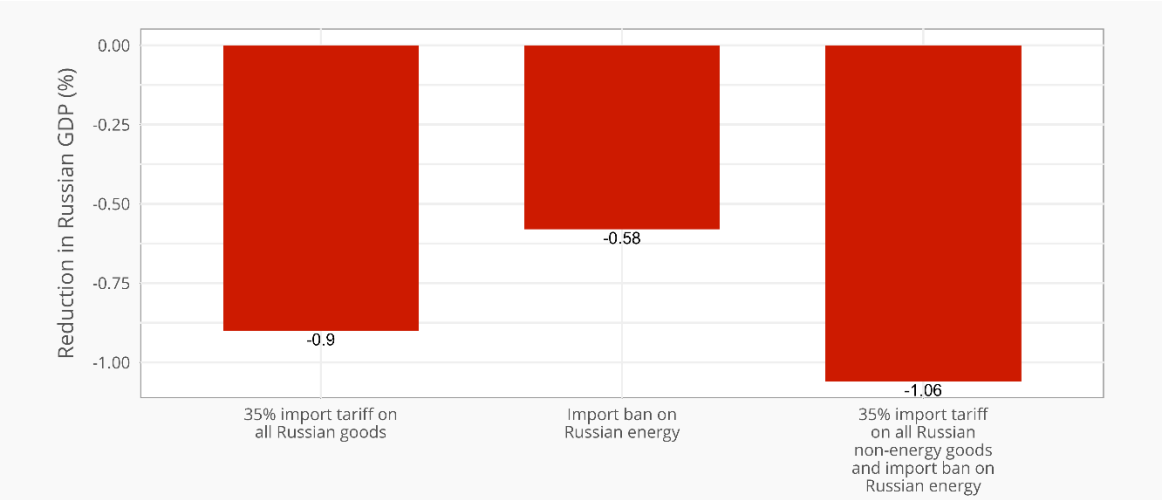
Scenario 1: Emulating Canada's 35% across the board tariffs on Russian goods.

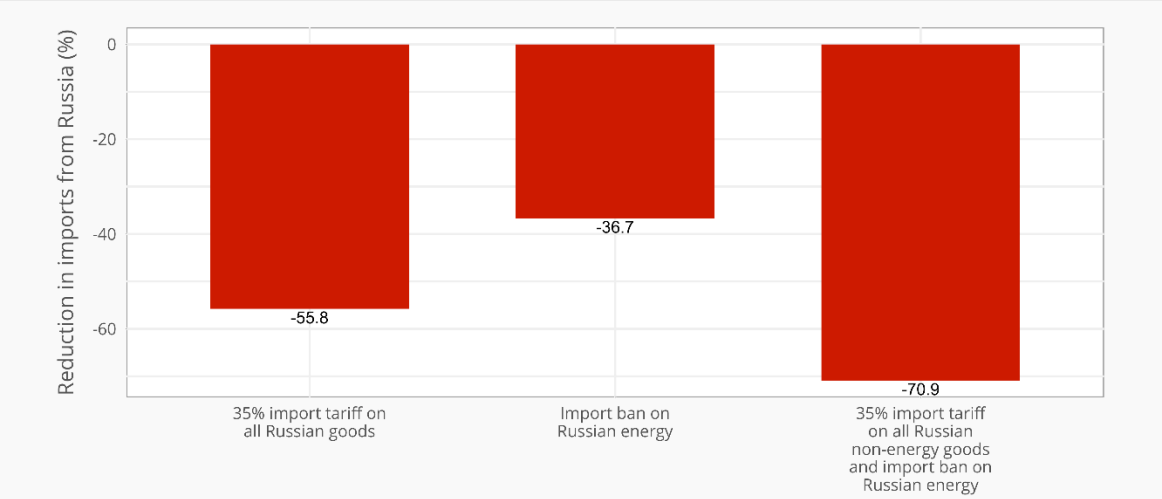


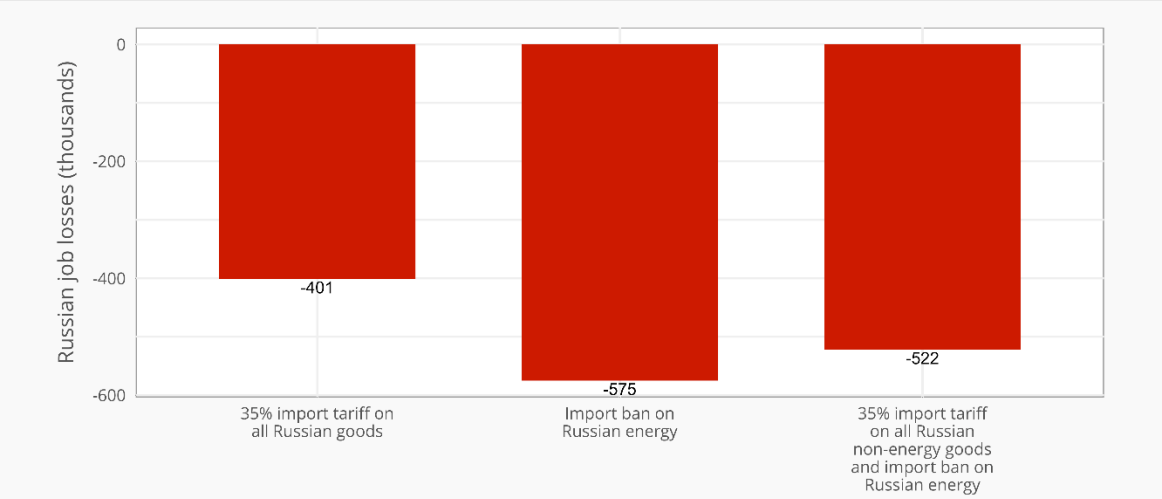
Scenario 2: An import ban on Russian oil and gas.



Scenario 3: Combining an import ban on Russian energy with 35% tariffs on other Russian goods.







Assessment: How much bite will G7 & EU27 MFN revocation have?

Once MFN treatment on Russian exports is revoked, governments should consider how much extra bite trade sanctions are likely to have on top of the financial sanctions already in force. The most severe trade sanctions package that we considered is expected to reduce Russian GDP by 1.06%. Is that a lot or a little? In what follows we put this estimated maximal loss in perspective.

One way to benchmark the 1.06% GDP loss is to compare it to the estimated gains Russia enjoyed from joining the WTO in the first place. A highly cited analysis of the impact of Russia's WTO accession is Tarr (2013). In this study the estimated medium-term impact of WTO accession on Russian national income was a gain of 3.3%. If the latter estimate is in the ballpark, then coordinated G7 and EU27 sanctions are likely to eat into a third of those gains. Whatever pique the Russian government may feel about any such coordinated Western and Japanese sanctions, on net there are still gains to remaining a member of the WTO.

The expected impact of trade sanctions on Russia could also be compared to losses inflicted on nations targeted during previous sanctions episodes. In an analysis of European Union, United Nations, and United States sanctions imposed on 76 countries at different points in time during the years 1960 to 2016, Gutmann, Neuenkirch, and Neumeier (2021) estimated that countries targeted by combinations of trade, financial, military and other sanctions saw their GDP fall by 4% on average in the two years following imposition. When compared to our finding of a maximum loss of Russian GDP of 1.06% from coordinated G7-EU27 trade sanctions, it suggests that financial and other sanctions will have to do the heavy lifting if the combined impact of all sanctions come anywhere near the historical average of 4%.

Overall, at times like this we understand that numerous legitimate factors determine sanction policy. We hope that the effectiveness of each additional sanction is still one of them. Our findings imply that coordinated G7 and EU27 trade sanctions will hurt the Russian economy. The scale of the hit inflicted may be less than some expect. A decade of Russian export diversification away from Western European, North American, and Japanese markets will blunt the impact of trade sanctions implemented in the days and weeks ahead.

Box: Brief summary of the key features of the simulation model

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The computational model (cModel) employed here is based on the Ricardian trade framework of Eaton and Kortum (2002), with competitive global markets for goods and services and with competitive local factor markets for labour and capital. Goods and services enter production as intermediate goods in addition to their final uses by households and government. In each industry and country, producers combine local labour and capital with globally sourced intermediate inputs and producers offer a set of varieties. An active government in each country collects revenues from taxes and tariffs, while government expenditure is spent on subsidies as well as goods and services procurement. Producers, households and governments globally source varieties within industries from the least costly producers. The simulation algorithm, implemented in Julia, calls equilibrium convergence for mutually consistent producer, household, and government decisions and budgets. Each country's observed net exports or imports (a trade surplus or deficit) are exogenous.

From the ITPD-E data by Borchert et al. (2020), we obtain production and trade flows for 170 supply industries in the benchmark year 2016, including services trade. To account for the input-output

relationships across countries and activities, we employ the WIOD data by Timmer et al. (2015) for the year 2014, extracting shares of supply industries by source country in use industries by destination (under Cobb-Douglas production) as well as expenditure shares of supply industries in (Cobb-Douglas) household and government consumption. Using shares of supply industries within use industries preserves positive value added by use industry but can result in negative inventory changes for data consistency. We apply the Wolsky (1984) disaggregation to infer a consistent input-output structure for the 170 ITPD-E industries that map into 38 matching aggregates of the 56 sectoral activities in WIOD. Our model has 43 individual countries plus an aggregate of the rest of the world for mutual consistency between ITPD-E and WIOD datasets. The combined data allow us to infer all shares in production, consumption and procurement. To calibrate elasticities, including industry-specific trade elasticities that measure the responsiveness of trade flows to goods and services prices, we use WITS tariff data for goods and an average tariff to approximate services trade barriers in gravity equations (Head and Mayer 2014).

For employment data by industry for the Russian Federation are from the Russia Longitudinal Monitoring Survey in 2014, mapped to our data using the Cross-national Equivalent File CNEF at Ohio State University for industry shares. We use the *World Development Indicators 2022* for total employment. Detailed cModel documentation is available from the authors (Chen et al. 2022).

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