

Impact of the Covid 19 pandemic on the US supply chain

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Abstract

The Covid 19 pandemic has disrupted US supply chains, with the medical and food supply chains showing the most severe disruptions. The U.S. medical supply chain is already overly reliant on imported supplies, so reviving the domestic medical supply chain is an important step in protecting American health and national security. The COVID-19 pandemic has also caused disruption at every stage of the food supply chain, causing many processing plants to close and millions of chickens, pigs and cattle to be culled. Due to the supply disruption, the price of meat in the US has increased sharply. Against this backdrop, the United States Department of Agriculture announced the Coronavirus Food Assistance Program (CFAP) to help the farmers and ranchers, distribute food to those in need, and protect the seafood supply chain.

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I. Introduction

The Covid 19 pandemic has severely affected a number of industries worldwide resulting in major disruptions in the supply of goods and services. The closure of the factory, causing the income loss for employees, has also significantly weakened consumer demand. Movement restrictions and social distancing measures directly affect transportation, travel and tourism—all industries directly related to trade in services. The effects on trade flows are further compounded by trade restrictions imposed on critical medical supplies, pharmaceuticals, and food. In the US, exports of goods and services fell by \$141.5 billion (13.6%), and imports fell by \$173.1 billion (13.3%) in the first five months of 2020 compared to the same period last year. As a result, the trade deficit decreased by \$32 billion (12.2%) (United Nation, 2020). US trade fell the most in April 2020, as people were encouraged to stay at home and the Government took many measures to slow the spread of COVID-19. The shutdown of the US economy began in mid-March 2020 and continues until at least mid-May 2020 as some states begin to reopen their economy.

The COVID-19 pandemic has highlighted the US's reliance on medical equipment, personal protective equipment (PPE), and pharmaceuticals from abroad, as well as the need to coordinate emergency medical measures with neighboring countries to avoid disruption to the US's economy. The covid 19 pandemic has also highlighted the need for more flexible food supply chains to ensure food safety in the US. Supply chains have been disrupted throughout the US economy, with the healthcare and food supply chains showing the most severe disruptions.

II. The medical supply chain

The Covid-19 pandemic has exposed a serious flaw in the US medical supply chain that is excessively dependent on imported supplies. Restoring the domestic medical supply chain is an important step in protecting American health and national security.

The Covid 19 pandemic that started in China in early 2020 has reduced exports from the country and resulted in a worldwide shortage of medical supplies in general and in the United States in particular. China is a major global supplier of PPE, medical devices, antibiotics and active pharmaceutical ingredients (Sutter, Sutherland and Schwarzenberg, 2020). During the height of the Covid-19 pandemic, supply chain disruptions and export restrictions made it difficult for hospitals in the US to import critical ingredients, from N95 masks to life-saving drugs. China, accounted for more than 85% of all personal protective equipment (PPE) imports from the US - including N-95 masks and other disposable and non-disposable masks, surgical drapes and surgical towels - have reduced PPE exports (Tony Paquin and David Sanders, 2022).

In the first year of the pandemic, the United States experienced shortages of 29 out of 40 essential drugs used to treat Covid-19 patients. Plant closures, delayed deliveries, and increased global demand for Covid-19 therapies led to rapid shortages of critical medications in the U.S. In December 2022, the Food and Drug Administration (FDA) reported shortages of over 120 drugs in the U.S., three times higher than pre-pandemic levels. According to an analysis by the U.S. Pharmacopeia, the likelihood of antibiotic shortages in

the U.S. is over 42% higher compared to other types of medications. The shortage of Adderall, a medication for ADHD, was severe to the point that many individuals with ADHD were unable to obtain their prescribed medication. In 2021, the chemotherapy drug fludarabine could be purchased wholesale for \$110. However, due to its scarcity, the price of this medication has increased to \$2,736 (Tony Paquin and David Sanders, 2022).

The main factor leading to this shortage and price increase is the US reliance on foreign manufacturing, especially over-reliance on Chinese and Indian manufacturing facilities. According to Yanzhong Huang, senior fellow for global health at the Council on Foreign Relations, before the Covid-19 pandemic emerged in early 2020, Chinese pharmaceutical companies supplied more than 90% of antibiotics, ibuprofen and hydrocortisone for the US, along with most acetaminophen and heparin. Shortages have been exacerbated by a spike in global demand for these products as the COVID-19 pandemic spreads worldwide and some countries have placed restrictions on exports of important medical products. In addition, in the US, the tax has reduced imports of medical and medical products from China, making the shortage of medical equipment increasingly serious. Tariffs on these products were raised starting September 2019 amid trade tensions between the United States and China.

Covid-19 is a wake-up call for the US manufacturing industry, showing the country's overwhelming dependence on imported essentials, from semiconductors to medicines and medical equipment. In the face of supply chain shocks caused by Russia's invasion of Ukraine and potential regional conflicts, it is imperative that the United States rapidly ramp up production of important pharmaceuticals, medical supplies, and critical medical equipment in the country. Boosting the production of US-made pharmaceuticals will support high-paying jobs and ensure that the country does not face future supply chain disruption, whether due to pandemics, wars or several other unforeseen crises. This is the purpose of the American Made Pharmaceuticals (AMP) Act (S. 3991 and H.R. 7400), introduced into Congress in early 2022. In addition, to better prepare for the US health system in response to future pandemics, the Centers for Medicare and Medicaid Services has finalized a rule to provide financial support for hospitals to purchase domestically manufactured N95 masks. That is a step in the right direction. This will encourage the production of PPE in the country and help hospitals no longer depend on foreign supplies.

In addition, the US also joins with other countries in restricting the export of medical supplies as of April 10, 2020.

- On March 17, 2020, the United States Trade Representative (USTR) approved the exclusion of surgical masks and disposable masks, respirators from the list of products imported from China subject to ad valorem duties in the context of US-China trade dispute. The US levies import duties on disposable surgical masks and respirators from one of the world's largest suppliers of these items.

- President Trump officially invoked the Defense Production Act (DPA) to address the shortages of medical supplies for combating the COVID-19 pandemic. On April 2, 2020, the U.S. government cited the DPA to request the company 3M to prioritize orders from the Federal Emergency Management Agency (FEMA) for N95 respirator masks. President Trump urged 3M to increase the importation of masks from its overseas facilities, including those in China. The U.S. government also demanded that 3M halt the export of N95 masks, which were currently being produced in the United States, to Canada and Latin American countries (in 2019, 34% of 3M's N95 mask production was exported to Canada, and 30% to Mexico). However, this decision was eventually rescinded. Several major automotive companies, including General Motors, Ford, Fiat Chrysler Automobiles, and Tesla, also shifted their production to manufacture face masks, ventilators, and face shields instead of automobiles.

- On April 7, 2020, Federal Emergency Management Agency (FEMA) issued a temporary final rule, which was published in the Federal Register Notice on April 10, 2020, titled "Prioritization and Allocation of Certain Scarce or Threatened Health and Medical Resources for Domestic Use" (section 328.102(a) of the new Title 44 Code of Federal Regulations). This rule stipulated that certain essential medical equipment needed to combat COVID-19 could not be exported from the United States without FEMA's approval. The medical equipment includes respirator masks (such as N95, N99, N100, R95, R99, R100, P95, P99, P100), elastomeric, air-purifying respirators and appropriate particulate filters and cartridges, PPE surgical masks, and PPE gloves or surgical gloves. This means that FEMA could restrict what companies like 3M can sell to hospitals in Canada and Mexico.

- On April 14, 2020, the Export-Import Bank of the United States (EXIM) announced temporary restrictions until September 30, 2020, on the financing of exports of critical medical supplies from the United States. These supplies include respirators, masks, gloves, Tyvek suits, face shields, and similar protective wear essential for combating the COVID-19 pandemic. According to EXIM, the financing of medical equipment exports accounts for a small portion, less than 1%, of the overall financial investment portfolio.

- The Coronavirus Aid, Relief, and Economic Security (CARES) Act (Public Law No. 116-136) includes several provisions aimed at enhancing the understanding of the United States' dependence on the healthcare supply chain, including to (Sutter, Sutherland và Schwarzenberg, 2020):

- (i) Expanding drug shortage reporting requirements;
- (ii) Requiring certain drug manufacturing facilities to develop risk management plans; (iii) Require the United States Food and Drug Administration (FDA) to maintain a public list of medical device that are identified to be a shortages; and
- (iv) Direct the National Academies of Science, Engineering, and Medicine to conduct a study on pharmaceutical supply chain security.

Many countries in Latin America heavily rely on the export of medical equipment from the United States, particularly those products listed in the restricted export under the new temporary final rule (Bown, 2020; ECLAC, 2020).

At the same time, the US depends on global (and hemispheric) supply chains. In many cases, the production facilities for safe, high-quality PPE are located in Central America, the Caribbean, and Mexico. As the United States looks at health care through a national security lens and reassesses the benefits and costs of diversifying sources of supply, countries in Latin America and the Caribbean have an opportunity to export to the US market.

III. The food supply chain

The food supply chain involves the process of moving food from the producer to the consumer. This process involves growing, handling and transporting food quickly and safely by air, land and sea. However, the US food supply chain system has faced severe disruption as the Government works to prevent the spread of COVID-19. From border closures to restrictions on transport channels, social distancing and travel bans, the food service industry came to a near standstill at the start of the COVID-19 pandemic.

Also, no matter what the product is or where it's shipped, the US food industry relies heavily on human labor to get food from farm to market. For example, farmers sow and harvest fruits and vegetables or raise livestock. Workers pack food and drive trucks to transport food across the country. Workers also unload food on shipping containers from all over the world. In other words, the U.S. food industry is only as strong as the people who keep it going. From farmers and workers to shippers and retailers, the COVID-19 pandemic has caused disruption at every stage of the food supply chain.

Disruption in on-farm production and processing

When the Covid pandemic started, farmers and food producers encountered significant disruptions in their work processes on farms and in food processing plants. At the farms, harvesting fruits and vegetables required close coordination among various groups to obtain products with the highest flavor and freshness. However, Covid 19 had a negative impact on the health of the labor force, leading to interruptions in harvesting activities. In meat processing plants, workers were also susceptible to contracting Covid-19 during each work shift. The reasons for this were due to the need to maintain low temperatures for meat preservation, the close proximity of workers, and the physically demanding nature of the work, which left the workers exhausted. This created a favorable environment for the spread of Covid-19. When workers fell ill, it caused disruptions in the production process. Furthermore, many meat processing plants had to temporarily close due to a high number of workers testing positive for COVID-19. This increased pressure on food supply, especially meat, for the domestic market. Some of the large meat processors that had to shut down their plants included Smithfield Foods, which processed about 5% of the pork produced in the United States; JBS USA, the North American arm of the world's largest meat processor, JBS S.A; Cargill, specifically their plant in Pennsylvania that produced steaks, ground beef, and ground pork; and Tyson Foods, particularly their pork processing plant in Iowa. When meat processing plants ceased operations, the producers had nowhere to sell their livestock and poultry, forcing them to euthanize millions of chickens, pigs, and livestock. This not only caused a meat shortage but also resulted in an extremely serious food waste issue. Due to the disruption in the supply chain, meat prices in the United States surged, with wholesale beef prices reaching record levels, and wholesale pork prices increasing by 30% in April 2020 (Michael Hirtzer and Jen Skerritt, 2020). The situation became so severe that the U.S. government had to establish a "coordination center" to assist affected livestock and poultry farmers in finding alternative potential markets. Furthermore, on the farms, crops that were harvested early in the year spoiled and were used as compost. Milk that couldn't be purchased was discarded.

Hotels, restaurants, and schools have no longer had a high demand for large quantities of products because, due to the government's social distancing requirements, people tend to prepare meals at home. As a result, the demand for retail food products has skyrocketed. This puts US farmers in difficulty when trying to shift their production, and, in some cases, they are unable to sell large quantities due to transportation challenges.

Disruptions in transportation

Measures restricting movement and social distancing have disrupted food transportation activities. Border controls have been limited, flights have been restricted, and road traffic has been affected, making it difficult to transport goods through checkpoints and control stations. Some transportation companies and airlines have had to reduce or suspend operations due to decreased demand and business restrictions. Additionally, transportation workers, including truck drivers, airline personnel, and sailors, have faced difficulties in working due to COVID-19 infections or travel restrictions. This has caused disruptions in getting food from the producers to the consumers.

Impact on Consumers

With fewer goods available and higher prices, the demand for hoarding goods has increased, causing American consumers to spend more money on food. As a result, they have also changed their lifestyles. Many consumers have started cooking and growing their own food. The pandemic has inspired a movement towards self-sufficiency in food production. Over 20 million Americans have taken up gardening for the first time, growing their own vegetables and fruits. Bonnie Plants, the nation's largest supplier and producer of vegetables and herbs, reported that nearly two-thirds of Americans under 35 have started growing their own food due to supply chain disruption. These younger consumers are also spending more time at home and have a desire to improve their health and live more sustainably (Roosevelt Robinson, 2022).

Government's Solution

In this context, the United States Department of Agriculture (USDA) announced the Coronavirus Food Assistance Program (CFAP), which includes two main elements (USDA, 2020):

(a) Direct support for farmers and ranchers: The program will provide \$16 billion in direct support, based on the actual losses of agricultural producers as market prices and supply chains have been affected, and to support producers with additional adjustments and marketing costs in 2020 due to lost demand and short-term oversupply caused by COVID-19.

(b) USDA purchase and distribution: The USDA will collaborate with regional and local distributors in areas where the workforce has been significantly affected by the closure of restaurants, hotels, and other food service establishments, to purchase US \$ 3 billion of fresh produce, dairy, and meat. The distributors and wholesalers will then provide a box of fresh produce, dairy, and meat products to food banks, community and faith-based organizations, and other nonprofit entities serving Americans in need.

In addition to these programs, USDA announced that it will utilize other available funding sources to purchase and distribute food for those in need.

The government has also issued an executive order to enhance the competitiveness of the U.S. seafood industry and safeguard its seafood supply chain. This order instructs agencies to expand sustainable seafood production in the U.S., including creating conditions for predictable and efficient aquaculture permitting processes, speeding up regulatory reforms to maximize commercial fishing opportunities, and maintaining restrictions on seafood imports that do not meet United States standards. President Trump also declared readiness to provide US \$ 300 million in support to fishermen and related businesses that have been impacted by the Covid pandemic (United Nations, 2020).

IV. Conclusion

Covid-19 pandemic is a wake-up call for the US manufacturing industry, showing the country's overwhelming dependence on essential necessities, medicines and imported medical equipment. In the face of supply chain shocks, the United States is compelled to rapidly ramp up domestic production of pharmaceuticals, medical supplies, and critical medical equipment to protect American health and national security. Besides, the covid 19 pandemic has taught us that food products are not always available to consumers. Like so many industries disrupted by the pandemic, the future of the US food supply chain is uncertain. What is certain is that COVID-19 has underscored the need to build a more resilient model in which the food supply chain is less likely to be disrupted.

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