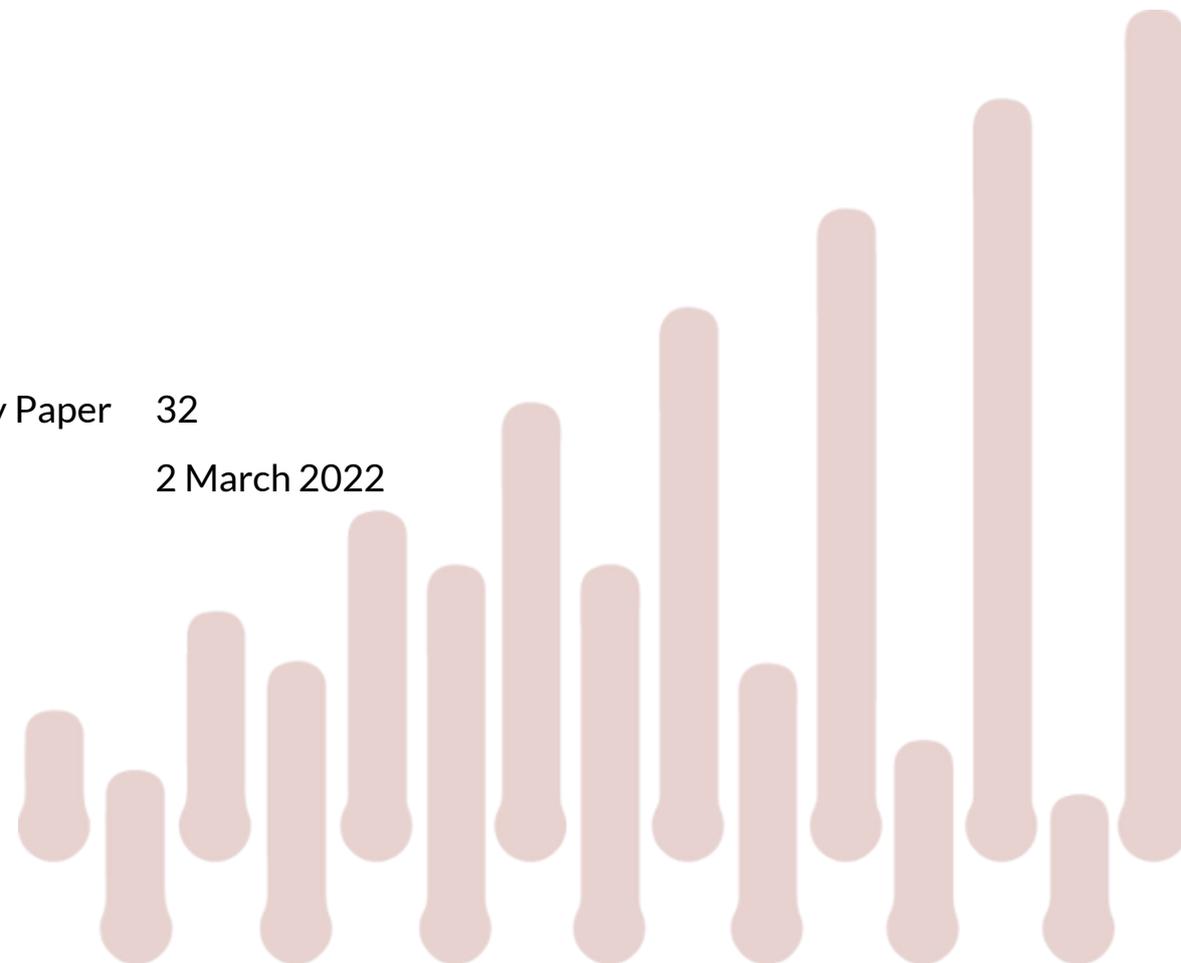


The Economic Costs of the Russia-Ukraine Conflict

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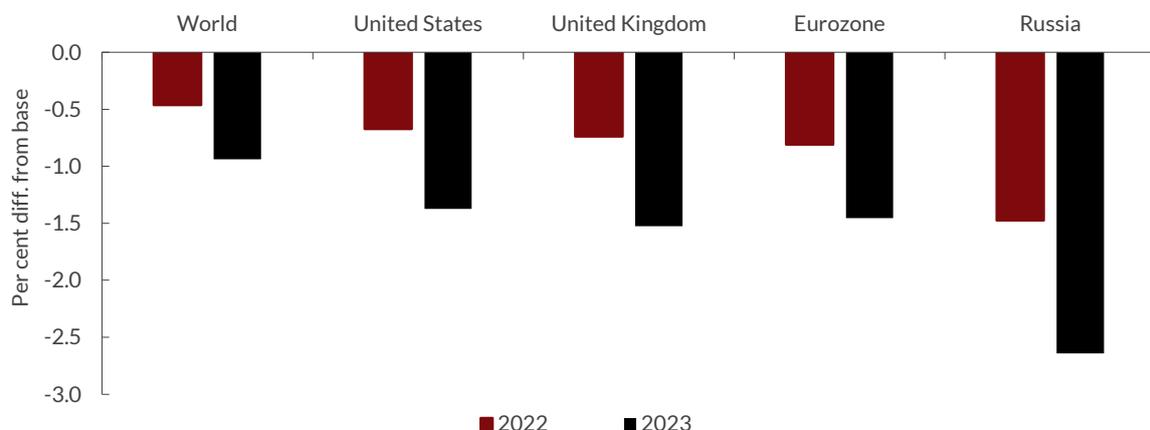
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- Using our Global Econometric Model, NiGEM, we estimate that the conflict in Ukraine could reduce the level of global GDP by 1 per cent by 2023, which is about \$1 trillion off global GDP (Figure 1) and add up to 3 per cent to global inflation in 2022 and about 2 percentage points in 2023.
- Russia and Ukraine are important suppliers of commodities, including titanium, palladium, wheat, and corn, and we envisage supply chain problems intensifying for users of such commodities, including car, smartphone, and aircraft makers.
- Europe is the region affected most, given trade links and reliance on Russian energy and food supplies; emerging markets are affected less than advanced economies.
- We expect higher public spending to support a massive inflow of asylum seekers from Ukraine and to bolster military spending, which will limit adverse effects on European GDP, though both are likely to add to pressure on resources and therefore inflation.
- The sanctions costs to Russia are partly offset by higher prices for gas and oil exports but the net effect on the economy will be negative with Russian GDP expected to contract by 1.5 per cent this year and more than 2.5 per cent by the end of 2023.
- Russian inflation is expected to soar above 20 per cent this year. Western inflation to go still higher with recession risks mounting.
- We see the impact on the UK could be to reduce GDP growth by around 0.8 per cent to 4.0 per cent in 2022 and to 0.5 per cent in 2023.
- For the UK, we now expect inflation to average 7 per cent in 2022 and 4.4 per cent in 2023, up from 5.3 per cent and 2.7 per cent, respectively, in our February Outlook.
- The war intensifies the dilemma facing monetary policy makers since it will add to inflation but weaken growth and damage consumer and business confidence, already undermined by Covid-driven price increases.
- Our advice is for central banks to proceed carefully but to use communication to signal that any delays in rate hikes are merely postponements, not cancellations.

Figure 1 The GDP cost of the conflict for the global economy

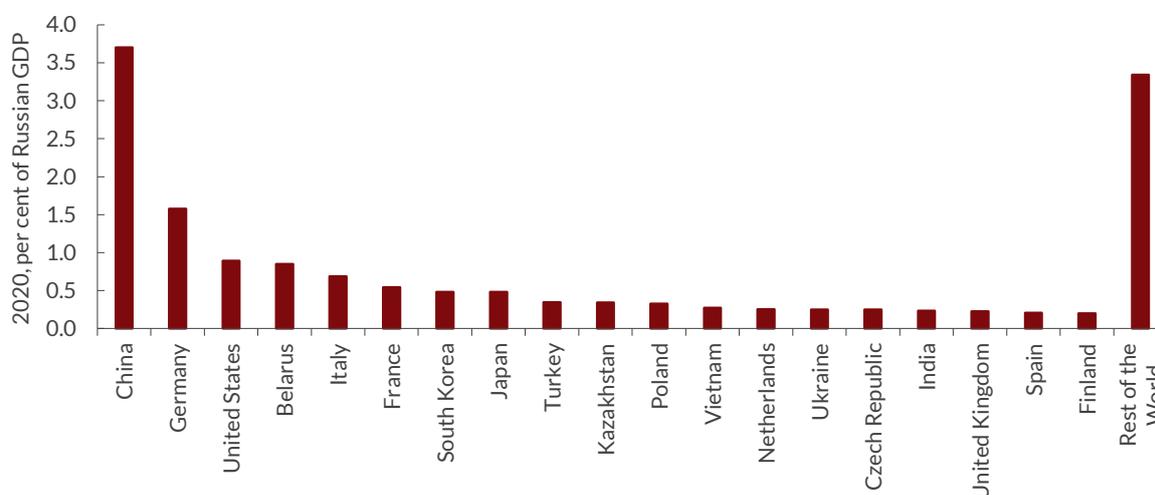


¹ This simulation is conducted in NiGEM and is available to model subscribers on request. Contact Iana Liadze for more information (enquiries@niesr.ac.uk).

Source: NiGEM simulations

The main impact of the Russia/Ukraine conflict on the world economy is through higher prices for energy and weaker confidence and financial markets, bolstered by strong international sanctions against Russia. Ukraine is not a significant trading partner for any major economy, Russia has a great exposure to the European Union and the UK. Countries such as China, US, Germany, France and Italy represent one of the major import partners for Russia, where Russian demand accounts for between 1-3.7 per cent of its GDP (Figure 2). Russia's share of global GDP was expected to be 1.6 percent in 2022, according to the International Monetary Fund (IMF), whereas Ukraine's economic output was predicted to account for 0.2 percent of world production. While the Ukrainian and Russian economies are in aggregate small in relation to the global economy, they are significant in some key areas, particularly energy and food. The conflict's impact on commodity prices and therefore household spending is more important than potential contagion through trade linkages with other nations. We have estimated these spillover effects using the National Institute Global Econometric Model (NiGEM).

Figure 2 Russia imports by country



Source: authors' calculations based on data from Trading Economics.

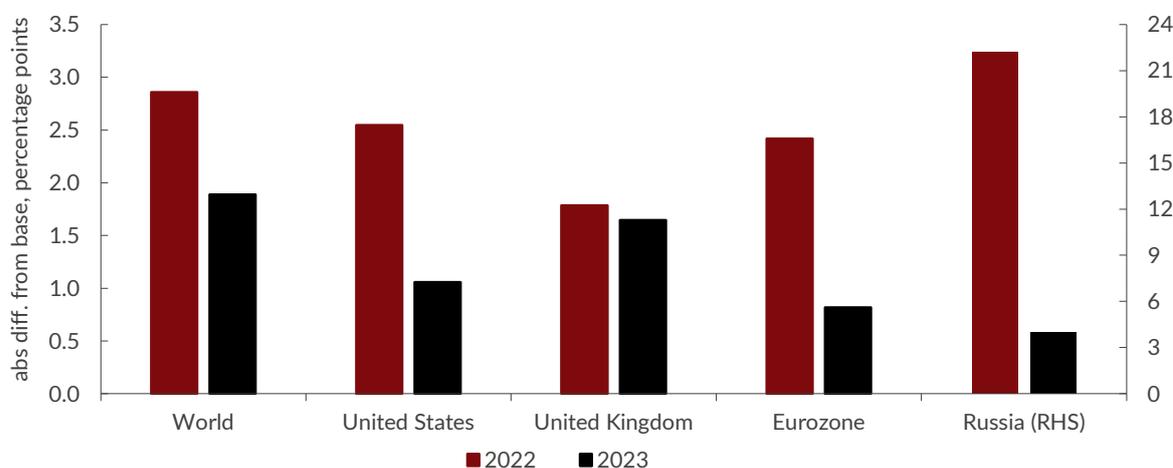
One important channel of trade spillovers is agricultural exports. According to the US Department of Agriculture, Russian and Ukrainian wheat exports are about a quarter of the global total (USDA, 2022). There are also significant exports of corn and other coarse grains, with Ukraine and Russia accounting for nearly a fifth of global exports. About 80 per cent of exports of sunflower oil are accounted for by Ukraine and Russia. Sanctions and disrupted supplies would lead to higher prices for wheat and other grains, adding to already strong inflationary pressures in the global economy. There could also be adverse political implications in some emerging economies that rely on imported grain and where food is a high share of household spending.

In the UK, bread and cereals have a weight of 2.1 per cent in the CPI. While flour prices move closely with wheat prices, this is less true for bread, where the cost of production, ingredients, packaging, and advertising mean that flour is a relatively small proportion of the cost of a loaf of bread (ADHB, 2020). However, higher energy costs mean the cost of baking and transporting bread has risen, and with global supplies already tight, pass through-to retail prices seems likely to be noticeable and might add 0.1 per cent or so to inflation. Higher food prices could have a much more important effect on emerging markets importing grain from Ukraine and Russia, such as Egypt and Bangladesh, where food is a much larger share of the CPI basket.

Further up the tech scale, Russia is a major producer of palladium, used in engine exhausts to reduce emissions, where it produced 40 per cent of global mine production, and about 10 per cent of global platinum supply. Russia and Ukraine produce about 15 per cent of global supply of titanium sponge, used in aircraft. Russia accounts for about 13 per cent of global fertilizer supplies. Disruptions to global supplies of these commodities, added to existing supply chain problems, have the potential to heavily disrupt specific industries and prolong shortages, for example of cars, thus helping to keep prices high.

While exposure to Russian real activity and demand might alone not be material enough to significantly disrupt the global economy, Russia's involvement could also have indirect effects on the world due to Russia being one of the world's largest oil producers and energy exporters. Should a military conflict lead to new international sanctions being imposed on Russia, those sanctions could target Russia's ability to export oil and gas with an ensuing escalation on energy prices.

Figure 3 The inflation cost of the conflict



Source: NiGEM simulations

We have seen the Brent oil price surge to over \$100 per barrel, the highest since 2014. Changes in crude oil represent about 40 per cent of the changes in the cost of fuel at the pump in the US, but far less in Europe, where the tax content is significantly higher. We assume that the oil price jumps by \$40 per barrel in our simulation. We expect that this surge will result in US inflation averaging 7.1 per cent in 2022 and 3.5 per cent in 2023, compared with 4.6 per cent and 2.5 per cent, respectively, in our February forecast. In the euro area, we expect inflation of 5.5 per cent in 2022 and 2.1 per cent in 2023, as against the forecasts we had of 3.1 per cent in 2022 and 1.3 per cent in 2023 in the February forecast.

For the UK, we now expect inflation to average 7 per cent in 2022 and 4.4 per cent in 2023, up from 5.3 per cent and 2.7 per cent, respectively, in February (Figure 3).² Inflation peaks at 8.1 per cent in 2022 Q3, 2.3 percentage points higher than at the time of our February forecast. The simulation assumes the Monetary Policy Committee (MPC) responds strongly to the rise in

² The behaviour of the UK inflation is a combination of the UK being a small open economy, with the import prices increase having a larger impact on headline inflation in the short-term, and regulatory assumptions embedded in the baseline.

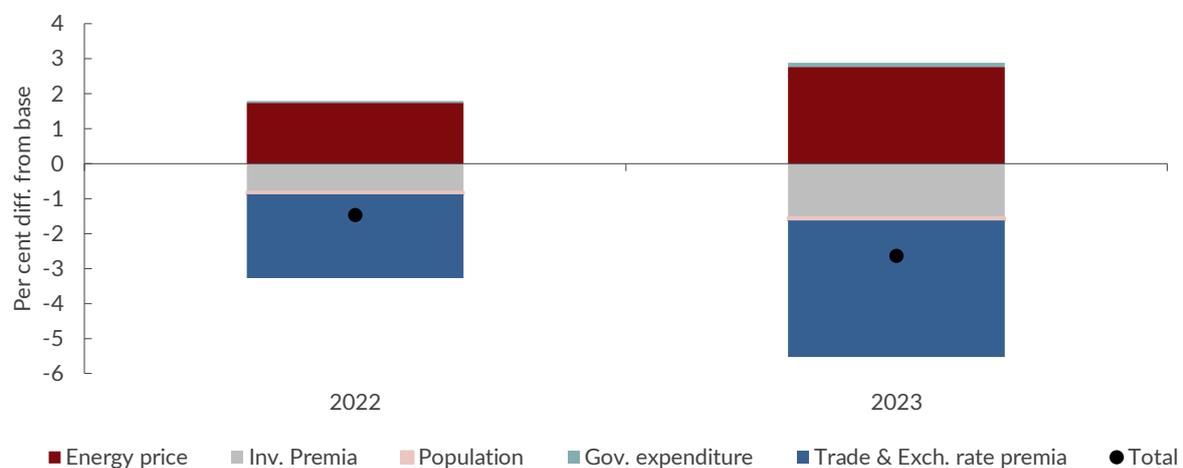
inflation. As argued by Stephen Millard at the Treasury Select Committee on 28 February, the MPC may decide to raise interest rates more gradually and by less than is implied by our simulation on account of the ongoing uncertainty and the possibility of a recession. In that case, it is possible that inflation may peak at a higher rate.³

Regarding our modelling assumptions, there are several channels to consider.

First, the economic sanctions on trade to Russia. More than 80 per cent of Russia's daily foreign exchange transactions and half of its commerce is in US dollars. The United States, the European Union, the United Kingdom, Australia, Canada, and Japan have declared intentions to target banks and rich individuals, while Germany has put a stop to a major Russian gas pipeline project. Russian central bank reserves abroad have been frozen, and its banks have limited access to the international payments system SWIFT, though energy transactions and payment of gas bills will still be allowed. These sanctions, which are more severe than the ones imposed in 2014 following the Russian annexation of Crimea, have been deployed in a first tranche, targeting some of Russia's state-owned banks block it from trading in its debt on US, European and Japanese markets.

The EU is also restricting access to European capital markets, preventing access to funds stored by EU banks, and prohibiting commerce between the EU and the two rebel-controlled territories. A partial closure of SWIFT to some Russian banks and the freezing of Russian central bank assets puts in the spotlight on Western bank claims on Russian entities where, according to the BIS, the largest exposures are for banks in Austria, France and Italy. Russian bank subsidiaries outside Russia are facing severe stress, according to the ECB, and may be forced to shutter.

Figure 4 The GDP cost of the conflict in Russia, by type of shocks



Source: NiGEM simulations

Russia might face a prohibition on financial transactions involving US dollars, as well as a restriction in hi-tech commerce with the US and Europe. The United States, for example, might

³ This peak is in line with Stephen Millard's evidence at the Treasury Select Committee on February 28th, 2022. Supply bottlenecks and rises in the prices of other (non-energy) commodities mean there is a risk inflation could peak at a higher rate, possibly as high as 11%, but this is not our central expectation.

prohibit corporations from selling semiconductor microchips to Russia. This sanction would affect not just Russia's defence and aerospace sectors (worth USD 6.25 billion of Russia's imports), but its whole economy. Overall, we expect economic sanctions could result in a curtailment of Russian imports of up to 30 per cent, though the extent of circumvention of restrictions through trade conducted through third countries makes this difficult to gauge.

Overall, we see the war contributing to a fall in GDP in Russia (relative to base) of 1.5 per cent in 2022 and 2.6 per cent in 2023. Russian inflation will spike due to higher import prices following the fall in the rouble and due to higher inflation expectations (Figure 4). The adverse effect will result in lower confidence, weaker real incomes, and disrupted trade. The overall effect on Russia's GDP is not going to be entirely cushioned by higher Russian revenues from exports of energy. If sanctions were to extend to Russian energy exports, the implications for the Russian economy would be much more severe, but the cost to the West would be still higher energy prices and a bigger growth hit, increasing the chances of recession accompanying significantly stronger inflation.

Secondly, significantly higher energy prices will feed into inflation. In the US, for instance, in the CPI relative importance of energy is 7.3 per cent, with energy commodities, such as fuel, accounting for 4 per cent and energy services such as electricity and piped gas 3.3 per cent. In the UK electricity, gas and other fuels' account for 3.3 per cent of the CPI with fuels and lubricants accounting for a further 2.7 per cent. Because many of the world's economic development engines, such as China, Japan, and Europe are net energy importers, increased oil costs will limit global growth. The US is self-sufficient, but higher oil prices will transfer income away from consumers to producers, with a potential adverse effect on demand there also. Meanwhile the increased income of energy producers will not be spent immediately, meaning that the oil price shock transfers income from spenders to savers, thus subduing global GDP.

The European Union is the most vulnerable of the major economies, not only to increasing costs, but also to the risk of energy shortages. Almost one quarter of the EU's crude oil imports from outside the EU, and almost half of the EU's imports for natural gas, come from Russia. The EU energy dependency rate, measured by the share of net imports (imports minus exports) in gross inland energy consumption (defined as the sum of energy produced and net imports), shows that the EU relies upon imports to meet more than 60 per cent of its energy needs. This means that the reaction to a surge in energy prices in the EU depends not only on the energy intensity of imports of EU Member States but also the share of imports from Russia. European reliance on Russian gas varies from zero in Spain to about 40 per cent in Germany and Italy but much higher in eastern Europe such as Czech Republic and Bulgaria. With summer coming, gas supply shortages in 2022 may not disrupt the economy too much, but the most crucial period if there are interruptions to gas supplies will be next winter. Rebuilding gas in storage over the summer will keep gas prices elevated. There is likely to be a significant investment in green energy in Europe and on port facilities to import LPG to reduce reliance on Russia, though this will take some time to build up: this will further add to GDP.

Were sanctions to be placed on Russia's energy exports (i.e., Western nations could refuse to buy oil and gas from the big Russian energy giants such as Gazprom or Rosneft) or were Russian gas exports used as a tool for leverage through lower supply, European energy prices would rise precipitously. If that happens, European energy prices will probably exceed the \$140 per barrel observed in 2008.

Third, there is the problem of asylum seekers. The UNHCR says there could be 4 million refugees as the crisis unfolds. Shorter term, there will likely be considerable migration from Ukraine into

western Europe, with Poland likely amongst the most important recipients in the first instance. In 2021, more than 600,000 people left Ukraine, not to return. In 2015, almost a million and a half migrants sought refuge in Europe during conflict in Syria, Afghanistan and elsewhere. Depending on what border controls are erected in Ukraine, how long the conflict lasts, and how the economy settles down after the war, large scale emigration seems likely. We have assumed a net outflow of two million a year in 2022 and 2023. This will present substantial challenges, mainly for western Europe, in terms of finding homes, public finances, providing jobs, and possible social tensions. The OECD in 2017 calculated that the initial year cost of an asylum seeker was about €10,000. In 2016, asylum seekers cost Germany over €20bn (Kroet, 2017). The fiscal cost of asylum seekers in Germany in 2015 was about 0.5 per cent of GDP, in Sweden about 1.35 per cent of GDP; and in Austria in 2017 and 2018, the cost was about three-quarters of a percentage point of GDP (OECD, 2017). Evidence suggests that these costs decrease in subsequent years as asylum seekers find jobs and add to tax revenues (Joakim, 2021; d'Albis et al., 2018). We see the problem of Ukrainian refugees as a European problem and would urge centralised funding in the EU, to alleviate the burden that would otherwise fall disproportionately on some Eastern EU countries, like Poland. In our simulations, we have increased public spending by 1 per cent of GDP in countries neighbouring Ukraine and added to public expenditure equivalent to 0.5 per cent of GDP elsewhere in Europe.

The conflict is expected to increase spending not related to the need of first assistance of refugees, but also defence expenditure. As China rises and increasingly challenges the US in Asia Europe, faced with a belligerent Russia, will have to spend considerably more on defence than hitherto. That will present considerable fiscal problems when it is already facing demographic challenges and some key players face profound debt problems coming out of the pandemic. For instance, NATO EU countries which are particularly exposed to the crisis, such as Germany, have boosted military spending, finally giving in to the US pressure to bring defence expenditure close to 2 per cent of GDP. There is a strong likelihood that defence spending will increase in NATO, over the next few years: we have assumed this would amount to 0.5 per cent of GDP over two years roughly equal to a 30 per cent rise in defence spending in Western Europe, where most countries do not meet the NATO target of a spend of 2 per cent of GDP, with the average being 1.6 per cent. Outside of NATO, countries such as Sweden, Finland and several Eastern European countries are also likely to drive a significant acceleration in defence spending in response to the Russia-Ukraine crisis.

Fifth, there is political risk and uncertainty. Russia's Ukraine invasion has up-ended many key western assumptions about the post-Cold War order. Indeed, the invasion symbolizes the shift in global power and a move away from the unipolar world that followed the collapse of the Soviet Union. U.S. hegemony has withered, and we are in a multi-polar rather than unipolar world, which is more dangerous (Mearsheimer, 2019). Uncertainty may drive up savings ratios and make firms more reluctant to invest. On the other hand, the crisis is another potential challenge to globalization, coming after trade disputes and Covid, and so manufacturers may be tempted to re-onshore some facilities.

With the freezing of Russian central bank assets, its banks' access to SWIFT being restricted, and Germany and the EU being willing to supply arms to Ukraine, risks in Russia are clearly more profound than elsewhere in Europe, with the rouble plunging on foreign exchanges (we expect it to continue its descent) and the central bank hiking interest rates to 20 per cent to contain inflationary pressure. Russian bank subsidiaries abroad have seen share prices fall precipitously and there have been queues at cash machines in Russia on worries of bank liquidity problems.

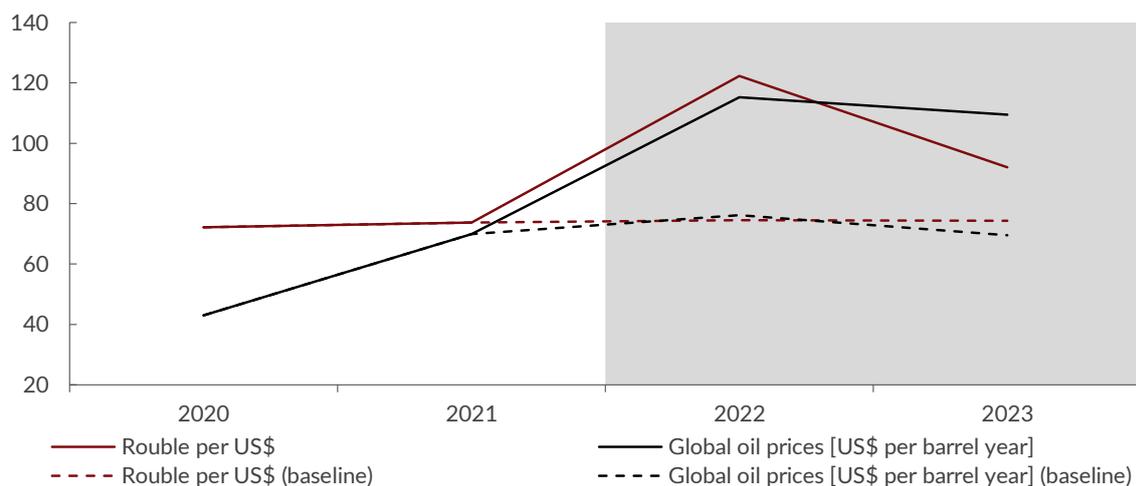
Lack of access to imports will result in supply chain problems, though Russia will seek to source supplies through countries not applying sanctions.

In Russia, inflation is likely to surge while the crisis will damage economic activity, though higher oil prices will buoy revenues. An increase in political risk and uncertainty mean inward foreign direct investment flows will soon dry up and restrictions on exports would increase the reliance on money printing to finance the war, increasing upside inflation risks. Worries over counterparty exposures to Russian entities will keep new lenders cautious and those expecting debt payments nervous. Risk premia on some European banks have risen, and share prices have fallen. Markets will be watchful for any sign of default or liquidity problems for firms with strong links to Russia.

Our recent analysis in the Winter 2022 Global Economic Outlook illustrated GDP growth and inflation risk estimates for both the global economy and the Euro Area based on the possibility of continued natural gas price increases starting from 2022Q1 (Macchiarelli et al., 2022). Here, we supplemented this price risk with a 4 percentage point investment premium shock in Russia, 2 percentage point in Ukraine, both equivalent to what observed during the financial crisis, and 0.5 percentage point applied to all EU countries. This shock can be thought of as representing an escalation of the situation in the Ukraine that represents a defence threat in the European immediate neighbourhood, as it will increase country risks.

We have already seen that stock prices globally have been adversely affected by uncertainty over Ukraine. A partial or full Russian occupation of Ukraine would raise serious questions about what the reaction of the West would be in terms of stationing more troops in Poland and other countries adjacent to Ukraine, Belarus, and Russia, and what the Russian subsequent actions could be, with particular questions over the Baltic states. In these circumstances, risk premia would be high, and investment might be deterred, in line with our assumed increase in risk premia.

Figure 5 The Rouble and energy price inflation



Source: NiGEM simulations

In our simulation, the downside range of the scenario implies that global GDP declines by 0.5 per cent in 2022 and close to 1 per cent compared with base in 2023, about 1.5 per cent lower for the Euro Area in 2023; Russian GDP is 1.5 per cent below our baseline this year, with the negative impact estimated to be up to 2.6 per cent next year. Increasing announcements of Western corporate withdrawals from Russia will reduce foreign direct investment, lead to

outflows of capital that will soften the exchange rate and reduce know-how and technology transfer to Russia, reducing its long-term potential growth rate. Nearer term, component and shipping container restrictions could exacerbate supply-chain problems, reducing activity and increasing upward price pressures. The unprecedented actions against the Russian central bank will act to curb availability of foreign exchange, which could crimp imports, while being a potential source of risk in the domestic banking system, where demand for liquidity has sharply increased, draining funds from the banks and limiting credit. These effects are difficult to quantify but suggest that the risks to our Russian growth outlook are on the downside and on inflation on the upside. The rouble is expected to plunge by up to 70 per cent as the result of an increase in risk and higher Russian inflation, which could be in excess of 20 per cent this year (Figure 5). As the result of the conflict, the UK economy could experience up to 2 percentage points higher inflation this year and the next.

The broad implications of this scenario are reminiscent of the 1970s energy crisis, when OPEC countries effectively raised the price of oil, and subsequent oil price shocks. Higher prices and supply limitations severely disrupted economic activity in the global economy and led to higher inflation, which would also increase the cost of living and could further squeeze household consumption.

The ECB recently opined that high energy prices would knock 0.2 percentage points off European growth. If gas supplies were interrupted and that if there were rationing the ECB said that the impact could be much worse, calculating that a gas rationing shock could knock GDP down by 0.7 percentage points (ECB, 2022). If Russian gas supplies were to cease entirely, the EU could go into recession. The UK draws most of its gas imports from Norway and produces a sizeable chunk of its own gas needs, so interruptions in supply would be less likely, but it would suffer from higher wholesale gas prices. With Ofgem limiting gas price hikes to households, higher wholesale gas prices would pressure the financial position of gas suppliers and, if it were to act to moderate the effect of higher prices, the government (Mortimer-Lee and Patel, 2022a, 2022b). Gas prices at the household level would likely rise when Ofgem reviews price limits again in October.

Near term, President Putin's demands over recent weeks extended beyond Ukraine, and it should be expected that he will use any military victory to pressure NATO for concessions elsewhere in Eastern Europe, with the clear threat that if it does not get what it wants, further aggression is likely. His calculation will be that the US will not risk nuclear war with Russia over the Baltics, say, or over Sweden and Finland joining NATO. We thus seem to be in for an extended period of high tension where Russia repeatedly tries to strong-arm the West. Those tensions will increase if, after a potential successful occupation of Ukraine, arms flow to Ukraine resistance groups from neighbouring countries.

The war in Ukraine represents a challenge for the global economy with only a few winners – energy exporters – and many losers. It calls into question monetary policy makers' strategy since it will simultaneously harm growth and put upward pressure on inflation when inflation is already at high levels. In the short run, higher rates cannot mute the higher prices resulting from the war but could exacerbate any fall in confidence and activity. Longer-term, lower activity will help to mute the second-round effects on prices so for policy-relevant horizons, monetary policy may not need to respond that much to the war itself. The dilemma for central banks is what to do about rate hikes already in the pipeline. The Gulf War contributed to the early 1990s recession and its end helped the recovery (Silk, 1991). In the face of uncertainty about the impact on activity, and about the possibility of a gas supply interruption in Europe, our advice is

for policy makers to wait for more information about the extent and effects of the war before raising interest rates. However, delay risks entrenching inflation, so that if they feel they must raise rates in the months ahead we would counsel doing so only slowly while they assess the impact on confidence and activity of the war and its squeeze, through energy, on real incomes.

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