

Energy Sanctions and the Global Economy: Mandated vs Unilateral Sanctions

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Abstract

The world is witnessing an unprecedented episode of ‘economic warfare’, with more than 30% of global GDP (the G7’s share) pitched against 11% of global energy production (Russia’s share). This paper analyzes oil sanctions against Russia. It shows that the risk of tighter sanctions backfiring, and harming the economies of the sanctioning countries, is manageable. In terms of sanction design, sanctions and embargo announcements have so far been decentralized and voluntary. In previous episodes, sanctions have been enforced, and breaching them was punished. The paper asks whether the unilateral or the mandated model will be more successful in maximizing damage to Russia’s energy revenues, while minimizing economic damage to the sanctioning alliance. Given the scale of Russia’s supplies, a gradual approach is called for. The optimal strategy uses unilateral sanction picking as long as Russian energy exports are large enough to pose a systemic threat; and sanction enforcement thereafter.

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1. Introduction

Seven weeks after the invasion of Ukraine, Russia continues to remain the world's largest exporter of commodities, including of fossil energy (oil, gas and coal).² A "western" alliance of countries and country groupings around NATO and G7 continues to support Ukrainian efforts to dislodge the occupying forces to regain its territory in the borders established in 1991.³

There is war in the Ukraine, but the alliance has no boots on the ground. Deterred by Russia's nuclear arsenal, it is at pains to avoid the risk of a direct military confrontation (which Russia would likely lose on conventional grounds) escalating into a nuclear conflict. The alliance does, however, support Ukraine's war effort in other ways: First, by providing armaments, information and logistical support; second, by what is legitimately called "Economic Warfare".⁴

It is an unprecedented duel, with at least 30% of global GDP (the G7's share) squaring off against 11% of global energy production (Russia's share).

This article analyzes the prospects of sanctioning Russia's energy production. It argues that the sanction regime established in the wake of the invasion of Ukraine differs from the design of energy sanctions in the past. Today, the sanctions and proposed embargoes are based on unilateral and decentralized decisions made country-by-country, and without penalty for continuing to consume Russian energy ("sanction picking"); whereas in the past, sanctions on energy exports have become increasingly centralized and mandated, with strong enforcement components attached, e.g., secondary sanctions ("sanction enforcement").

We ask which of these two models will be more successful in maximizing damage to Russia's energy revenues while minimizing damage to the economies of the sanctioning alliance. The answer is that, given the scale of Russia's supplies, a gradual approach to drive down volumes, keep pressure on the relative prices of Russian energy, and protect the economies of sanctioning countries, is called for. The optimal strategy uses sanction picking as long as Russian energy exports are sizeable enough to pose a systemic threat to the sanctioning countries, and sanction enforcement thereafter. For this to work, the commitment to scale down imports has to be credible, the process should not stagnate, and the willingness to spend resources on enforcement later on has to be beyond doubt.

Section 2 sketches the short history of economic warfare between Russia and the Western alliance. Section 3 conceptualizes the design of energy sanctions. Section 4 asks how much room for manoeuvre there is, before the price increases induced by tightening sanctions on oil exports will damage the economies of the sanctioning countries. Section 5 makes the argument that, to avoid energy sanctions backfiring in this way, they need to be introduced gradually; the optimal path for an energy embargo to evolve under current circumstances is continued reliance on decentralized, unilateral decision-making, as long as Russia's energy exports are large enough to pose a systemic threat to the economies of the sanctioning countries, and to switch to a centrally-mandated and enforced sanction regime after that point.

² For a detailed breakdown of Russian commodity exports, see WTO (2021).

³ Protection of these borders was confirmed by the US, Russia and Ukraine in their Trilateral Statement in 1994 (e.g., Pifer (2011)).

⁴ For a definition, see Shambaugh (2022).

2. An Economic War Foretold

Economic warfare is the use of “economic means against a country in order to (...) reduce its political and military power”. Economic means may include “trade embargoes, boycotts, sanctions, tariff discrimination, the freezing of capital assets, the suspension of aid, the prohibition of investment and other capital flows, and expropriation” (Shambaugh 2022). With the exception of permanent (non-recourse) expropriation, all of these elements have been deployed in the short history of the economic war of the Western alliance against Russia.⁵

The threat of an invasion was apparent for some time before it happened; and so has been the announcement of the alliance to react using economic means. The measures which have been implemented so far were planned; their design, deployment and sequencing is part of a deliberate strategy of escalation, in an effort to maximize the damage to Russia’s economy.⁶ They should therefore lend themselves to a systematic assessment with relative ease.

(a) Fortress Russia

By the time of writing (mid-April 2022), sanctions against the citizens, institutions and products of the Russian Federation continue to evolve rapidly.

Russia is the world’s largest exporter of commodities and energy: Fossil fuels (oil, natural gas and coal) account for the bulk of its export revenues and almost half of its pre-war budget revenues.⁷ Unsurprisingly, increasing attention is being paid today to curtailing the revenue flows from these key commodities.

For its part, Russia has been preparing against the economic consequences of export restrictions. The foundations were laid in its response to the twin economic shock of 2014, when a collapse in world oil prices coincided with the economic sanctions imposed on Russia for the annexation of Crimea. In response, Russia overhauled its macroeconomic framework.

By the yardstick of improving the economy’s resilience against terms of trade shocks, Russia’s macroeconomic response was swift and well designed. First, the Central Bank (CBR) used the occasion to liberalize the exchange rate; second, fiscal policy did not accommodate but became more restrictive; and third, the country put into place the institutional and legal infrastructure required to accelerate the accumulation of financial reserves.⁸ Over time, the emergency response morphed into a sophisticated macroeconomic framework based on inflation targeting (2015) and a fiscal rule (2017).⁹

⁵ A useful timeline of international sanctions against Russia is published and kept up to-date by the Peterson Institute, cf. Bown (2022).

⁶ Is the objective to damage the economy (as in lowering GDP and income levels), or to impede Russia’s ability to finance the war? We cannot know, but the economic means would not necessarily be the same. Public commentary indicates the conviction that the former will be the most effective way to accomplish the latter.

⁷ The export share of oil in 2021 was 37%, natural gas 13% and coal 4%. Oil and gas accounted for approximately 40% of the budget of the Russian Federation in 2021 (cf. Reuters 2022).

⁸ From an accounting point of view, all foreign reserves are captured in the Central Bank’s statistics: Russia’s Reserve Fund has been merged into the National Wealth Fund (2018), and the NWF’s assets are held by the CBR which does not publish them as a separate line item (the MoF still does).

⁹ Inflation targeting was formally introduced in 2015 and the fiscal rule in 2017 (for today’s monetary policy, cf. Bank of Russia (2022a), for an introduction to the fiscal rule cf. Sanghi and Kojo (2017)).

In the short term, exchange rate liberalization meant that the burden of preventing an erosion of confidence and capital flight had to be carried by rising interest rates. Together with restrictive fiscal policy, this pushed the economy into a recession in 2015, and – with lower commodity prices and an increasingly heavy toll of state interference in the economy – likely contributed to lower long-term growth.

On the country’s balance sheet, however, the combination of these policies with the subsequent recovery of energy prices translated into the accumulation of foreign exchange reserves which came to be known as “Fortress Russia”.

Table 1: Fortress Russia

(Official foreign currency reserves and their composition, selected years)

USD billion	Dec-14	Dec-15	Jun-20	Jun-21	Jan-22	Percent	Jun-20	Jun-21
FX securities	285.5	271.3	286.7	303.5	311.3	USD	22.2	16.4
FX currency & deposits	42.3	36.4	139.0	141.3	152.0	EUR	29.6	32.3
Gold	46.1	48.6	130.8	130.4	132.2	GBP	5.9	6.5
IMF	3.4	2.6	4.8	5.2	5.2	Other	7.2	10
SDR	8.2	7.9	6.7	7.1	24.1	Yuan	12.2	13.1
Other	0.0	1.6	0.9	4.2	5.4	Gold	22.9	21.7
Total	385.5	368.4	568.9	591.7	630.2			

Source: Bank of Russia¹⁰

For its inhabitants, however, building fortress Russia carried a price tag. Annual economic growth in Russia averaged 5% between 2000 and 2014 and has deteriorated to 0.9% since then. Meanwhile, the global economy grew by 3.4% every year since 2014 (advanced economies by 2.1%): Year after year, Russia’s citizens have fallen further behind (IMF 2022). By the time of the invasion Russia, then the world’s 11th largest economy – falling behind by this measure as well and trailing countries such as Italy – officially sported the world’s fourth largest financial reserves and, as a share of GDP, the world’s third highest military expenditures.¹¹

With oil, natural gas and coal exports generating the most valuable revenue streams, it will, in an escalating economic war, only be a matter of time until these flows are attacked. The accumulation of stocks of financial assets was a way to “sanction-proof” the economy against the degradation of its revenue flows.

The sanctions imposed in 2014 may have triggered building up Russia’s defence system, but they did not address energy exports directly. In general terms, they were aimed at persons and institutions

¹⁰ Since June 2021, the currency composition of reserves has not been published by the Central Bank. However, it is possible to take changes in the currency composition of Russia’s National Wealth Fund as a proxy (which has been published by the Ministry of Finance). Doing so indicates a strong acceleration of the trend out of USD and into Yuan holdings. Personal communications with officials confirm this view. For the data in table 1, cf. Bank of Russia (2022b, c).

¹¹ Saudi Arabia and Israel devote a larger share of GDP to military expenditures (Szmigiera (2021)).

supporting the annexation of Crimea and the separatist insurgency in eastern Ukraine. Energy was peripheral, with restrictions limited to long-term technology transfers and foreign investment.¹²

Eight years on, the contours of the conflict were clear to both sides. For the sanction-willing West, Russia's hard currency inflows were considered the key target of an economic war, and its stock of financial asset the main defence line.

In the run-up to the invasion, the 'sweeping' and 'unprecedented' measures promised in the event of an invasion, were typically described as a two-pronged pincer movement. The idea was to isolate Russia from the global financial system *and* constrain its commodity and energy exports. Both moves were aimed at curtailing the source of Russia's financial strength, its balance of payment surplus.¹³

(b) Non-energy sanctions

All is fair in love and war: The first round of coordinated economic measures by the alliance after the invasion was a surprise. Commodity and energy exports were not targeted at all; but the financial sector restrictions were more comprehensive than anticipated. Instead of degrading revenue flows, these measures degraded the stocks accumulated to protect them.

The key element of surprise was the freezing of assets of Russia's Central Bank. In an unprecedented step against a G-20 member, and a signatory of all the treaties and institutions comprising today's global financial architecture, a broad coalition of countries and their institutions (including non-NATO and non-G-7 members such as Japan or Switzerland) blocked all CBR assets within their respective jurisdictions.¹⁴

An estimated 50-60% of the CBR's international reserves – currency deposits and securities held in commercial banks and central banks outside of China – was "frozen", leaving Russia in the main with Yuan-denominated assets, SDRs, plus (substantial amounts of) gold and cash in its vaults.¹⁵

Neutralizing these assets robbed fortress Russia of ammunition. It also had a direct effect on global energy markets.

First, the asset freeze reduced the credibility of Russia brandishing the threat of cutting its own oil and gas exports in order to harm the economies of the sanctioning alliance. In the long-term, the lack of a financial backstop will push Russia further into the unenviable position of a raw materials supplier forced to peddle its wares on the cheap. Bereft of market access, economic integration and financial assets, Russia will need all the foreign currency income it can get.

Third, in the short term, markets generally reacted with "self-sanctioning". For a large number of foreign companies (including energy producers), legal uncertainty, limitations on capital flows,

¹² European Council (2022) contains a comprehensive listing and assessment of EU sanctions against Russia over Ukraine since 2014.

¹³ Cf. Gurvich and Prilepskiy (2015) for an early anticipation of these aims, and related modelling, in Russia.

¹⁴ The G7 (February 25) and Switzerland (February 28) announced asset freezes, the BIS suspended Russia's membership (March 10), and access to Russia's SDR assets at the IMF (20 billion, equivalent to 4% of the CBRs reserves) depends on China's willingness to trade them – a rather abstract option, given that access to Yuan is available without any international scrutiny, cf. Martin and Mohsin (2022).

¹⁵ According to the CBR, "every ounce" of its gold reserves is in Russia. So will be substantial US Dollar cash holdings, if part of Russia's pre-invasion strategy was to safeguard against a run on its banks. Access to Yuan (and likely to Western currencies as well) is available by utilizing existing currency swap lines with Chinese financial institutions.

unknown prospects concerning further sanctions and the risk of reputational damage, meant to close shop and leave immediately, although their activities had not been restricted directly.

The demand for energy from Russia declined for analogous reasons. With uncertainty about future sanctions and public pressure mounting, corresponding banks, letters of credit, or cargo insurance all but vanished. Traders were hesitant to take new shipments of Russian crude oil or petroleum products on their books. Fear of running afoul of the new regulatory regime and the disruption to reliable infrastructure for trade and finance combined to leave an estimated one third (2.5 Mb/d out of 7.8 Mb/d) of Russian oil exports without a buyer.¹⁶ As a result, Russian oil exports (and later spot-priced coal), started to trade at a sizeable discount – even before they were sanctioned directly.

3. The Design of Energy Sanctions

If the goal of sanctioning energy production is to degrade the revenue flows of the producing country, the problem is that successful attempts at lowering local production will backfire, if they lead to global price increases large enough to damage the economies of the sanctioning countries. In the case of a very large energy producer such as Russia, this risk is the prime reason for countries not to take part in an export embargo.

Oil and coal are fungible and traded in globally integrated markets; natural gas is well on its way to establish such a market.¹⁷ This introduces further complexity to the design of sanction regimes. As long as the phalanx of consuming countries is not closed and sanctions not universally enforced, fuel exports embargoed in one location will ultimately enter the global marketplace in another.

But in reality, this takes time. The physical reconfiguration of trade and production, the adjustment of crude quality, of shipping routes, contracts and, very importantly, of the global refinery configuration will cause large and persistent frictions even for the most globalized of fuels. Corrections will require clear price signals and instantaneous corrections will often be physically impossible.

Oil comes from different geographies, with different (but overlapping) quality characteristics, and it can be stored. In that respect, it is often joked, oil is like wine. However, volumes are larger, there are large indivisibilities in production and transport, and in the end, the demand for oil is always derived demand, usually for a refined product. Even so, sanctions will have a dual effect on oil prices, just as they would have on wine.

(a) The strategic target

The larger and more permanent the disruption caused by an embargo, the larger and more time consuming the physical reconfiguration. The cost of the adjustment may hurt global oil consumers as well as the local producer under sanctions. A dual price signal indicates where the cost is falling, thus conveying the efficacy of sanctions: To the extent that sanctions successfully lower aggregate supply,

¹⁶ Initial estimates vary. The one quoted here is at the upper end and from the IEA (2022).

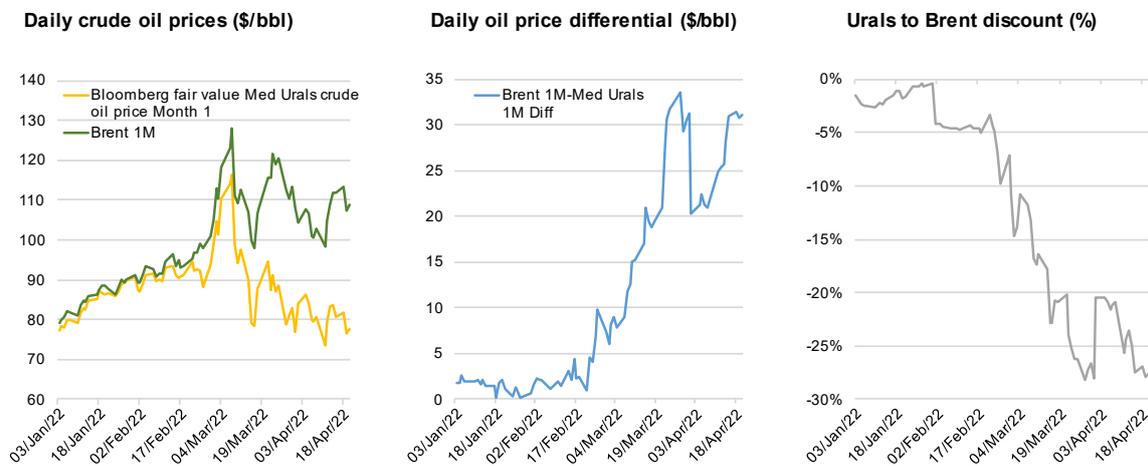
¹⁷ In 2020, for the first time, inter-regional LNG trade exceeded inter-regional pipeline trade in natural gas. The share of inter-regional trade in total gas consumption (pipeline and LNG) reached 25% (BP 2022).

the global price of oil will rise. To the extent that sanctions successfully diminish the demand for oil from a sanctioned location, the relative price of this blend will fall.¹⁸

The higher the increase in the global price of oil, the greater the pain for consumers everywhere. The lower the local relative price, the greater the pain for the exporter. The price differential may be a yardstick for the efficacy of energy sanctions, but subject to a constraint: The global price cannot be allowed to rise to a level which would harm the economies of the sanctioning countries.

It is important to understand these two separate effects: *The art of successfully calibrating energy sanctions is to maximize the price discount of the fuel under sanctions while curtailing volume demand, subject to constraining the global price increase so as to minimize damage to the economy of the sanctioning parties.*

Figure 1: The dual price effect of oil sanctions on Russia



Data source: Bloomberg

The dual price effect of energy sanctions is on display in Russia – both before and after energy sanctions proper had been imposed, indicating the extent to which the initial measures in the financial sector affected other segments of the economy (cf. Figure 1).

Immediately after the invasion, the first round of financial sector sanctions and the uncertainty they created reduced the demand for Russian oil and oil products by an estimated 2.5 Mb/d (out of total exports of 7.8 Mb/d). That much stranded oil opened the price differential between Urals Blend, the most prominent Russian type of crude, and Brent, the global benchmark. The associated shortfall in global supply moved the global price up at the same time. Both movements were substantial.

The global price increase (by the time of writing) had peaked on March 8th, 37% above February 23rd, the day before the invasion and 73% above the price at year end 2021. The differential – normally fluctuating around 2% - rose for longer and peaked on March 28th and 31st at 28%, compared to 5% on the day before the invasion and 2% at year end.¹⁹

¹⁸ For a more detailed discussion, see Rühl (2022a), on which this argument is based.

¹⁹ We have, in this non-technical discussion, so far omitted explicitly analyzing a situation in which the price differential widens while both prices increase. To the extent that the local price increase overcompensates for volume losses, this would be a situation the sanctioned country could live with very well. Eyeballing the data

The price data support a plausible narrative. First, the global price, proxied by Brent, started rising long before the invasion (likely also influenced by other factors), whereas the relative price for Urals fell markedly only afterward - indicating that markets to an extent had priced in the outbreak of hostilities (and an adverse impact on global oil supplies), but less so the severity of the sanctions imposed immediately afterward.

Second, the timing of the global price peak and the record discount suggests correct anticipations, based on effective communication. Both peaks coincided with major announcements, signalled in advance: On March 8th, the US government revealed the first energy sanctions since the invasion, namely a US moratorium against all fossil fuel imports from Russia. On March 31st, the release of 1 million barrels per day of the IEA's strategic petroleum reserve was announced, for the next 180 days. Both were drastic measures; and in both cases, prices retreated quickly from their records, as if indicating a degree of relief that there was no surprise. Finally, the most recent increase in the global oil price as well as the discount for Urals, is widely seen as indicating expected action by the EU on oil sanctions.

(b) The need to escalate

Without further action to depress the demand for Russian oil exports, the current discount will be temporary.

Markets are good at adapting to new rules of the game. Workarounds to current financial sector restrictions will be found, including alternative channels for payment flows, and arrangements for cargo insurance and legal recourse. As the new infrastructure emerges, the discount on Russian oil will gradually evaporate, safe for a permanent mark-up to reflect higher transaction costs. The flows of crude and diesel which the US used to import will go elsewhere, directly or indirectly replacing oil now shipped to the US in its stead.

Without further action, the present adjustment will become just a temporary deviation. Ultimately, a lasting reduction in Russia's revenues will require sustained production cuts.

It is easy to see why. Oil markets are competitive. A fungible commodity in a globally integrated market will always be redirected to its highest valued use and re-equilibrate with a new set of relative prices. With China, India and many smaller countries in need of low-priced oil and able to import Russian oil with impunity, the adjustment becomes a matter of the time it takes for the physical infrastructure to adapt. After that, the income from commodity exports will continue to

underlying Figure 1, it seems at first sight as if the financial cost of the sanctions so far has been smaller for Russia than for the alliance: By mid-April, the dated Brent price for the month (\$106/barrel) was \$21 higher than for January (\$85 per barrel), whereas Urals traded only \$3 lower than in January (\$81 vs \$84 per barrel). However, this does not allow for the conclusion that the sanctioning parties had larger financial losses than Russia. Allowance must be made for Russian volume losses (2.5 Mb/d), and the financial losses have to be made comparable, e.g., by expressing them as a share of GDP. Under those conditions, plus the additional simplification that all traded oil is crude oil, the G7 show additional import costs of 0.6% of GDP per annum, while Russia has lost revenue of about 5% of GDP. (This calculation barely qualifies as a rough indicator. It assumes no change beyond the initial (observed) impact of the financial sector sanctions. It was, however, repeated three times, with GDP and oil parameters for 2019, 2020 and 2021. Results for the G7 stayed at 0.6%, results for Russia varied between 4.6 and 5.5%.)

Any advantage of this nature to a country under sanctions would likely be a temporary aberration, since a higher global price will eventually attract additional supplies, bringing the price back down again.

flow – and, given the decline of other imports into Russia, presumably rebuilding financial reserves even faster than the first time around.

It is therefore only a matter of time for the question of how the Western alliance can address the energy complex directly to be back on the agenda. To affect Russian revenues in the short term, by preventing a new equilibrium under new trading rules and infrastructure from being established and competing away the discount (and the global price increase), requires the expectation of escalating embargoes. In the long term, it requires closing the phalanx of countries banning imports of Russian energy.

For now, the most important signal sent by a persistent discount, is the expectation of further shocks to the system.

4. Oil and the Economy

This analysis leads to two strategic objectives. The first is the need to prevent an increase in the global price of oil so steep that it would damage the economies of the sanctioning alliance. The second is the need to keep the pressure on, to enforce volume cuts and trigger price discounts to limit Russia's export revenues and keep the system from stabilizing. Difficult as the first assessment may be, it makes little sense to move to the second without any idea of what headroom there is.

The interface between production cuts and global economic activity can, in turn, be broken down into two links. The first is the effect of production cuts on prices, the second the effect of oil price changes on global economic activity. Each of these has been the subject of considerable academic research; it is fair to say that both fall into the category in which conclusions have to be prefaced by "it depends".²⁰

Mindful of these limitations, it is still possible to establish a roadmap laying out the main factors that matter for political or commercial decision-making in the present situation.

(a) Safety valves on the supply side

The price effect of sanctions limiting oil production in one location will depend on the (perceived) ability of the global system to generate additional supplies from elsewhere, and on the timing of this response. At present, at least four principal safety valves exist, in addition to the general notion of higher prices boosting investments down the road.

- The Strategic Petroleum Reserve (SPR): Including the recently announced release, the SPR holds 1.5 billion barrels of crude and products in between the member states of the IEA. Just eyeballing this number, without regard to practicality, this is equivalent to 15 days of global oil consumption, 192 days of total Russian oil exports, 333 days of Russia's oil exports to Europe (OECD), or 1,500 days of adding the 1 million barrels per day to global markets which have already been announced (for 180 days). Sometimes mocked as a stop-gap measure (because eventually it will have to be replenished), in terms of economic warfare, this is in effect a powerful instrument.²¹

²⁰ A small selection of examples includes Baumeister et al (2009), Blanchard and Gali (2007), Cashin et al (2014), Kilian (2009), Hamilton (2011).

²¹ For a timely assessment of the SPR's capability, see IEA (2022b).

- OPEC members under sanctions: A return to the nuclear agreement and the cancellation of oil export sanctions against Iran, as well as a resolution of the impasse in Venezuela, would add a consensus estimate of about 1 Mb/d immediately (mostly from Iran), with more to come as production facilities are restored. These numbers are subject to considerable uncertainty, as are the prospects for a political solution in both cases. Efforts to restore peace in Libya (0.3 Mb/d) and Nigeria (0.5-0.7 Mb/d) also have the potential for small but rapid supply responses.
- Core OPEC members: Saudi Arabia, the United Arab Emirates and Kuwait together have an estimated 4-5 Mb/d of spare capacity, available immediately. From this should be deducted the safety cushion of at least 2-2.5 Mb/d traditionally held by Saudi Arabia. It will require political effort to accelerate it, but eventually the remainder will become available.
- US domestic production: For a variety of reasons, the response of shale oil production to the price recovery since the pandemic has been less than ebullient. It also had to cope with the current administration's desire to restrict shale oil output growth for climate policy reasons. Adjusting domestic energy policy to maximize domestic production would add at least 3 Mb/d over the next 18 months.

The picture which emerges is not one which would allow the replacement of Russia's exports in one fell swoop. The safety valves sketched above are policy dependent, have different timelines, and are tilted toward crude. Nevertheless, they can be activated on short notice. The global refining system is unlikely to become a bottleneck. These are stopgap measures – to be deployed in addition to the global supply response to high prices.²²

In sum, there is sufficient oil available now, and certainly enough below ground in the longer term, to significantly tighten Russia's exports in short order, and eventually even to replace its crude and product exports. It may not be efficient, but it can be done. Ratcheting up the pressure on Russia's exports, as we have seen, will have to happen to maintain a discount on its price; and eventually, to start denting its export volumes more seriously, while the global trading and production system adjusts. The long-term ability to replace Russian production gives credence to the idea.

(b) The real price of oil

The links between oil prices changes and global economic activity are harder to discern. A number of observations can indicate the lay of the land; and may be useful for the judgement calls that need to be made – under present circumstances perhaps more so than models surrounded by walls of caveats.²³

Oil prices so far (not all of this due to the war) have increased by less than natural gas or coal prices. Gas prices in Europe have roughly tripled over last year's already high average. They peaked in early March 2022 at the equivalent of \$400 per barrel of oil. Oil prices are less removed from historical norms.

The impact of oil price changes on economic activity depends on a country's initial conditions and two key transmission channels. In terms of initial conditions, it matters whether oil prices are driven

²² In 2021, 3 Mb/s out of total Russian oil exports of 7.8 Mb/d were refined products. IEA (2022c) contains more detailed information on scope and composition of Russia's energy, including oil exports. See also Finley and Krane (2022) for an insightful early discussion of ways to replace Russian oil.

²³ The following section draws on Rühl (2022b), where more detail on the oil price–economy nexus can be found.

up by strong economic growth, as happened between 2004 and the Great Recession in 2008; or if rising oil prices, caused by other factors, hit an already faltering economy, as was the case during the oil price shocks in the 1970s. Consuming countries cope better with relatively expensive energy in the former scenario.

In today's economic environment, this should be a call for caution—but at a closer look, more so for China and other non-sanctioning, energy-importing emerging market economies than for the core members of the sanctioning Western alliance. At the time of the invasion, Europe and the US were rebounding strongly from the depths of the COVID-related recession. China's economy, however, is increasingly constrained by its zero-COVID policy, and many other emerging markets have yet to see a full recovery.

From a balance of payment perspective as well, China (and India) are more vulnerable than Europe or the US. In China, net imports as a share of GDP are similar to those of the EU, but oil consumption is rising. In contrast, in the geographic boundaries constituting today's EU, oil consumption has peaked back in 1979. In the US, exports and imports are large, but roughly balanced.

Oil intensity is higher in emerging markets as well, and higher specifically in India and China, than in the G7, the core of the sanctioning economies – again implying that oil price variations will have more of an impact on non-sanctioning than on sanctioning economies.²⁴

Of the two main transmission mechanisms by which oil price changes affect economic performance, the first one is indirect – but highly relevant at this point of the economic cycle. High oil prices may influence inflation and therefore the interest rate needed to bring inflation down again.

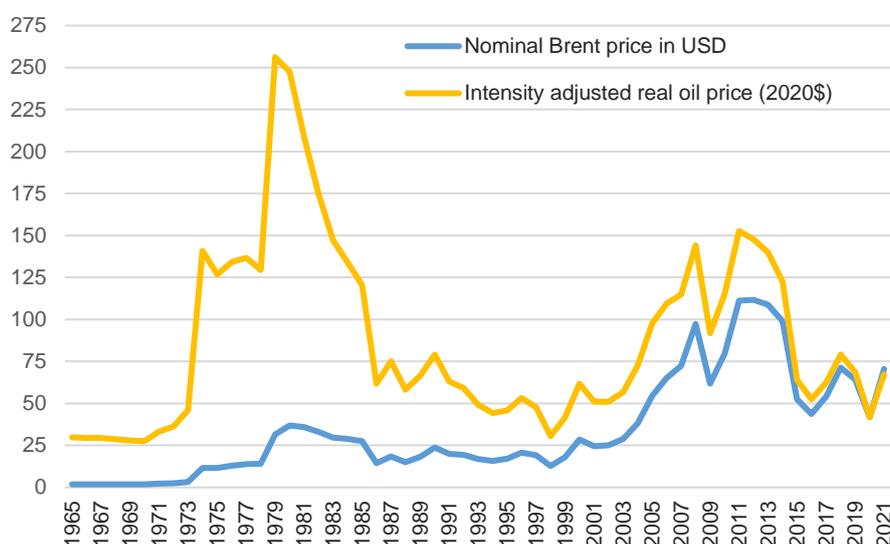
The link is not limited to periods of price increases. Once prices stabilize or fall, their impact on the rate of inflation reverses. In periods of great volatility, the net effect becomes hard to discern. The volatility of commodity prices is the reason why central banks tend to exclude food and energy from their favorite inflation gauges. A gradual tightening of Russia's oil exports, a staggered deployment of the safety valves, the slow adjustment of physical infrastructure, and the reaction of demand, are unlikely to combine into a straight-line increase of oil prices, and more likely to create an irregular, volatile pattern. Persistent, secular upward movements will have to be managed and, in a phase of tightening monetary policy, central banks will have to be engaged.

The second, direct impact on economic activity is harder to gauge. It starts from the observation that it still takes almost 65 litres (17 US gallons) of crude oil to produce \$1,000 worth of global GDP. Oil remains the world's dominant fuel. Changes in the relative price of such an important input weigh on global economic activity.

However, historic data suggest some breathing space. To see it, one has to keep in mind that the widely used comparison of oil prices over time in nominal terms is misleading. A \$100 oil price today is obviously not the same as a \$100 oil price ten years ago—but the difference is more than just inflation.

²⁴ In 2019, the OECD, EU and US had oil intensities (barrel of oil per \$1000 of GDP) of 0.34, 0.26, 0.35; the Non-OECD, China and India of 0.54, 0.36, 0.71, respectively.

Figure 2: The price of oil, adjusted for inflation and oil intensity



Data source: BP (2021), Oxford Economics (2022), Rühl (2022b)

When calculating the economic impact of changes in labor costs over time, it is common to use unit labor cost to encapsulate productivity improvements. In a similar manner, the efficiency with which oil is used, in transport and in production, increases year after year, and in strikingly regular fashion. Factoring in these efficiency improvements yields a more accurate measure of real oil price changes over time.²⁵

By this metric, the average price in 1979, the year when high prices are widely credited with having caused a recession, was the equivalent of more than \$250 per barrel in today's prices (2020 dollars). The highest nominal price ever recorded—\$148 in 2008—becomes almost \$220 today, in inflation and efficiency-adjusted terms. The (very stable) average annual prices during the high price period of 2011–13 translate into almost \$150 per barrel in today's terms. Note that this was a three-year period without a recession.

This is admittedly a rough and ready measure and not meant to replace more detailed studies of the price elasticity of output growth. But it provides a useful historical perspective, suggesting that there is no need to reach for the panic button at current prices. From this perspective, it was not a reckless gamble for the US to declare a moratorium on Russian oil imports at prices above \$100 per barrel; and there is, especially after the SPR release, room for others to follow.

²⁵ The argument is based on Rühl and Erker (2021), which contains detailed data on the underlying relationship between oil consumption and GDP.

5. How to Optimize an Oil Embargo?

For economic warfare to be successful for the allies, an export embargo of the world's most important fuel will have to be established, on a scale so large that it risks the well-being of the world's most important economies.

The first move in this very public warfare was successful in driving a wedge between the sanctioned price and the global price of crude oil. However, it will do little to reduce Russia's revenues by reducing export volumes. Re-equilibrating global oil markets will compete away the discount, if no further tightening is introduced. Meanwhile, (historic) data suggests the global oil price is not at a level close to harming the economies of the sanctioning parties; and there are buffers of spare capacity as well as inventories of crude and oil products in the system.

Everything seems to suggest that imposing further, direct sanctions on Russia's oil and gas exports is the order of the day. There is, however, a little discussed but important strategic question on how to accomplish this most effectively.

(a) Sanction-picking vs sanction enforcement

The current sanction regime differs conceptually from the design of previous episodes, not only in size or scope.

All sanctions in place and all moratoria announced so far have been decided upon by individual nation states in a decentral and voluntary manner. There are no enforcement mechanisms. Even countries wanting to increase Russian energy imports, can do so with impunity.

The US has declared a unilateral moratorium on all Russian energy imports;²⁶ the UK announced the phasing out of Russian oil (not gas), the EU of two-thirds of Russian gas (not oil); and Germany added coal to an ever longer list of individual moratoria. Perhaps by happenstance rather than design, the discussion has moved from the centralized, mandated approach of previous sanction episodes, to 'sanction picking', with individual countries unilaterally imposing import restrictions they feel they can afford, and on selected fuels across the whole commodities spectrum, including oil and gas.

This is a far cry from the sanction regimes developed previously. Oil market sanctions against Iraq, Venezuela and especially Iran, increasingly came to be characterized by a 'one size fits all' approach with progressively more centralized decision making (in the US) and the need to introduce strong measures to enforce sanction decisions. Over time, secondary sanctions have emerged as the weapon of choice to deter violations of the primary sanction regime.

In the economic battle between the world's largest economies and its largest energy exporter, sanctions need to be tightened, but gradually. The question is whether decentralized, unilateral sanction picking or centralized, mandatory sanction enforcement is better suited to find the optimal pathway. The answer is that the most promising strategy will utilize the voluntary approach first (as long as Russian energy exports are large enough to impose a systemic threat on the sanctioning countries) and mandated sanction enforcement later (when their disappearance no longer threatens the sanctioning economies).

²⁶ Not because the US is energy independent but because Russian imports accounted for only a relatively small share of US gross imports (8%). US oil trade with the rest of the world is substantial, and its petroleum trading position balanced only in net terms.

In the US, a political discussion about the need to reinforce the stance against Russia increasingly expresses the desire to impose secondary sanctions, to dissuade China and India (and many smaller energy importing economies), from the temptation of cheap Russian fuels. By now, a well-developed toolbox exists to circumvent secondary sanctions, by creating special purpose vehicles and the like. However, the true cost of imposing secondary sanctions goes beyond monitoring and enforcement. In the short term, it may push others closer to Russia. Over the long term, it will deepen the wrong sense of economic rivalry (and how it is resolved) with countries which are subjected to the threat of secondary sanctions, thus creating the potential for more economic warfare later.

Meanwhile, the EU is battling its own version of a mandatory approach to sanctions. The European Commission is debating whether and how far to restrict oil imports into the EU. By its rules, trade restrictions in energy (of which sanctions would be a part) on private companies can only be enacted by the bloc as a whole, not by individual countries. With the Commission's need for unanimous decision-making, and some countries sceptical toward stringent restrictions of oil imports, the outcome is predictable: The efficacy of sanctions would be better served if the need to agree on the lowest common denominator could be suspended and replaced by allowing for unilateral decisions across fuels. Without having to bargain for quotas, the aggregate outcome should be superior.

As long as it does not lead to an accumulation of unfulfilled promises, sanction-picking may become a commitment device, signalling the trajectory ahead. And if it does, revealed political preferences are probably better than hidden ones.

The rationale for sanction-picking emerges also in discussions around pipeline imports of natural gas to Europe. This gas is produced in Western Siberia. Because there are no gas pipelines eastward through Siberia, pipeline exports to Europe cannot be re-directed to Asia. Gas unwanted in Europe remains stranded, with no possibility of generating revenues for Russia.²⁷ However, for Europe, to cut off these imports in one go entails the systemic economic and political risks flagged above.

These are the circumstances under which the gradual scaling down of gas imports – unilateral sanctions by country, or over time, if Europe acts as one player – is the best option. As long as the commitment (and the schedule) to scale down is credible, it is not economically rational for Russia to retaliate by curtailing pipeline exports before Europe does.²⁸ Once the gas flows are small enough for their disappearance to no longer threaten the economies of the importing countries, sanctions can be enforced (and why not at various levels).

Given the scale of Russia's global energy supplies, a gradual approach to drive down volumes, keep pressure on relative prices, and protect the economies of sanctioning countries is called for. This is best pursued in a voluntary, decentralized and unilateral manner. For this to work, the commitment to scale down has to be credible, the schedule consistent, and the willingness to spend resources on enforcement later on beyond doubt.

The time of mandated sanctions which are enforced does come later. For enforcement to work, it has to be credible. It will be credible once the threat of cutting energy exports by the sanctioned

²⁷ The US has pledged shipments of 30 bcm of natural gas into Europe to help address these risks. However, even that would be possible only as part of a grand political bargain, persuading Asian importers to forgo already contracted shipments of liquified natural gas (LNG), to allow them into Europe instead (and to replace them with coal in Asia). Cf. Collins et al. (2022).

²⁸ Always with the caveat, of course, that economic rationality may not rule the day under conditions of duress. To be precise: It may be rational for Russia to cut off its gas exports despite financial losses, for example if this improves its credibility at other points of the economic conflict.

country is no longer a threat to damage the economy of its adversary beyond what it is prepared to endure.

6. Conclusion

The war in Ukraine is less than two months old. From the early planning stages, economic warfare has been one of its key components. It pitches the core of the world's richest countries against the world's largest commodity exporter. Under the circumstances, energy export sanctions are and will remain one of the most important tools the Western alliance can deploy.

As time goes by, economic warfare is likely to become more important. Its effects will emerge over the long term, but they depend on choices made today.

This paper has traced the short history of attempts at establishing an embargo of Russian energy exports, from the early indirect success via disruptions of the financial sector, to the question of how the future path of sanctions should progress. Is it preferable, to continue today's unilateral and voluntary decision making, with embargoes established country-by-country, for fuels they select; or is it preferable to have a centralized strategy of mandating sanctions and enforcing them?

The conclusion drawn here is that to optimize the path toward an encompassing embargo, the voluntary approach is called for first, while enforcement should be administered later in the process. If that switch happens too early, because the old instincts of centralization prevail – of enforcement in the US, of unanimity in the EU – it will be to the long term detriment of the anti-war alliance.

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