The higher costs involved in moving to a lower-trust global economy
By Angelo Katsoras

Trade tensions, shortages of medical supplies during the pandemic, the Ukraine war and China’s strict COVID-related lockdowns have accelerated plans to diversify supply chains and re-shore production in key sectors in order to increase resiliency and reduce reliance on geopolitical rivals. However, the process of building alternative factories and sources of materials will be very expensive and take many years to complete.

Moving toward more secure but less-efficient supply chains

Over the last several decades, efficiencies have been gained by narrowing the production of key components to a small group of the most efficient suppliers. The semiconductor sector is a case in point. The Taiwan Semiconductor Manufacturing Company manufactures 92% of the world’s most advanced chips. The company, in turn, is reliant on Dutch-based ASML for its most advanced lithography systems to etch the designs for each chip.

These lithography systems use lasers which require neon gas. Up until recently, Ukraine supplied about half the world’s semiconductor-grade neon from the cities of Mariupol and Odessa. Complicating matters further, Russia produced the crude neon that was sent to Ukraine to be purified. The second-largest producer of neon gas is China, with 30% of global supply. Producing neon elsewhere involves creating specialized equipment within steel plants.

While producing goods in multiple locations will eventually increase the resiliency of supply chains, it will reduce economies of scale and add to operating costs.

The United States is intensifying moves to become more self-sufficient

Over the past few years, the United States has taken a number of measures to improve supply chain security. Below are two recent examples:

- The Senate and the House have passed different versions of the Chips for America Act that includes $52 billion for domestic semiconductor manufacturing. While the bill is likely to pass into law in one form or another, one important question remaining is whether a House amendment that would allow the government to block U.S. corporations from making certain international investments will be included in the final version. Up until now, the focus has been mostly on preventing certain countries from purchasing strategic assets within the United States.

- The Biden administration invoked the Defense Production Act via an executive order to boost domestic production of minerals and factories required to manufacture electric vehicles. This support includes grants and loans. Previously, President Trump resorted to this act to spur production of masks, while President Truman used it to increase steel production for the Korean War effort.

China controls about 60% of the world’s production of rare earth minerals and nearly 90% of the refining capacity. China also refines 35% of the world’s nickel and 50% to 70% of its lithium and cobalt. This means that America often must still ship certain key minerals to China for processing.

If the United States fails to develop alternative supply chains for these minerals on a wide enough scale, it risks going from being energy independent of most fossil fuels to relying on other countries, including China, for inputs essential to the transition to green energy. However, the trade-off for securing supply is that any production brought online in the West will have higher operating costs compared with imports from countries with lower environmental standards and wages.

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1 “Supply chain crises force corporate America into a ‘what if’ mindset,” Financial Times, March 31, 2022
3 “Chip industry under threat with neon production set to fall off a cliff,” CNBC, March 25, 2022
4 “War in Ukraine inflates price of neon for chip-making, but it might be good for China,” South China Morning Post, March 17, 2022
Europe: The challenge of reconfiguring energy supply chains away from Russia

Europe, in particular, will have to balance plans to speed up the transition to green energy with the short-term necessity of becoming less reliant on imports of Russian oil, gas and coal. This will be a long and costly process:

- The EU’s plan to almost triple wind and solar capacity by the end of this decade requires about 52 million tons of steel alone.
- Bloomberg NEF estimates that $1.5 trillion will need to be spent by 2050 to build the grids required to deliver renewable energy across the continent.⁶

As for reducing reliance on Russian oil and gas, this means not only finding alternative supplies but also building new pipelines that transport gas and oil from the west instead of the east from Russia. The following map illustrates the extensive network of pipelines that have been built over many decades from Russia to Europe for natural gas alone. Russia accounted for 40% of the EU’s total gas consumption in 2021.⁷

Building alternative infrastructure will take at least several years. For example, it is estimated that it will take at least three years to complete the two LNG terminals that the German government ordered recently.

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⁶ "The Price for Europe to Wean Off Russian Gas Keeps Going Up," Bloomberg, April 3, 2022
⁷ "How Europe can cut natural gas imports from Russia significantly within a year," IEA, March 3, 2022
Companies increasingly will be forced to fully map out their supply chains

The complexity of many supply chains has made it very difficult for many companies to know all their suppliers, particularly subcontractors several levels down:

- A 2020 report by the UN Economic Commission for Europe found that only 34% of clothing brands were able to completely trace their supply chains from the farm to the factory.\(^8\)
- "Michael Essig, a professor of supply management at the Bundeswehr University in Munich, calculated that a multinational company such as Volkswagen has 5,000 suppliers (the so-called tier-one suppliers), each with an average of some 250 tier-two suppliers. That means that the company actually has 1.25 million suppliers."\(^9\)

**The largest companies have thousands of suppliers globally.**

**Beyond the first tier, companies rely on a network of thousands of suppliers**

Companies will increasingly be required to undertake the expensive process of fully mapping out their supply chains to ensure resiliency, compliance with sanctions and avoidance of exposure to human rights abuses. Germany passed legislation requiring firms with over 3,000 employees to verify that their supply chains are free of human-rights violations starting in 2023. Starting this June, the United States will prohibit imports of products from the Xinjiang region of China unless companies can prove forced labour was not used. In 2020, Xinxiang accounted for 20% of the world supply of cotton, 9% of its aluminum, and 45% of its polysilicon, a key ingredient in solar panels.\(^10\)

The following passage from a recent Economist article illustrates just how expensive it can be for firms to ensure compliance with existing sanctions: "Global spending on sanctions compliance by banks alone (no reliable figures exist for non-banks) reached a record $50 billion or so in 2020, the latest year for which estimates are available."\(^11\) The amount spent this year will likely be much higher due to the wave of sanctions imposed on Russia following its invasion of Ukraine.

**How the Ukraine war is disrupting China’s supply chains**

In 2021, trains moved about $82 billion worth of Chinese exports into the EU primarily along a 7,500-mile corridor that runs through Russia to Europe, a tenfold increase over 2016. That is about 16% of China’s total exports to the EU. The war has disrupted plans to continue expanding the use of this rail line. Although the EU has yet to officially ban imports that pass through Russia, rail-

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\(^8\) "Enhancing Transparency and Traceability of Sustainable Value Chains in the Garment and Footwear Sector," UN Economic Commission for Europe, April 2020
\(^9\) "Blindsided on the Supply Side," Foreign Policy, March 4, 2020
\(^11\) "Banks and firms face a mammoth sanctions-compliance challenge," The Economist, March 19, 2022
cargo shipments are all but frozen. Companies are being forced to either reroute their cargo to railways that avoid Russia or ships, options that take longer and are more expensive. Exports to China from Europe have also been impacted. For example, BMW has been forced to use an alternate train route that goes through the Balkans, Turkey and the Caucasus region. This can take almost twice as long as the Russian route.

Given the long-term tensions that this war will surely create between the West and Russia, the de facto restriction on using this rail line is likely to long outlast the war.

> Source: “First freight train linking UK with China arrives,” Deutsche Welle, April 29, 2017

### The rise of stockpiling

The more that governments and corporations worry that goods will not be delivered in a timely manner, the more that they will resort to stockpiling. Agriculture is a case in point. Even before the Ukraine war impacted the agriculture sector, rising prices and a growing reliance on food imports had prompted China to increase its food stockpiles to very high levels. The U.S. Department of Agriculture estimates that China holds 69% of the world’s corn reserves, 60% of its rice reserves, and 51% of its wheat reserves.

China’s wheat stocks nearly doubled between 2014 and 2019 from 76 million metric tons to 150 million tons. It has enough supplies to meet demand for 18 months.

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12 “China’s Bet on Sending Its Exports Through Russia Hits Setback,” Wall Street Journal, April 2, 2022
13 BMW and Audi suspend shipments by train to China,” Nikkei Asian Review, April 26, 2022
14 “China hoards over half the world’s grain, pushing up global prices,” Nikkei Asian Review, December 23, 2021
15 “Ukraine War Gives Egypt a Wheat Crisis Only China Can Solve,” Bloomberg, March 14, 2022
Other countries, including Russia, Belarus, Hungary, Serbia, Turkey, and Egypt, are restricting exports of products such as wheat, corn, oilseeds, and lentils. Indonesia, which provides more than a third of the world’s exports of palm oil—a widely used cooking oil—recently announced a ban on its export.

The longer Russia’s invasion of Ukraine continues, the greater the political pressure many countries will face to adopt beggar-thy-neighbour agriculture trade policies in an attempt to counteract rising food prices. Russia and Ukraine together accounted for about 12% of total calories traded in the world in 2021.16

**Locking in Mineral Supplies**

As supply concerns grow, more companies will attempt to lock in access to commodities rather than buy them from open markets in a just-in-time fashion. Tesla is a case in point. It has reportedly signed a long-term supply deal with Vale SA for nickel. Concerns that nickel supplies are tightening have been reinforced by the fact that Russia accounts for about 5% of the world’s nickel production and 17% of the world’s production of refined Class 1 nickel, which is used in stainless steel and electric vehicle batteries. More recently, GM signed a multi-year deal with the Glencore mining company for the supply of cobalt.

A South Korean consortium led by LG Energy Solution, the world second-largest battery manufacturer, has taken things one step further. It plans to invest $9 billion in Indonesia to build a supply chain that extends from the mines to the manufacturing of electric vehicles. Indonesia is the world’s largest producer of nickel, a key resource for making electric batteries.17

The return of stockpiling and multi-year deals to lock in materials increase the risk of seeing supply in various sectors swing back and forth from scarcity to overabundance—a problem that just-in-time deliveries had minimized for several decades. These inventory swings in turn risk making economic cycles more volatile.

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16 “How will Russia’s invasion of Ukraine affect global food security?” International Food Policy Research Institute, February 24, 2022
17 “LG Energy signs $9bn EV supply chain deal in Indonesia,” Financial Times, April 19, 2022
The challenge of imposing massive sanctions on China

In an era of where geopolitical tensions are growing between the major powers, it is important to note the following point. If trying to unwind ties with Russia has proven difficult, imagine how much more challenging it would be to do the same with China. Russia accounts for about 3% of world GDP on a purchasing-power-parity basis, compared with 18% for China. Moreover, the fact that the Middle Kingdom accounted for close to 30% of the world manufacturing output in 2019 means its supply chains are much more intertwined with the West than Russia’s are.

Source: "Could the West punish China the way it has punished Russia?" The Economist, April 23, 2022
In the current low-trust environment, corporations and countries will establish additional—and potentially redundant—supply chains in less strategically vulnerable locations that will often be closer to where the end products are sold. While this will lower risk levels, it will do so at a hefty price. These include the long-term costs associated with reconfiguring semiconductor and healthcare supply chains, speeding the transition to a green economy, and building up domestic mining and refining capacity to lessen dependence on imported commodities. This is particularly the case for the EU owing to its heavy reliance on Russian fossil fuels and commodities.

Also, governments increasingly will force producers of key technologies to exclude rivals. For example, the U.S. and Dutch governments have blocked ASML, the world’s largest producer of lithography equipment used to make computer chips, from selling its most advanced machines to China.18

This lower trust and more protectionist global economy will be especially challenging for smaller companies. Unlike large corporations, many of them do not have the resources to overcome protectionist measures by setting up operations in the world’s largest markets. Smaller companies also have fewer financial resources to bid for and stockpile various commodities and components.

**The return of guns vs. butter**

Finally, the war in Ukraine has caused many countries to make plans to significantly increase defence spending, in some cases reversing many years of decline. In some countries this will soon lead to a political tug-of-war over how much should be spent on defence versus social programs. High debt and rising interest rates will further complicate matters.

**Bottomline:** All of the above points covered in this report point to a world economy where operating costs are structurally higher compared to the last decade.

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