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The World Will Never be the Same – The Russia-Ukraine Conflict as a Trigger Point for (Infrastructure) Investors

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[3] Note: Views expressed are those of the author at the time of writing and are subject to change. GGI and any affiliated organisations may hold different views and may make different investment decisions. While any third-party data used is considered reliable, its accuracy is not guaranteed. This paper does not provide investment advice but aims to stimulate thinking and discussion. The value of your investment may become worth more or less than at the time of original investment.

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1 Preamble

1.1 Thoughts for the people affected by the conflict in the Ukraine

Before discussing mostly investment aspects that the Russia-Ukraine conflict has triggered, we would like to emphasize that no financial consideration and economic discussion should let us forget that this conflict has seen human suffering on a scale that Europe had been previously spared for a long time.

We want to express our deepest sympathies with everybody who has been drawn into this conflict and suffers because of it. Our thoughts are with the many civilians and soldiers who have lost their lives and their family and friends, with the victims who have been hurt, the people who had their homes and livelihoods destroyed, and with the refugees who had to flee the regions in the Ukraine that were attacked.

1.2 Motivation of this paper

Our intention in sharing with you the insights in this paper is not to provide investment advice nor to impart how we at Generali Global Infrastructure invest.

We have asked an external expert to provide an analysis of the current situation and crucially what it may mean for the longer-term investors who are interested in getting a better and more nuanced understanding of the key drivers for change and how they are affecting the environment in which we take investment decisions. Patrick Liedtke's point of view is aimed as much at informing and educating us and our clients as it is to elicit discussion, providing the impetus for a deeper and more comprehensive exploration of what awaits us in the future.

We thank him for his stimulating work, which is part of the many sources of intelligence and data that we use to make the best investment decisions for our clients.

If following the reading of this paper you are interested in engaging further with us, we would like to invite you to contact us.

Philippe Benaroya

CEO of Generali Global Infrastructure

2 Introduction

Geopolitical events come and go. And while wars are human tragedies, unless they affect major economies their effects on financial markets are usually limited and transient. The historic databanks are full of examples how stock and bond markets recover after an initial shock. Sometimes this takes longer, but the conventional wisdom is that unless there is a major and lasting disruption to the world economic system, the world will keep turning and finance will move on.

In this report, we will make the case for why we believe that the Russia-Ukraine crisis is different. It is different for several reasons. Even though Russia's economy is only a fraction of the US, EU or China, its role in the world is much more relevant than this. In the GDP ranking of nations, Russia only occupied the 12th spot in 2019 with a GDP according to the IMF of USD 1.67trn. To compare, this is one spot above Spain and four below Italy. And the Ukraine figures in 57th position, with a GDP of USD 147bn.[4]

Qualifying the conflict as having only limited impact purely because the GDP of the nations involved is small compared to the rest of the world, neglects the role of Russia as an important producer of energy, in particular fossil fuels, and of commodities, especially metals and uranium. We shall analyse the latter in more detail, but even though Russia is a top producer of many raw materials, our reasons for why this crisis will have longer lasting effects lie elsewhere.

The Russian crisis is an inflection point at the end of an era. For several decades, the world moved ever closer, and globalisation brought unprecedented growth and prosperity to many parts of the world. Lasting peace allowed many nations to reap a "peace dividend" in the form of lower military spending, which allowed more investments elsewhere. However, a few years ago this trend started to slowly reverse.

As the Russian bombs are bringing devastation to a European country, several things suddenly become more apparent: First, with an unprovoked attack by one of the leading military forces in the world on a neighbouring nation, the premise of global (relative) peace, at least among the larger nations, no longer holds. The world is reacting to the Russian violation of Ukraine's territorial sovereignty by rearming itself. The peace dividend is gone.

Second, the energy and raw material dependency on Russia has created a deeper rethink about sourcing and supplying in the future. While Europe is at the forefront of changing its procurement systems, particularly sensitive given its high dependency on Russia, it is not alone. Other nations are reconsidering how far they should have concentration risks in their economic production system and are keen on reducing them.

Third, while the CoViD pandemic already led to nations becoming more occupied with themselves, the war has disrupted global supply chains to a larger extent than the GDP-weighting of Russia or Ukraine would suggest. Nations are now shunning the exposure to countries that do not share similar values and have government systems that are different from their own. While during the period of accelerated globalisation the thinking was that closer interconnectedness would lead to change and transform autocratic governments into democratic ones, Russia has demonstrated that this is a fallacy. As Russia attacked Ukraine, so the world looked at China and Taiwan with trepidation.

And finally, the world is waking up to a new macroeconomic environment. The long period of ever lower interest rates and tame inflation is truly behind us. Many countries will see inflation in 2022 like they have not experienced in the working lives of many of their adult population. According to the IMF, the annual inflation rate in the US accelerated to 7.9% in February 2022, the highest since January 1982. And Europe and other leading nations are likely to experience worse. As inflation is on the rise,

[4] Source: IMF data as per www.imf.org/en/Data, accessed on 29 March 2022.

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the future growth prospects are falling. The world is likely to move from a period of relatively constant growth, that not even the Global Financial Crisis and the CoViD pandemic could derail for long, to a period of reorganisation where growth will be very uneven and overall lower.

It is not the Russian war in Ukraine that causes the future to be different. It is a different future that begins with the Russian war as the first major event of a new era.

3 Geopolitical situation

3.1 The slow but steady depart from globalisation

For the better part of the past 75 years, the world moved gradually towards closer interconnectedness. Modern infrastructure, especially transport and communications, made it possible to create supply chains stretching tens of thousands of miles across the world. They facilitated the growing exchange of information, investments, goods and services on a world-wide scale. Globalization became the term used to describe not only this exchange but the resulting growing interdependence of the world's economies, cultures, and populations.

The creation and then steady expansion of what is today the European Union, the establishment of the North American Free Trade Agreement (NAFTA), the Asia-Pacific Economic Cooperation (APEC), and finally the World Trade Organisation were important milestones towards more globalisation. Seminal events like the fall of the Iron Curtain, the rise of the Asian Tiger economies and particularly the accession of China to the WTO exemplified the movement towards increasingly closer (esp. economic) relationships amongst nations.

However, that trend slowly started to lose its impetus and began to even reverse upon itself. While world trade as percentage of GDP[5] increased from 25% in 1970 to 61% in 2008, it then started to decline, falling to 51.6% in 2020.[6] Foreign direct investments (FDI), another indicator for world interconnectedness that had grown for a long time,[7] fell to USD 1.5trn in 2019 (the last year before the pandemic), thus being much lower than the USD 2.7trn in 2016 or indeed the peak of USD 3.1trn in 2007.

Seminal events in recent years that underline the new movement towards deglobalisation include: the shift in US foreign policy (especially vis-à-vis China), Brexit (the first major reversal of the European integration trend since World War II), a reconsideration of far-reaching production chains under climate change considerations, as well as the often very nationalistic and protectionist response to the CoViD pandemic (incl. independent and uncoordinated measures to contain transmission, limitations to global vaccine distribution, arbitrary travel restrictions etc.).

With the Russian-Ukrainian conflict, two things have happened and very quickly so: Firstly, the previously rather overlooked movement towards de-globalisation has received a massive boost and is now more widely recognised. And secondly, next to the prior mostly economic and financial considerations regarding supply change organisation, another dimension came to the fore: the increased vulnerability to political events and military operations. The latter has led, in turn, to a reconsideration of national attitudes towards countries that do not form part of the same economic and military alliance.

[5] Source: World Bank Data as per *data.worldbank.org/indicator/NE.TRD.GNFS.ZS?end=2020&start=1970*, accessed on 25 March 2022.

[6] While the global coronavirus (SARS-CoV-2) pandemic saw a sharp drop in 2020 in global trade as percentage of GDP, which stood in 2019 at 56.3%, it is notable that the growth trend had been broken in 2008, for every year since then has been lower than the peak value of 61%.

[7] Indeed, FDI grew steadily during the 1990s and then suffered two periods of set-backs, from 2001 to 2003 in the aftermath of September 11 and the dot-com stock crisis, and then again from 2008 to 2009 as a consequence of the Global Financial Crisis. However, FDI grew fast after these periods making up lost ground fairly rapidly and reverting back to an upwards growth trend. It has only been in recent years that the long-term growth trend was broken.

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3.2 The Russian invasion of Ukraine as a trigger point

When the Russian tanks started rolling into Ukraine, it was not merely the start of a local military operation but became the cause for a series of widespread and cascading reactions by many countries opposing the invasion. These in turn led to several rounds of retaliatory responses amongst the involved nations and their allies. Next to the military consequences of the attack (ongoing war in Ukraine, NATO deployment in Eastern Europe, military budget increases etc.) an avalanche of economic and financial measures was unleashed by and upon the world. The introduction of sanctions and embargoes by the US, the EU, Ukraine, Russia and many of their respective allies has had widespread impact and will produce lasting effects.

As the conflict unfolded, it became clear very quickly that its ramifications would not be limited to the military and economic dimensions but be far more pervasive. The exclusion of Russia from international bodies (ranging from the economic and financial like the Swift payment system to the cultural like sporting events), the introduction of travel bans, operational restrictions, asset freezes and seizures have unravelled also cultural and social ties that previously had existed for many decades. Suddenly the world is clearly headed in a new direction.

3.3 The renaissance of national and regional independency and autonomy

After the second world war, the Allied nations that had fought fascist Germany and Italy in Europe and imperial Japan in Asia came to the realisation that a repeat of the punitive policies following World War I was not the best approach to create lasting peace and stability. Instead, they aimed at reforming political and social structures in the countries that had lost the war, pursuing a strategy where closer financial links, economic cooperation and social interaction would make a war less likely. This plan was hugely successful in Europe and Japan, sparking the creation of the European Common market (later the European Union) while in Asia, Japan became an important partner to the US and Europe.

This valuable lesson was not lost on the Europeans and as the old Soviet Union disintegrated, the European Union, led by Germany as the driving force, adopted in the 1990s a similar policy towards Russia. German Chancellor Gerhard Schröder coined the phrase "*Wandel durch Handel*", ie "*Change through trade*", trying to pull Russia closer towards Europe by creating close economic ties and making Germany consciously gradually more dependent on Russian commodities, especially oil and gas. Other European nations followed.[8] The idea was again to avoid conflict through closer interconnectedness and mutual dependency.

The wisdom of this idea with regard to Russia is now being called into question. The European Commission announced on 8 March 2022 that it "*…has today proposed an outline of a plan to make Europe independent from Russian fossil fuels well before 2030, starting with gas, in light of Russia's invasion of Ukraine.*"[9] The wider conclusion now drawn is that closer economic and financial connectedness, especially without deeper social and political reforms, are apparently not enough to prevent military conflict.

And this lesson is being applied not only to Russia or Belarus by Western nations but also reshaping the position towards China and other nations. Back in 2009, the European Parliament wrote that it "*…believes that democracy requires an effective civil society, which is in turn strengthened by trade and economic relations with the European Union; therefore believes that 'change through trade' is a way to aid China's transformation towards being an open and democratic society benefiting all*

[8] The IEA (International Energy Agency) writes on its website that "*In 2021, more than half of Russia's oil exports went to Europe, which received about one-third of its oil imports from Russia. Germany was the largest European buyer of Russian oil, followed by the Netherlands and Poland.*" www.iea.org/articles/frequently-asked-questions-on-energy-security accessed on 29 March 2022.

[9] As per ec.europa.eu/commission/presscorner/detail/en/ip_22_1511, accessed on 29 March 2022.

sections of society".[10] Since then, the European Union has been more guarded regarding those ambitions while the US already engaged in a trade war with China in 2017[11] and wondered openly following Russia's attack about China's intentions regarding Taiwan.

So, while a general and fundamental reappraisal of the risks inherent in international trade and the dependency of a nation's production systems on other countries is being undertaken, the driving force of globalisation has turned into the contrary and the ideological paradigm of "change through trade" is replaced by a desire for more independence and greater autonomy.

[10] As per: European Parliament Resolution of 5 February 2009 on Trade and economic relations with China (2008/2171(INI)) accessed via www.europarl.europa.eu/doceo/document/TA-6-2009-0053_EN.pdf on 29 March 2009

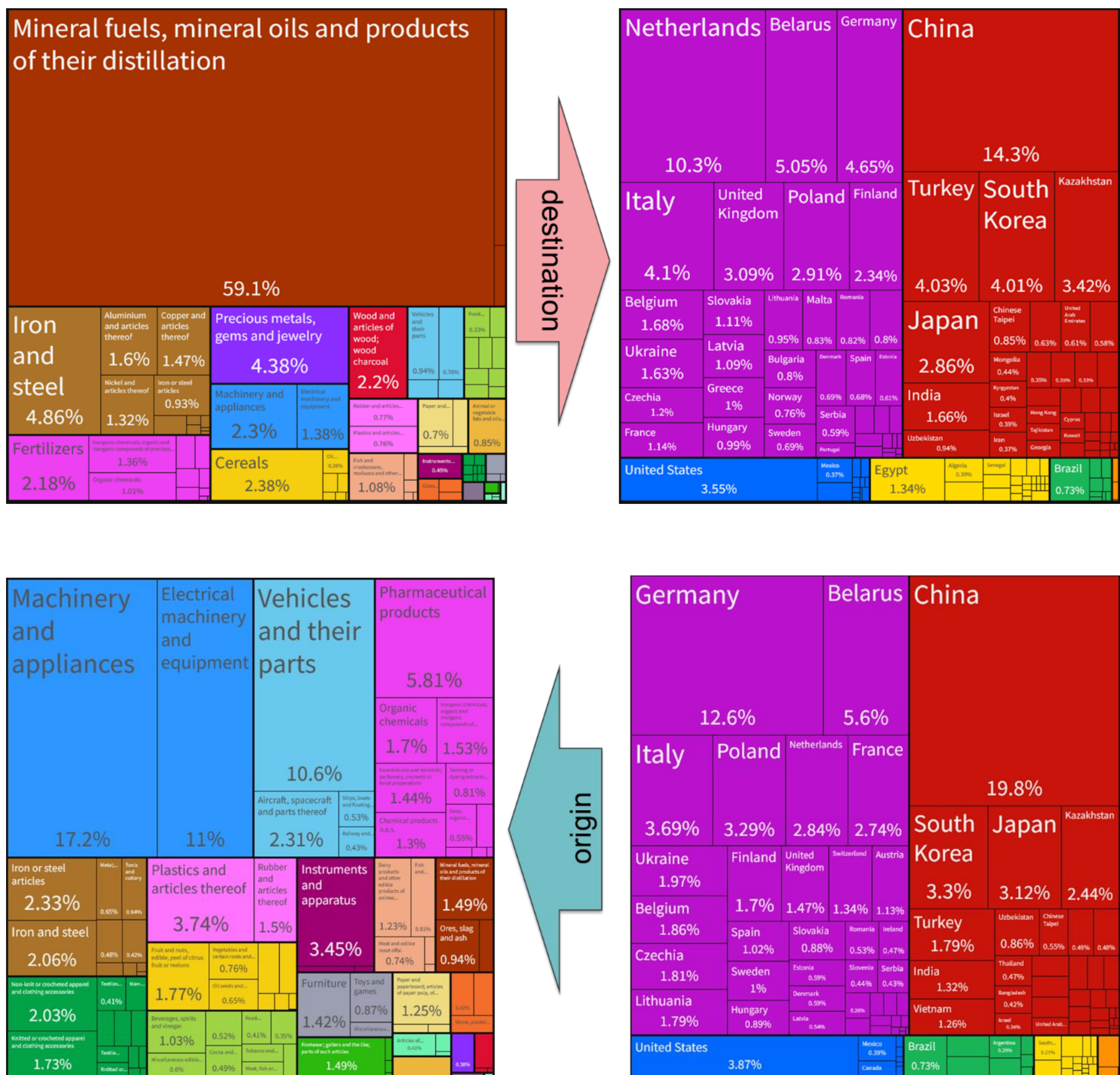
[11] For a deeper analysis of the 2017 to 2021 trade war between the US and China see e.g. Chad Bown's paper "*The US-China Trade War and Phase One Agreement*", published by the Peterson Institute for International Economics, www.piie.com/sites/default/files/documents/wp21-2.pdf

4 Economic and social consequences

4.1 International dependency on Russian primary goods

According to the World Bank, the Russian Federation had total exports of USD 427bn and total imports of 247bn.[12] The GDP of Russia in 2019 was USD 1.69trn. The Federation's exports of goods and services as percentage of GDP amounted to 28.54% and imports of goods and services as percentage of GDP was 20.91%.

A visualisation of Russia's export and import data is shown below.[13]



[12] Last available data for 2019 as per wits.worldbank.org/CountryProfile/en/RUS, accessed on 29 March 2022.
[13] Using the CEPII database for 2019, visualised as per OEC.

With a positive trade balance of USD 180bn and a fairly limited value of imports (at least in proportion of the overall GDP), the Russian economy is not as dependent on foreign goods as many other open economies. However, its exports are highly concentrated and consist of predominantly fossil fuels and metals, which together make up about two thirds of all exports.

From a strategic point of view, the EU countries are highly vulnerable to an interruption of Russian oil and gas deliveries. The International Energy Agency provides the ratio of Russian imports to domestic fuel consumption in 2020 as in the inset table.[14]

Country	Share of Russian oil*	Share of Russian gas
Finland	100%	67.80%
Netherlands	100%	35.90%
Greece	90.90%	38.90%
Poland	76.10%	46.40%
Hungary	59.20%	100%
Germany	37.20%	45.70%
Sweden	33.10%	14.10%
Italy	18.70%	40.90%
United Kingdom	16.90%	3.00%
France	16.70%	20.00%

While the US is one of the top 10 destinations of Russian fossil fuels in absolute terms, those make up only a very small part of the US energy needs and can readily be covered domestically or by other producers. For the UK it is somewhat harder to replace Russian oil (especially diesel) than Russian gas, but its dependency is also far lower than that of the EU. This explains, at least in part, why the US and the UK were quick to ban Russian fossil fuels whereas the EU has been playing for time, particularly to get out of the all-important heating season in Central Europe.

Other sectors are important too: The Food and Agriculture Organization Corporate Statistical Database lists Russia as the top exporting nation for grain in 2020. In 2019, Russia was also the 2nd worldwide producer of platinum, 2nd largest world producer of cobalt, 2nd worldwide producer of vanadium, 3rd largest world producer of gold, 3rd largest world producer of nickel, 3rd largest world producer of sulphur, 4th worldwide producer of silver, 4th largest world producer of phosphate, 5th largest world producer of iron ore, and 6th largest producer of uranium (2018).[15] According to Trade Data Monitor, Russia was the world's leading exporter of fertilizers: In 2021, it shipped out USD 12.5 billion worth of fertilizers, up 78.4% from 2020.[16]

In summary, the world is having a hard time replacing Russian exports but is feverishly trying to do so.

4.2 Disruption of supply chains and their reorganisation

As the Russian war in Ukraine is having a direct impact on certain supply chains, it is also calling into question whether long and complex sourcing arrangements spanning the globe are indeed the best way forward. For many years, supply chain managers tried to optimise cost as their number one priority, often at the expense of resilience. This changed somewhat, albeit only gradually, with the slowing of globalisation, but it became a hot topic when the *Ever Given*, a huge super-container ship, ran aground and blocked the Suez Canal in March 2021. Suddenly, global supply chains looked not cheap but vulnerable.

[14] www.iea.org/reports/russian-fossil-fuel-reliance-data-explorer accessed on 29 March 2022.

* A value of 100% could actually also mean that more Russian oil was imported than used during the year by the country in question.

[15] USGS data as per pubs.er.usgs.gov, accessed on 29 March 2022.

[16] Cited from tradedatamonitor.com/index.php/data-news-articles/145-gold-oil-diamonds-and-fertilizers-10-things-you-need-to-know-about-russian-exports, accessed on 29 March 2022.

However, the Russian attack has also triggered a more fundamental and holistic reconsideration as the world's largest country is being perceived as unfriendly and unreliable by many nations.[17] At the same time, more questions are being asked about the relationship of the Western democracies with China. An important part of the answer seems to be near-shoring or on-shoring of production systems, thus curbing the reliance on other nations, particularly those that do not share democratic systems, free speech, human rights etc.

In a world where alliances are being redefined stricter along lines of differing philosophies of governance and control, supply chains are likely to follow those lines closer than in the past.

4.3 The ESG dimension

Wars are human disasters of the biggest kind. However, any war is also a catastrophe from an ESG perspective, with massively negative consequences for the environment. Just consider the CO2 emissions of armies, the impact of first destroying and then rebuilding the infrastructure after the conflict, the pollution from ammunition and war materials etc.

Nevertheless, longer-term there might be a silver lining for the global environment and the ESG movement. The important shift away from long supply chains will reduce transport emissions in the future. Shorter supply chains require less energy and create consequently lower emissions. In addition, as more supply chains end in countries with high environmental standards, such as the EU and the US, than in those with lower standards, such as e.g. China or Russia, basing more production in such ESG-orientated countries should further reduce greenhouse emissions and avoid other adverse environmental impacts.

While there are currently discussions underway, especially in Europe, to counter the reliance on Russian oil and gas by burning more of the dirtier coal, these solutions are largely meant to overcome a short impasse. Longer term the most promising solution is to curb the dependency on fossil fuels for transportation and heating and replace it with renewable energy. For many years, politicians in the EU have strongly advocated for a move towards greener energy and a lower dependency on external energy provision.[18] This position has been recently reinforced as renewables are seen, too, as a solution to the Russian energy crisis. EU Energy Commissioner Kadri Simson said, "*…ultimately, the best and the only lasting solution is the Green Deal – boosting renewables and energy efficiency as fast as technically possible. We are still far too dependent on fossil-fuel imports; but boosting home-grown renewables help us out of this trap.*"[19]

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[17] The UN General Assembly overwhelmingly adopted a resolution on 2 March 2022, demanding that Russia immediately end its military operations in Ukraine. A total of 141 countries voted in favour of the resolution, which reaffirms Ukrainian sovereignty, independence and territorial integrity. Only 5 voted against. See news.un.org/en/story/2022/03/1113152, accessed on 29 March 2022.

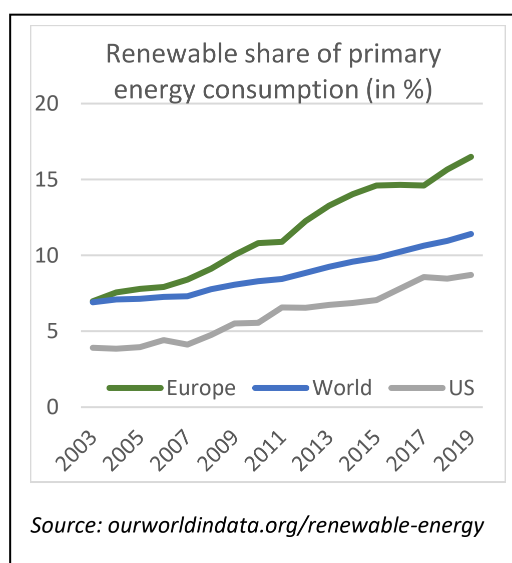
[18] "*The European Commission is committed to policies that will contribute to the European Green Deal ambition of achieving carbon-neutrality by 2050. They are also aimed at boosting the internal energy market, making our energy more secure, more sustainable and more affordable.*" See ec.europa.eu/info/topics/energy_en, accessed o 29 March 2022.

[19]Remarks by Commissioner Simson at the IEA press conference on 3 March, as per ec.europa.eu/commission/commissioners/2019-2024/simson/announcements/remarks-commissioner-simson-iea-press-conference-its-10-point-plan-reduce-european-unions-reliance_en, accessed on 29 March 2022

4.4 Infrastructure demands of the future

4.4.1 Energy

In the previous chapters we looked at the longer-term consequences of the war in the Ukraine and how particularly Europe is in dire straits to find workable solutions. As many countries are keen on replacing Russia as a key energy provider, the regional infrastructure will have to change to accommodate this goal. Firstly, short-term alternatives have to be found to replace Russian oil and gas. It is expected that nuclear energy production will play a more prominent role, as already announced e.g., by France. Other countries like Germany that have tried to avoid it on the grounds of the dangers of its production and the unresolved storage problem of nuclear waste will find it harder to reverse their policy of shutting down nuclear power plants, but the pressure to bring them online again will mount as other alternatives are expensive and slower to build. Dirtier technologies such as an extension of coal burning in Europe are very likely only a brief stop-gap measure while the systems are adapting to the current supply shock.



Source: ourworldindata.org/renewable-energy

The expected winners of the energy transformation are widely expected to be renewable power sources, especially those that also work well in countries with colder climates. Oil and gas shall increasingly be replaced by hydropower, wind farms, bioenergy, solar power or geothermal energy, a development for which there is now an even stronger incentive than before.

Already over the past years, the worldwide energy production mix has moved towards renewables. In Europe it already comprises 16.5% of total primary energy consumption. While many countries are actively changing their energy mix, this has a direct impact on the energy infrastructure. Instead of Russian gas pipelines, Europe will need a more powerful electrical distribution grid, especially as the production of renewable energy takes place in different locations to where the existing power plants are. Those locations will have to be connected to the grid and the grid made more intelligent. Countries in other parts of the world will take notice of the solutions adopted and likely emulate them.

Besides the supply of energy, alternative forms of flexibility for the power system have to be scaled up as well, notably seasonal flexibility but also demand shifting and peak shaving. Governments, particularly in Europe, need to step up efforts to develop and deploy sustainable and cost-effective ways to manage the flexibility needs of the power systems. A range of options will have to be explored, including intelligent grids, more energy efficiency and increased electrification (esp. instead of direct gas use). In addition to demand-side responses, long-term energy storage technologies have to be deployed alongside short-term sources of flexibility such as batteries or pump stations.

Europe also needs to ensure that there is adequate regulatory support to accelerate the business case for these investments.

4.4.2 IT and Communication

The biggest change in the use of IT and communication technologies in the past decade has been the adoption of work-from-home practices as required by the lockdown restrictions introduced in the wake of the CoViD pandemic. Suddenly, with the exception of essential jobs, entire countries started to produce mainly services but also a few goods from home. The existing IT and communications infrastructures were put to a collective stress test.

While the outcome from a business continuation perspective has been largely a success, some shortcomings have become apparent as well. Abundant residential bandwidth and ubiquitous connectivity are still elusive more than 2 years since the first lockdowns, even in the most advanced economies. The reliability of systems is not high enough while data transmission and storage demands shall grow faster than in the past. In this area, further investments will be required as most office workers are expected to mix limited office presence with more productivity at home as part of their normal job routine. Already, several institutions, such as the International Energy Agency (IEA), have called for the establishment of a routine 3-day work-from-home/ 2-day office presence arrangement to save energy.[20]

The Russian war in Ukraine is providing further momentum to the trend of decentralised production. The rapidly rising costs for transportation as a direct outcome of the oil and gas crisis in the wake of the invasion will further disincentivise travel – both locally to the office as well as regionally and globally. The alternative is a further adoption of video conference technology and the introduction of more integrated production systems that can readily assemble an otherwise dispersed workforce. This will require more investment into broadband technologies, 5G telephone systems, data centres and home IT technology.

4.4.3 Transport

While general mobility has been subdued since the beginning of the CoViD pandemic, the Russian invasion will further delay if not entirely prevent a return to pre-CoViD levels. According to Google, the workplace mobility during the week to 21 March 2022 was 22% below pre-CoViD levels. In Germany it was -14%, in France -12% and in the UK -27%. Retail and recreation mobility, i.e. mobility for places such as restaurants, cafés, shopping centres, theme parks, museums, libraries and cinemas, was down significantly as well: -12% in the US, -13% in Germany, -14% in France, and -15% in the UK.[21]

As mobility becomes more expensive, the reliance on delivery systems will continue to grow. This is changing the mix of traffic. More and heavier goods vehicles are replacing family cars. The road networks will have to keep pace with the shift in usage.

At the same time, Europe needs to ramp up its liquefied natural gas (LNG) imports if it wants greater independence from Russian gas. The resulting move towards more LNG, which shall come from overseas, will have to be connected to the existing power system. New LNG terminals and the build-out of the supporting transport and regasification infrastructure are necessary.

Experts at the IEA believe that there is some potential to scale up biogas and biomethane supply in the short term even though the lead times for new projects are significant. The technology is low-carbon and offers important medium-term upside for the EU's domestic gas output. However, also in this area infrastructure investments will be necessary as the biogas has to be transported as well.

[20] See www.iea.org/reports/a-10-point-plan-to-cut-oil-use, accessed on 29 March 2022

[21] As per www.gstatic.com/covid19/mobility/, accessed on 25 March 2022.

5 Key challenges for investors

For the further discussion, there are three core assumptions with regard to how the Russian-Ukrainian war will affect financial markets in the longer term:

- Increased volatility
- Challenges to economic growth
- Surge in inflation

5.1 Increase in long-term volatility

As described in earlier chapters, the Russian invasion has triggered a retaliatory response by NATO and its allies of an unprecedented kind, employing a forceful strategy of economic and financial isolation against the aggressor that few observers would have expected. The full ramifications of those actions and the subsequent reactions by Russia are not all clear yet, but they have already added to a higher degree of uncertainty. As the involved actors countenance measures and countermeasures, it becomes harder for financial markets to project into the future, which in turn creates more volatility.

From a purely military perspective, the probability of a tail-risk scenario, i.e. the use of nuclear weapons in Europe, just multiplied as the Russian invasion was failing to achieve the desired quick victory. This tail-risk scenario has arguably become more probable than at any time since the fall of the Iron Curtain, with unknown consequences for the world. Even if the Russian-Ukrainian conflict were to end soon and without further escalation, the world realised how precariously close it might have come to see the deployment of nuclear weapons on the battlefield, thus creating a lasting effect on military risk analysis for the future. A retrenchment from this scenario would only happen very gradually and over a long period of time.[22]

As the bombs keep falling in the Ukraine, international contracts are being ripped up or unilaterally changed. The US, Europe and other allies refuse Russia access to central bank reserve funds held in their jurisdictions, while Russia seizes foreign assets and declares existing contracts null and void.

For several decades, the level of confidence in international treaties and contracts – be they between nations or between companies of different nations – has been rather high by historic standards and reinforced by a series of international institutions, such as the WTO. However, the Russian conflict has undermined this confidence and going forward investors will have to take into account that economic sanctions and financial measures happen faster and become more painful than during the previous era.

As the world is retreating more within national borders and striving for more autonomy, it will also place less weight on international treaties since they become slightly less relevant for the functioning of a nation. While more interdependence among nations was meant to create more stability, less interdependence is likely to lead to the contrary. And less political stability means more financial volatility.

5.2 Growth challenges

There are some very obvious consequences that stem directly from the current conflict in Eastern Europe and which have an impact on economic growth:

- The war is costing Russia and the Ukraine billions of dollars in military expenditure.

[22] Note: The closest historic parallel that is being drawn up is the Cuban missile crisis of 1962, which very nearly ended in the deployment of nuclear weapons and shaped security thinking for decades to come.

- The allies who are supporting Ukraine's defence effort, are also spending billions providing weapons, logistical and economic support.
- Russia and Ukraine are destroying important parts of the European infrastructure, which have to be rebuilt.
- They created additional cost for other nations, especially NATO, who responded by moving military personnel and equipment, adjusting their defensive capabilities.
- They triggered a rearmament around them.[23]
- In the Ukraine, the war has devastated large parts of the economy already
- The economic and financial sanctions implemented will lead to a deep recession in Russia
- Energy and commodity prices, especially those provided by Russia, surged.
- International companies are leaving the Russian market and future direct investments are curtailed
- Supply chains are being rerouted
- People have left their homes and jobs and are resettling elsewhere
- The IT infrastructures of various countries were attacked
- A further escalation of the energy delivery stand-off between Russia and the EU carries the risk of a European recession

All the above have a negative impact on growth: very significant in the short term but in many cases reducing growth prospects in the longer term as well. A new phase of stagflation has become much more likely. The negative supply shock, coupled with a wider adjustment to the new security landscape, is expected to create higher prices in the absence of meaningful growth.

However, there is an additional element to take into account. The Western retaliation to the Russian invasion was to freeze Russia out of the global financial system. The lessons for nations not dealing in US dollars or Euros is twofold: First, when foreign currency reserves can be frozen so readily – as happened to the Russian assets held at the central banks in the US, EU, Japan, UK, Canada, Australia and Switzerland – then the value of those assets is far less relevant than in the past. As a consequence, other nations will build them less and use them less. Second, when payment systems and banking networks can cut off a nation's financial infrastructure, then that nation – and others like it – will design alternative strategies. It seems that the participation of the countries of the world in American and European designed and dominated financial infrastructures will be considerably lower in the future. This means that transaction costs, which gradually declined as part of the globalisation process, will rise again, thus also dampening future growth.

5.3 Surge in inflation

For many years, inflation in the developed world was more of academic interest than a real business concern. As central bankers watched over inflation developments, the era of globalisation and especially the integration of China into the world economy on a large scale, led to a period of sustained low inflation.

Immediately following the Russian invasion, markets reacted by sharply pushing energy prices up: crude oil is almost 80% dearer year-on-year, gas more than 100%. Other commodity prices have moved sharply upwards as well: lithium over 250% (year-on year), magnesium 150%, nickel 100%, tin and cobalt over 60% while oat, cotton, coffee, wheat and palm oil are up by between 60 and 80%.[24]

[23] The most visible example being Germany's decision to ramp up defence spending by EUR 100bn and committing to keeping it above 2% of GDP in the future. See the speech by Olaf Scholz, Chancellor of the Federal Republic of Germany, to the German Bundestag on 27 February 2022 in Berlin. As per www.bundesregierung.de/breg-en/news/policy-statement-by-olaf-scholz-chancellor-of-the-federal-republic-of-germany-and-member-of-the-german-bundestag-27-february-2022-in-berlin-2008378, accessed on 29 March 2022

[24] Data as per Bloomberg and Reuters, accessed on 29 March 2022.

As energy becomes more expensive, so will the goods that further downstream depend on energy. The inflationary shock to the system has already started to create secondary waves and it is likely that those will not only multiply but are likely to become more pervasive and entrenched. Inflation feeds to a certain degree on itself as it pushes everybody's expectations upwards, thus creating an environment where it can become self-fulfilling. In a low-growth environment, as discussed above, the tools for governments and central banks to combat inflation are severely restricted.

For investors this means that they need to adapt their strategies. Asset classes that provide direct or indirect inflation protection are likely to outgrow those that don't. It will be hard to make a case for bonds in such a scenario and even inflation linkers have their limitations as adverse movement in spreads could frustrate the investment goal.

Overall, it is expected that manufacturers and consumers alike will test their pricing power in the new economy. While most experts expect a period of higher inflation, it is less clear for how long this will last. Monetary policy could yet help dampen it and the adjustments to the production systems might bring more growth faster than we currently think.

At the same time, inflation will not be uniform as certain sectors can pass on costs more readily to the market while others cannot. Equally, the impact on wage growth is going to be diverse from one sector to the next. Specialists in those areas that are growing and those sectors that are most relevant to the adaptation process will see their income prospects rise.

6 Repositioning investments

The key question arising from the earlier analysis is for investors what to do with the insights. How should investments be repositioned when there are fundamental changes to the economic system? We shall look into the three key aspects of volatility, inflation and growth.

6.1 Dealing with volatility

Other than for specific traders who profit directly from more volatility in the market, it is almost always a negative factor. Volatility, particularly when triggered by great uncertainty and more risk rather than technical factors, creates cost. We posit that there are three promising strategies to deal with a period of higher volatility.

6.1.1 Increase diversification in portfolios

First, increase portfolio diversification. Particularly under the scenarios described above, where inflation, growth and volatility are uneven and even less predictable than during previous periods, decoupling the investment success from singular risks is a superior strategy.

This is particularly important when considering not only the dispersion of positions within a given asset class but crucially between asset classes. Traditionally, investors would often look at diversification through the lens of how well their equity portfolios are diversified and then mix in some bond positions to achieve a smoother growth path. However, as we have seen in the past, bond and equity markets can also move in the same direction and then some of that diversification benefit is lost. Luckily, today's investors have more choice among asset classes that are readily investible than in the past. Particularly private investments, which crucially include infrastructure projects, have become marketable more widely. Access to those investments provide another layer of diversification, with different underlying drivers that will respond differently to adverse scenarios.

However, one has to be clear that diversifying away from an event such as a major war, is extremely hard to do. The reaction of the global financial markets following the Russian invasion has demonstrated this once again. Besides, the developments we described above will create more correlation between assets that were previously less correlated as some original value drivers suddenly behave in unison.

In consequence, this is one more reason why savvy investors are going through their portfolios scrutinizing the positions they hold and those that they don't with a new perspective. This offers a chance to create more resilient yet still productive portfolios.

6.1.2 Limit the impact of less stable geographies and sectors

As we have seen previously, there are regions of the world and certain sectors that are more at risk than others. Where the provision of energy and commodities are more concentrated, the risk is higher. Where dependency on single or a few providers exist, the risk is higher. Where supply chains are limited or likely to be rerouted, the risk is higher.

In a world of generally more risk and less geopolitical stability, the existing exposures to geographic risk and sectors with higher geopolitical exposure (think mining, airlines, etc. or investments in Ukraine or Taiwan) ought to come down. It seems prudent to avoid those investments that could find themselves to be in a future conflict zone or that can be easily targeted by sanctions. Of course, as always in investing, markets reward risk taking and so at some point there will be such an adjustment that the higher risks associated with those sectors and geographies will be rewarded accordingly. However, for now most investors hold on to investments that they made under a different regime and for as long as the regime shift is not fully reflected in the price of assets, one has to wonder how well those investments will perform given that their historic price no longer reflects the future risks appropriately.

6.1.3 Use of more stable asset classes

There is a further consideration to be made when deciding on investments. All other things equal, inherently more stable asset classes offer an additional layer of protection. As the financial world has discovered via the more widespread investment in private asset classes, there is a degree of insulation against market movements.

Why? Because the nature of private asset classes shields them from the short-term volatility of public markets. They are not traded every day and there is less liquidity. While those are elements that investors generally like and are ready to pay for, they have marked down private assets which are thus cheaper for otherwise the same risk exposure than highly liquid, publicly traded assets. The differential between less liquid private assets and publicly traded liquid assets can be measured[25] and is referred to as the illiquidity premium.

This premium makes them attractive to investors, who have then found out that there are benefits to holding assets whose (accounting) value do not move with every short-term adjustment of markets. Marking assets to model rather than short-term market fluctuations creates more stable accounts.

Besides, public assets also move as a function of their liquidity, so when liquidity dries up, they become less valuable, which in turn makes them less attractive. This is a risk that private assets, which are by nature less liquid, do not face – at least not to the same degree.

In an environment, where volatility and instability are on the rise, those will feed through the system. A reduction of volatility is thus of more value than previously. Consequently, as from an accounting perspective (as private assets are not subject to mark-to-market accounting rules) there is less volatility and from a liquidity perspective as well (since private assets have significantly less liquidity downside risk) then this is a positive for those assets.

The longer the uncertainty and instability remain, the more financial markets are expected to reward stability and hence inherently more stable asset classes have a high prospect of outperformance than in the past.

6.2 Dealing with inflation

As expectations point to more inflation and rising interest rates, the question that poses itself is how to manage this. The most common way investors have dealt with rising inflation has been as follows:

- Shift portfolio allocation from bonds to stocks. Stock prices tend to outperform bonds when inflation rises so an allocation shift should help longer-term performance. The downside is an addition in risk taking as well as more volatility in the portfolio. The latter is not good given that we expect additional volatility based on the points discussed above, which drives up the equity risk premium. Also, this strategy has limitations in a stagflation environment as stocks tend to perform better when growth is higher. This is a consequence of inflation hurting the real economy so that dividend growth rates fall (or at least cannot keep pace with inflation).
- Diversify geographically into regions with less inflation expectations. It has often been the advice to investors with highly domestic portfolios that they should seek to diversify more internationally. However, in the scenario we describe here, there are limitations as to how much could be diversified internationally when the global system is submitted to inflationary trends and geopolitical stability is more questionable in the future. Trading potential (regional) inflation diversification against the protection in well-functioning advanced markets seems like a tough proposition.

[25] Albeit one has to admit that direct measurements of the illiquidity premium are not readily possible and so the methods to find the illiquidity premium are usually based on stripping away the known value drivers and using the residual as a proxy for the illiquidity premium.

- Invest in bank loans. Traditionally, the strategy to buy bank loans was based on the understanding that banks profit from an inflationary environment as the value of their loans go up and they enjoy a certain leverage. To control risk, the most sought-after tranches are the senior secured loans as they are more stable while the more junior tranches are more exposed and thus more at risk of underperformance. In our scenario, senior secured loans should, fully risk-adjusted, outperform the more junior tranches. However, it is questionable whether an engagement in financial institutions will be so profitable. Banks have profited for many years from globalisation and the ability to operate internationally. As this becomes harder at the same time as sanctions might become more wide-spread, banks will be under pressure. Sanctions also add to the general cost of doing business even when an institution does not fall directly under them as complex rules have to be observed and fraud avoided. This happens right when financial institutions will profit less from globalisation than in the past as the trend has already reversed. However, banks could profit from yet another extension of easy monetary policy. It certainly bears watching this space closely.
- Invest in commodities: It seems like an obvious case to make. When there is price inflation in commodities, it should be profitable to invest into them. In reality, the case is more nuanced and complex. We just experienced a supply shock and financial markets have already reacted to that by driving prices up significantly, especially for Russian-sourced commodities. It is far from certain that those same commodities, which have just become so much dearer, will remain on such a steep upward path. Market adaptations, energy saving strategies, replacement via renewables etc., all could well exert more downward pressure on fossil fuels in the future. Inflation would then be in the system and work its way through the production chain, but it might not increase energy prices further. Commodity prices could then stagnate as well if not fall. This is especially true if the higher inflation in certain sectors crowds out demand for raw materials in others. Or when growth stagnates so much that more capacity is freed up.

6.2.1 Direct inflation protection through inflation linked securities

Another avenue that can be chosen is to directly protect portfolios from inflationary pressures by investing in inflation linked bonds. Treasury Inflation Protected Securities (TIPS) were created by the U.S. Treasury Department in the 1990s in an effort to provide investors with a way to protect their fixed income investments from inflation. Their principal and interest payments are indexed to the Consumer Price Index (CPI), thus providing investors with protection from a decline in the purchasing power of their money. However, they have proven to be an imperfect inflation hedge. This is because the prices of TIPS are not only dependent on inflation – or more exactly on the inflation as measured by the CPI – but also dependent on the prevailing market real interest rate.

Right now, the current yield for a 10-year TIPS is -0.46%.[26] This means that an investor has to pay a premium to invest in a bond with no coupon. Even in an inflationary environment, investing in TIPS will provide a rate of return less than that of expected future inflation. Should the real yield increase, then the price of the TIPS would decline, further diminishing the TIPS' total return.[27] This makes TIPS an imperfect inflationary hedge with limited use.

6.2.2 Fixed versus floating

An alternative to inflation linked securities are floating rate investments. While fixed rate instruments suffer when interest rates go up (and the more so the longer their duration), floaters have a zero duration and move in sync with increasing interest rates. Floating rate investments indeed outperform fixed rate investments during times of rising interest rates, albeit those gains are reduced in real terms

[26] As per market data on 29 March 2022

[27] It is actually possible that TIPS generate negative returns even when inflation is rising. This happens when the movement in interest rates outpaces the inflationary gain on the TIPS.

by increases in inflation. As long as interest rates keep rising as fast as inflation, or even faster, the investors stand to make gains. When they do not keep up with inflation, then the bonds underperform.

While a move towards floating instruments seems a promising strategy at this time, it is not without its pitfalls. The aforementioned impact of inflation outpacing interest rate rises is a real possibility as central banks are caught in a tough spot when a stagflationary environment happens. The inflationary pressure would require them to raise interest rates to cool off price rises, while the absence of growth would call for lower rates to stimulate the economy. It seems implausible to assume that central banks would just focus on one aspect and totally neglect or ignore the other. Hence, a policy of "some of this and some of that" seems most likely. In other words, interest rates might go up but not as much as they would if growth were stronger.

In consequence, floating rate instruments should outperform fixed rate bonds, but they would still not be the optimal solution to our problem.

6.2.3 Inflation-resilient investments

A very different approach to deal with a stagflation environment and a geopolitically more instable world would be to focus on aspects of stability. Ideally, we would find instruments that fulfil a series of criteria that would make them resilient to inflation. In our scenario, they ought to:

- Provide (a certain degree of) protection from inflation
- Exhibit lower volatility, as markets are expected to value that
- Profit from the growth pockets that are expected to exist even in our stagflation world

It seems that there are two asset classes that could fulfil the above: real estate and infrastructure.

Real estate has traditionally been an instrument to use when inflation expectations were rising. While not perfect for short bursts of inflation, investments in real estate tend to be among the asset classes that perform best when inflation is prolonged and endemic. The things to watch out for when looking at real estate investment opportunities are the exposures to geopolitical risk (as discussed earlier). Ideally, the investment would be positively exposed to the trend towards more near-shoring and onshoring.

Infrastructure is a newer asset class, but one that has grown very dynamically over the past decade. Investor value similar characteristics, including inflation-resilience, as they find in real estate. In addition, the sector has profited from many years of underinvestment into infrastructure by governments. International organisations, such as the OECD, have long pointed out that more investments are necessary and would be beneficial to future growth prospects.[28]

Infrastructure is thus not only resilient but also part of a faster developing part of the economy, one where an investment already gap exists. Adding to this the consequences of the Russian-Ukrainian war and (especially energy) policy shift, and it becomes clear that this is a special opportunity in time.

We already noted the need for adapting the transport and energy infrastructures as well as the demands on IT and telecommunication. Providing investment solutions that address the shortfall in existing infrastructure as well as pivoting towards tomorrow's even more pronounced demands, it appears that here is a sector that has all the hallmarks for future success.

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[28] In 2011, the OECD wrote a much-publicised report, saying that "*Governments must act today to ensure that the infrastructure needed in 2020-2030 will be planned, developed and operational in time*". Cf. OECD Project on Infrastructure to 2030, available on www.oecd.org/futures/infrastructureto2030/48634596.pdf, accessed on 29 March 2022.

Obviously, much can go wrong in infrastructure investments as well, as the owners of the Nord Stream 2 pipeline can attest to.[29] Hence, the need to make sure risks are appropriately researched, especially bearing in mind the changing circumstances going forward, and then fully reflected in the investment decisions. That said, the sector is vast, and the needs well identified, so that there are plenty of investment opportunities, especially also in stable regions of the world, and in Western and Central Europe in particular.

6.3 Growth challenge and opportunity

We already identified and discussed the challenges that a lower growth environment creates for investors. Notwithstanding the difficulties that the world will face as we are moving further away from globalisation, become more national orientated again and have to cope with higher uncertainty, there are opportunities. The energy transformation, the need for better transport infrastructure, the shortening of supply chains will create pockets of opportunities that savvy investors can exploit.

The trend towards more ESG-orientated investments has already transformed the investment world. The investment research firm Morningstar wrote that "*Sustainable funds represent a substantial and growing portion of the fund universe—in part due to the launches of new funds, and in part due to existing funds adding ESG factors to their prospectuses.*"[30] According to their statistics and despite the CoViD pandemic, 2020 saw a remarkable acceleration of the trend towards more ESG. In the last quarter of the year alone, ESG strategies brought in record flows of $152 billion, reaching a record asset level of USD 1.6 trillion, and drove a record number of 196 special product launches.

6.3.1 Building out energy infrastructure

In an environment where more infrastructure is desperately needed, energy independence is leading to a decoupling from traditional producers of oil and gas, and ESG and autonomy considerations are privileging local renewable energy production, the investment case to gain more direct exposure in this sector seems compelling.

The announcements by Europe's leading governments to substitute Russian oil and gas with cleaner energy generated in the region is a very visible factor that will drive energy infrastructure investments in Europe over many years to come. How the Americans, who embarked already years ago on a strategy of energy independence – here more focussed on the relationship with the Middle East rather than Russia – found out, changing the infrastructure is a slow and protracted process.

Back in 2011, the OECD projected that worldwide *"…USD 53 trillion of investment, equivalent to an annual 2.5% of global GDP, will be needed to meet demand over the coming decades. Over USD 11 trillion of that will be required for ports, airports and key rail routes alone."*[31] Only a fraction of that sum has already materialised and the situation, particularly in Europe is dearer than before. The report further states that "*[i]ncreased private-sector investment in strategic transport infrastructure will be essential*".[32]

It takes huge investments in different fields, from generation to transportation to usage, to renew systems that were first built and then optimised for fossil fuels. Other energy sources and their carriers find a much less developed environment in which to fulfil the various roles that energy does in a modern economy: heating homes, propelling cars, creating electricity etc. Even though Europe is a

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[29] Nord Stream 2 is an offshore natural gas pipeline running under the Baltic Sea from Russia to Germany. Following the Russian invasion of Ukraine, the German government suspended certification of Nord Stream 2 on 22 February 2022, which in turn led to Nord Stream AG to file for bankruptcy ten days later.

[30] Cf. www.morningstar.com/lp/global-esg-flows, accessed on 29 March 2022.

[31] Cf. OECD Project on Infrastructure to 2030, available on www.oecd.org/futures/infrastructureto2030/48634596.pdf, accessed on 29 March 2022.

[32] Op.cit.

global leader when it comes to the use of renewable energies, it is itself still far from achieving a zero-carbon economy. Most aims target 2050, which seems far away for politicians and business leaders to make commitments but is rather close when considering that energy infrastructure projects take years to build.

6.3.2 IT and communications infrastructure upgrades to cope with demand shift

As pointed out earlier, an additional field where more investments are needed is the IT and communications infrastructure. Already the CoViD pandemic has triggered lasting changes in the organisation of our work and leisure activities that require a strengthening of the IT and communications systems. As the google mobility data we analysed clearly shows, more time is spent at home, with the consumption of decentralised services than in the past.

This creates more opportunities for growth in areas that are, at least partly, decoupled from global physical production and their supply chains. When people have video conferences or watch Netflix movies, they expect high bandwidth and reliability from their telecom providers. Making sure that those are delivered will require additional upgrades to our infrastructure that need to be financed. It and communication infrastructure investments are therefore a similar growth pocket to energy and renewables.

They also share the qualities of being resilient to inflation and, especially once up and running, largely independent of commodities. Hence, supply shocks to raw materials tend to bypass them.

6.3.3 Rethinking social infrastructure

One area that has not received a lot of attention is that of social infrastructure. Social infrastructures include healthcare (hospitals), education (schools and universities) and other public facilities (like community housing and prisons). These structures serve as the backbone for communities and societies depend on the provision of services that are carried out there.

As the CoViD pandemic painfully illustrated, when shocked, the healthcare sector can quickly reach a saturation point. Discussions regarding the triage of patients, something that has been extremely rare in past decades in Europe or the US, became an ongoing issue in several countries. It seems those systems could also benefit from greater investment and while their future is not as directly affected by the Russian-Ukrainian war as other types of infrastructure, it seems that we need to revisit the provision of services in these areas as well.

One element that sets them apart, is their inherent stability over long time horizons. They tend not to experience as many fluctuations in usage and hence value as other assets. Furthermore, the interest in communities to keep them operating tends to be high, so that even in the absence of explicit guarantees, there is often an implicit assurance that limits downside risks.

We would not make as strong an investment case here as for the other types of infrastructure. However, it would seem of interest to consider them as a mix-in for diversified infrastructure portfolios, particularly as their risk factors are also of a more social and political nature rather than just economic or financial.

7 Dynamic portfolio construction

Portfolio construction is the process of understanding how different assets and asset classes in a given portfolio impact each other, their performance over time and the risks associated with holding them. In an ideal setting they reflect an investor's objectives and his risk appetite.

However, neither investor objectives nor the risk appetite are static over time. Nor is the risk and return profile of assets. Hence, successful portfolio construction needs revisiting ever so often. In other words, it needs to be dynamic in nature. This is particularly important when major market shifts happen.

We would argue that in the wake of the Russian invasion and the major reactions adopted a deeper rethink is required by all investors as to whether their objectives should still remain the same, how their perception of the risk landscape might have changed and where they see new opportunities emerging.

7.1 Shortcomings in most existing portfolios

A key question regarding portfolios that were built before the invasion, is what their key shortcomings might be, now that the risk and return landscape has changed. Starting with the most obvious, any direct exposures to Russia and the Ukraine are problematic. This is not limited to direct investments in those countries or into companies incorporated there, especially as they might be targets of sanctions. It is also important for any investments that have tangible links to either Russia, the Ukraine or institutions that are operating there.

Next on the list are investments that are affected by the fallout, in particular the surge in energy and commodity prices. As many input prices have skyrocketed, so will the production margin suffer as many cannot expect to pass on prices to their clients.

Third are assets that will suffer due to higher inflation and rising interest rates. Here, particularly fixed income investments are at risk as they will underperform in direct proportion to their duration.

Fourth are strategies that have low levels of geographic and sectoral diversification. As the world becomes less predictable, more concentrated portfolios are much more likely to underperform on a risk adjusted basis.

And finally, portfolios that make less use of private assets will forgo the illiquidity premium that investors can reap when they expose themselves to those alternative assets. In an environment where liquidity, even of the supposedly more liquid publicly traded assets, can vanish overnight, the downside risk for less liquid assets is smaller than that of the liquid ones that trade at a premium.

7.2 Acceleration of past trends

It is interesting to note that private assets have already been among the fastest growing asset classes in recent years. Ever since the Global Financial Crisis put more emphasis on liquidity, pushing its price up, have investors realised that they could generate additional returns by giving up liquidity to those who had to have it. Particularly insurance companies, whose business model is by nature long liquidity, started to transform their portfolios. Pension funds with long-dated liabilities followed suit.

The changing circumstances of today's economic environment will accelerate this trend. Market disruptions, such as those caused by the Russian war, tend to make markets less liquid and in consequence, the price for liquidity dearer. This is an opportunity for investors who do not need high

levels of liquidity as they can benefit from the higher premium associated with this trade. We therefore expect the trend towards the less liquid private assets to not only continue but further accelerate.

The second important past trend that will receive a boost by what is happening now, is overall diversification. During the times of low and then ultra-low interest rates, investors were looking for additional sources of revenue. They expanded the range of exposures in their portfolios to include new asset classes and more exotic exposures.

While not everything worked as expected, they became used to a higher level of sophistication for portfolio construction. And what they learned can now be put to good use. Portfolio construction today needs to be more dynamic than in the past to be able to flexibly react in a world of greater uncertainty. It also needs to include a broader range of exposures to escape concentration risk.

7.3 Downside risk control and upside capture

The ideal characteristic of an investment is when downside risk is limited while an upside can still be captured well. Given our prior analysis, we think that infrastructure investments have such a potential, particularly given the prospects of a more stagflationary world where growth will be patchy and inflation more pronounced.

As there are different classes and types of infrastructure investments, care has to be exercised to what exposures, read risks, are included in the portfolio. Geographical and typological elements are as important as the position in the capital stack, which expresses the overall riskiness of the investment.

7.3.1 Infrastructure for defensive investors

For more defensive investors, infrastructure investments offer returns that are slightly above the comparable bonds due to the additional illiquidity premium. This premium is not only attractive for additional future income but also provides a cushion against corrections.

The exposures to look for are of the more senior tranches of the capital stack where investment grade ratings are prevalent. Infrastructure investments have strong track records with regard to ratings and the general rating risk is considered low, particularly as the dispersion of rating over time tends to have a slightly positive skew to it.[33]

In the unlikely case of an investment grade paper suffering a credit event, the ultimate recovery rates tend to be slightly higher than for other loans of the same rating, thus providing an additional level of protection from loss.[34]

7.3.2 Infrastructure investments with upside potential

As discussed earlier, we believe that infrastructure investments form part of the future strategic transformation of economies, particularly in Europe and the US. There is much political support for projects and a realisation that the ambitious goals of the climate conferences regarding CO2 emissions can only be achieved if there is an acceleration of renewable projects. This provides considerable tailwind for investments in these sectors.

For investors who are looking for more risk, the junior tranches of infrastructure projects could be the right assets. The market for sub-investment grade infrastructure has grown considerably over the past

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[33] See Moody's "Examining infrastructure as an asset class": "*The cumulative default rates for infrastructure loans are consistent with low investment-grade corporate loans. By year 11, infrastructure loans are comparable with Baa3-rated corporate loans (5.25% vs. 5.39%). By year 20, infrastructure loans are comparable with A-rated corporate loans (5.35% vs. 5.32%)*" As per www.moodysanalytics.com/articles/2020/examining-infrastructure-as-an-asset-class, accessed on 29 March 2022

[34] Op.cit.

years and while many transactions involve BB and B-rated paper, they offer considerably higher returns than their investment grade companions with moderately more risk.

Equity investments in infrastructure are of course also possible. It is important to understand though that while the infrastructure equity market technically falls in the same bucket as private equity investments, which would include venture capital, the return profile is very different. Due to the long-term and dependable nature of the investments, they compare from a risk perspective closer to core real estate exposures than to opportunistic investments. Double digit returns tend to be rare, but the lower overall returns are achieved by considerably lower risk exposures than for other equity investments.

8 Final Reflection

Whenever an academic, even one with a long career in business such as me, writes a report sponsored by a company with commercial interests, the questions immediately arise, why he does it, what the ultimate motive is and whether he is biased.

The motivation for this report was not born out of a desire by GGI to draft a report that would extoll the virtues of infrastructure investments. Writing about infrastructure was rather the outcome of discussions between GGI's CEO, Philippe Benaroya, and myself about what the future will bring for the industry and their business. I started by laying out a few core ideas, which have since been refined and thanks to some expert friends in the industry tested for plausibility. Philippe was intrigued and wanted to know more. A few conversations later he proposed that we should share these insights with GGI's partners and clients.

What was originally meant to be a shorter paper of some 4 to 6 pages became this report. And yes, I am indeed biased towards infrastructure. Probably ever since I had the opportunity to be one of the architects of an infrastructure investment platform in my prior job. However, the reasons for why I am enthusiastic about the potential of the asset class are the ones detailed in this report. It is up to you as the reader to agree or disagree with this vision. Hopefully, in either case you will find something of interest in it.

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