



Economic Analysis: Russia-Ukraine war impact on supply chains and inflation

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Russia's decision to invade Ukraine further complicates global supply chain challenges and will increase inflationary pressures. In our most recent [chartbook](#), we note that persistent pandemic-related disruptions to the supply chain will mean continued shortages of goods at least through 2022 and likely beyond. U.S. businesses will need to consider on-shoring or near-shoring production, logistics management, and other measures to add resilience to their supply chain network.

Supply-chain disruptions will contribute to elevated inflation in 2022

Supply chain inefficiencies can be caused by time delays, labor shortages, congestion on transportation routes, or lengthy customs processes. These inefficiencies have a cost, raising prices for consumers. The overall effect is like tax on the economy.

The recent surge in inflation—8.5 percent year-over-year in March—is due to several factors, including supply chain issues. Supply chain issues have exacerbated price increases in industries with large increases in demand and shortages of key resources.¹

Supply chain problems will likely only resolve when demand is below capacity for an extended period. On one hand, we expect consumer spending on goods to remain strong because of the tight labor market and wage increases. On the other hand, the Federal Reserve has begun a series of rate hikes that could dampen demand. Ramping up supply in many industries remains challenging due to ongoing constraints. The current inflationary environment adds more challenges for planning and coordinating production. Industry leaders vary on when they think supply chain constraints will ease, ranging from mid-2022 to later in 2023.² Due to the following four reasons, we claim that supply chain issues will continue to contribute to inflation throughout 2022.

Russia-Ukraine war will exacerbate challenges in certain supply chains and add to inflation

The Russia-Ukraine war is likely to exacerbate and elongate global supply chain disruptions. Although the U.S. does little direct trade with Ukraine or Russia, certain U.S. businesses and industries face significant exposure from the war: energy, food, and semiconductors are likely to be most affected.

Growth in domestic energy production in the past two decades has made the U.S. much less reliant on energy imports; imports of oil and gas are down 63 percent from their 2008 peak.³ In the near term, the cut off of oil from Russia, the world's third-largest energy exporter (normally shipping 4.3 million barrels of crude per day) will raise prices for gasoline and a range of petroleum-based products. Crude oil spiked to more than \$125 per barrel after the invasion and was trading at around \$104 per barrel in mid-April. Transportation, utilities, agriculture, plastics, chemicals/fertilizers, and metals are among the most highly impacted industries from higher oil prices.

The supply and price of global food commodities have also been directly impacted by the war. Russia and Ukraine account for 29 percent of global wheat exports and 17 percent of global corn exports. Chicago wheat futures surged to an all-time high of \$13.50 per bushel in the first week of March from less than \$8.00 per bushel as of February 21 (a year-over-year change of nearly 90 percent).⁵

¹ Source: Fernando Leibovici and Jason Dunn, "Supply Chain Bottlenecks and Inflation: The Role of Semiconductors," St. Louis Fed Economic Synopses No. 28, December 2021

² Sources: Kendrick Global Supply Chain Management Institute, Boeing Center for Supply Chain Innovation, UPS, Hewlett Packard Enterprise Co., and Flexport.

³ Source: U.S. Energy Information Administration (EIA)

⁴ Source: Bloomberg Intelligence

⁵ Source: CME Group

Higher wheat prices will not only affect prices of bread and other wheat-based products at the grocery store, but also will raise the cost of feed, driving meat, dairy, and egg prices higher. Industrial fertilizer prices will also rise: fertilize manufacturing requires large amounts of oil as well as ammonia, urea, potash, and processed phosphates, all of which are impacted Russian exports.⁶ The U.S. imports 20 percent of its urea from Russia. Canada and China may increase their fertilizer output to meet global demand, but it will take some time.⁷

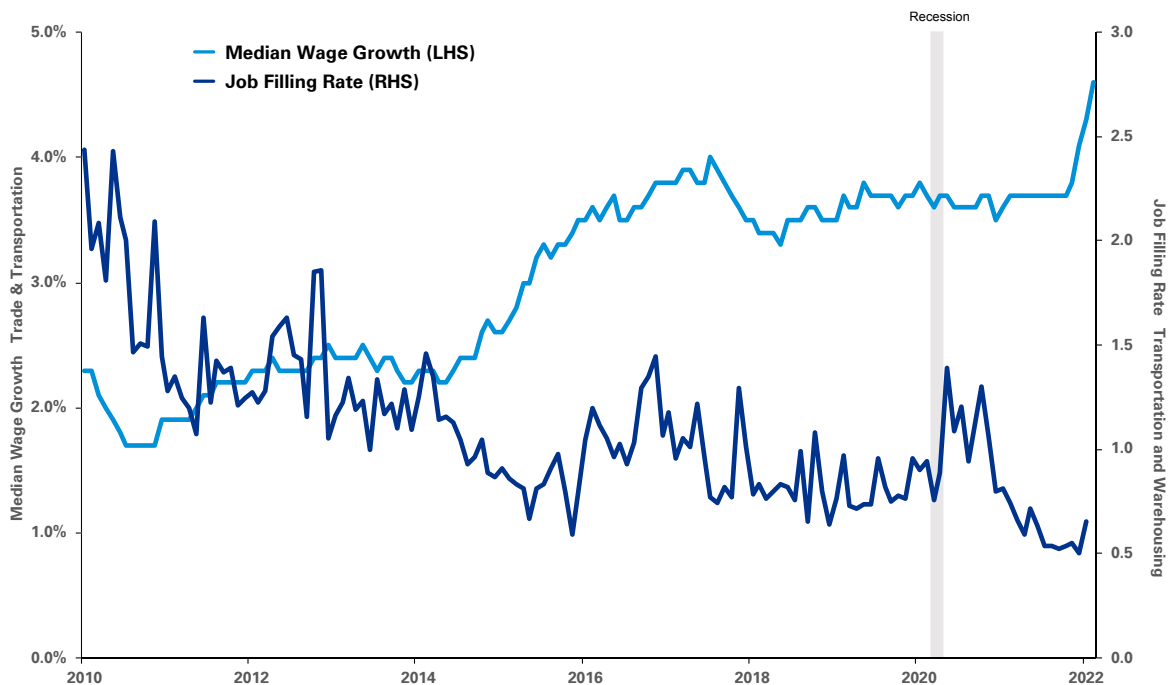
Already strained global semiconductor supply chains could soon feel the effects of the war.⁸ Ukraine supplies more than 90 percent of the United States’ semiconductor-grade neon, Russia supplies 35 percent of United States’ palladium, and Russia supplies 20 percent of global production of semiconductor grade nickel.⁹ While finding alternative sources of supply is not impossible—semiconductor manufacturers have already announced the creation of manufacturing sites both in and near the United States—it will take time, exacerbating semiconductor shortages.

Supply-chain workers are in short supply

Businesses are struggling to find workers. This is especially true for key supply chain industries, such as trucking, where labor shortages predated the pandemic. Job openings for workers in the transportation and warehouse sectors reached an all-time high in December 2021 at 611,000 and remain elevated as of February at 489,000 (February 2020: 293,000), further exacerbating disruptions to the global trade network. The job filling rate, a measure of how quickly companies fill open positions, has been on a downward path for transportation and warehousing businesses for the past decade. As the graph below shows, companies could only find one person to fill every two job openings that were posted in late 2021.

The tight labor market has also pushed wage increases to new highs as employers compete to find workers. It remains to be seen whether more workers can be found this year if the wage growth continues to accelerate. The end of the pandemic would alleviate labor shortages somewhat, but high demand for shippers and couriers is likely to persist past the pandemic, perpetuating an imbalance between labor supply and demand. Additional issues will continue to weigh on labor supply and demand, especially in trucking, including chip shortages that limit truck production and a low hiring rate.

Wages are up while jobs are hard to fill in transportation and logistics



Source: KPMG Economics, Bureau of Labor Statistics, Federal Reserve Bank of Atlanta, Haver Analytics, February 2022

⁶ Share of export market, respectively: 23 percent, 14 percent, 21 percent, and 10 percent.

⁷ Source: China Phosphate and Compound Fertilizer Industry Association and Canpotex.

⁸ Source: “Russia-Ukraine war: Impact on the semiconductor industry,” KPMG LLP, 2022

⁹ Source: The Observatory of Economic Complexity

Delivery and shipping struggle to keep up with demand

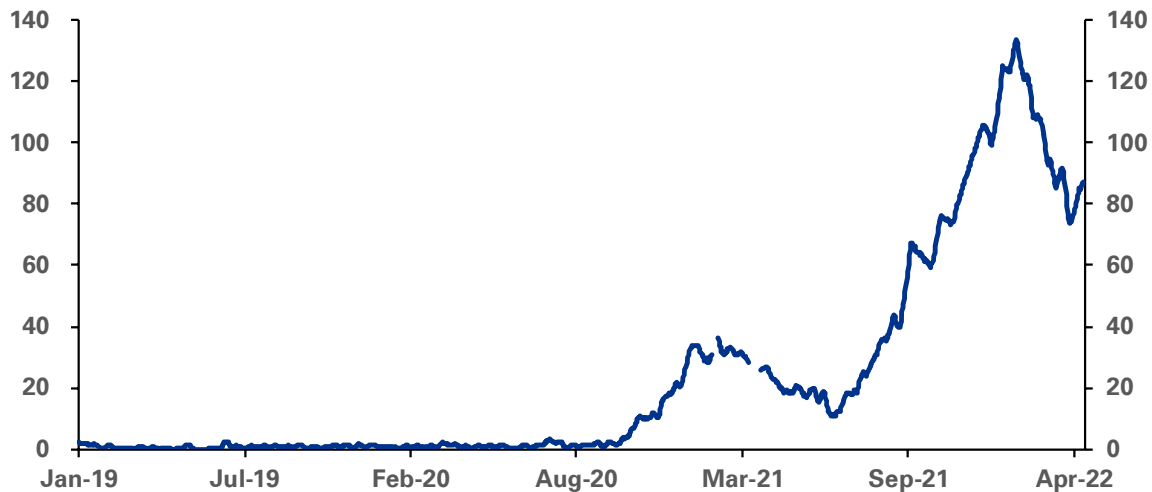
Shipping, logistics, port, and customs processes are all important nodes in U.S. retailer supply chains. When transportation companies and ports run efficiently, the time and cost from supplier to consumer goes down.

Supplier delivery times of manufacturers have been slowing for over six years as of April and slowing at a faster rate (60+ ISM) since October 2020, suggesting continued long wait times for products. Services-providing industries have been slowing for 35 months and slowing at a faster rate since February 2021. The Russia-Ukraine war will aggravate already strained logistics routes in the Black Sea.

For example, ports have been increasingly strained from a surge in imports and labor shortages. At Los Angeles and Long Beach, the number of vessels waiting to unload cargo is still historically high. Prior to the pandemic, the average number of ships waiting was fewer than five, and as of April 12th, the number of ships was 87, after some improvement from the peak of 129 ships on January 26th. East Coast ports are beginning to see new strains after some shippers diverted traffic from the West Coast.¹¹ In addition, some ocean carriers have begun “blanking” or “void sailing”—skipping a particular port or an entire leg of a scheduled route to avoid delays. The easing of these problems we saw in the first half of the year may reverse in July 2022, when the International Longshore and Warehouse Union will likely go on strike.¹² They represent 22,400 dockworkers across 70 terminal operating companies at 29 West Coast ports.¹³

Record number of vessels waiting to enter L.A.-Long Beach ports

Total Container Vessel Backup, 7-day Moving Average



Source: KPMG Economics, Bureau of Labor Statistics, Federal Reserve Bank of Atlanta, Haver Analytics (February 2022)

COVID-19 continues to disrupt supply chains

COVID-19 outbreaks over the past two years have kept people out of work and created supply chain disruptions. Lockdowns during the early days of the pandemic triggered goods shortages that persist today. The figure below shows a global weighted lockdown measure and a weighted lockdown measure for U.S. trading partners. Major U.S. trading partners implemented restrictive measures during the Delta and Omicron variant waves, extending disruptions.

Trading partners that have implemented highly restrictive measures may still be vulnerable to waves of COVID-19, as the Asia-Pacific region is currently experiencing. Under China’s zero-COVID policy, for example, port operations have recently been interrupted in Shanghai, Shenzhen, Tianjin, and Ningbo-Zhoushan. In 2020, these ports handled 43.5 million, 26.55 million, 18.25 million, and 28.72 million containers of cargo, respectively.¹⁴ The resulting shipping delays are further disrupting the flow of goods between China and the U.S. In air shipping, roughly 50 percent of pre-pandemic air cargo flew in passenger jets. When international air travel was restricted those flights were canceled, and that capacity was gone.¹⁵

¹⁰ Source: The Institute for Supply Management publishes a monthly diffusion index on supplier deliveries. An index reading of 50 or more indicates slowing delivery times, and below 50 indicates faster delivery times. The higher the monthly reading, the more deliveries have slowed during the month.

¹¹ The Port of Charleston now has over 30 ships waiting to unload

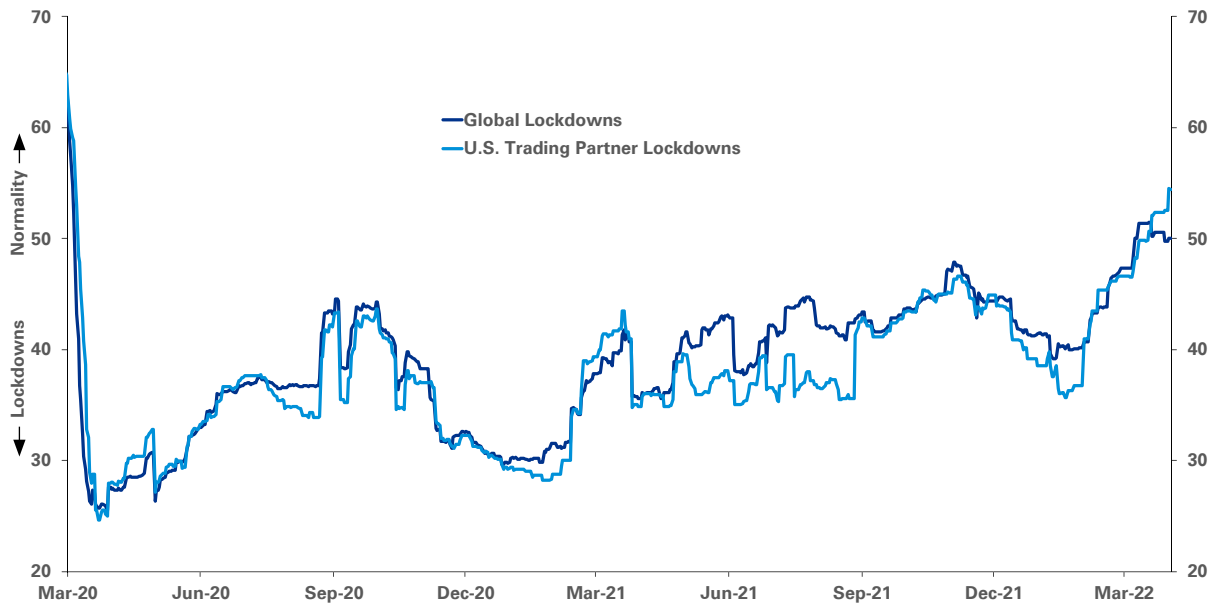
¹² Source: International Longshore & Warehouse Union and Pacific Maritime Association

¹³ Source: Peter S. Goodman, “New Supply Chain Risk: 22,000 Dockworkers May Go on Strike,” The New York Times, March 28, 2022

¹⁴ Source: Sam Whelan, “Congestion Surges at Chinese Ports amid Shanghai Lockdowns and Driver Curbs,” April 3, 2022

¹⁵ Source: NBER Working Paper no. 27224 (April 2021) and Phil Levy via Discourse, November, 2021

Lockdown Stringency—Impact of global lockdowns in U.S. supply chains, index



Note: "Global Lockdowns" is based on Our World in Data's Stringency Index, weighted by 2019 GDP. "U.S. Trading Partner Lockdowns" is weighted by 2021 YTD Import Volumes, top 15 countries that the U.S. imports from (China, Mexico, Canada, Japan, Germany, Vietnam, South Korea, Taiwan, Ireland, India, Switzerland, Italy, U.K., Malaysia, and France). The indices are inverted.

Source: KPMG Economics, Our World in Data (April 12, 2022), U.S. Census Bureau (November 2021), IMF, Haver Analytics

Summary

Russia's decision to invade Ukraine will likely result in further inflationary pressures from supply exacerbated supply-chain challenges. Supply-chain driven inflation is unlikely to ease in 2022 due to many factors: surging commodity prices associated with the Russia-Ukraine war, rising freight shipping costs as a result of port congestion, shortages of workers in logistics industries, and ongoing uncertainty about waves of COVID-19 and related lockdown measures. Given the stressed state of global supply chains, businesses will need to consider strategies such as onshoring and near-shoring production, diversifying raw material sources, and leveraging big data analytics to better gauge demand and manage purchasing. As pandemic impacts deteriorate and inflation moderates into 2023, businesses can start to rebuild their inventories and bolster supply-chain resiliency.

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