

# How the coronavirus has—and has not—disrupted the global supply chain

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MBA students Sabrina Kramer and Michele Hansen listen as John Roger Nielsen, warehouse supervisor in UNICEF's supply division in Copenhagen, Denmark, explains how UNICEF works with government and company partners to strengthen supply chains for essential goods supporting child survival and development around the world. The students were on a June 2019 study-abroad program led by Associate Professor Barbara Hoopes exploring business operations and logistics in Finland, Sweden, and Denmark. Credit: Barbara Hoopes

Shortly after officials reported SARS-COV-2—also known the coronavirus—had reached the shores of the United States, an odd thing began to happen. Average Americans, gripped with some combination of fear and powerlessness, began to buy as much toilet paper as would fit into their vehicles. Within days, stores, most of which were in areas that had not yet been affected by the virus, found it impossible to keep the product on shelves.

While the psychology behind the toilet paper hoarding has been much discussed, the "shortage" of the product illustrates the delicate ecosystem that is the global supply chain, a complicated push and pull between manufacturers, suppliers, retailers, and customers, among other links in the chain.

"People do not need more toilet paper than before," explained Barbara Fraticelli, assistant professor of practice for the Department of Business Information Technology (BIT) in the Pamplin College of Business.

"There has been a surge in demand due to panic buying and hoarding. This will be followed by a big drop in demand. Demand swings are very costly for supply chains. For other items, like sanitizing wipes and face masks, demand is genuinely higher because the items are being used more than ever before."

Barbara Hoopes, an associate professor in BIT, said that, "Panic buying has wreaked havoc on toilet paper. It is manufactured in the United States, has consistent demand, and thus should be the easiest product to manage. Hoarding upset the steady supply chain."

When the supply chain is impacted by changes in supply and demand, it can lead to a phenomenon known as the bullwhip effect. Named for the way the amplitude of a whip increases down its length, the bullwhip

effect refers to the increasing swings in inventory in response to shifts in customer demand as one moves further up the supply chain.

Coincidentally, the bullwhip effect was something Fraticelli's students were learning about prior to leaving for spring break.

"Our class took part in an activity called the 'beer game,'" said Fraticelli. "Each student took on a different role within the beer supply chain—brewery, distributor, wholesaler, retailer—to learn how information is relayed throughout a supply chain. Small changes in beer demand at the retailer led to huge disruptions at the distributor and brewery. The game, as always, ended with a classroom full of students frustrated with one another. Unfortunately, we are currently seeing the bullwhip effect in real life."

Many of today's supply chains are global in nature, where goods, parts, or raw materials are manufactured in other countries and then shipped to the United States. This is done, in part, because goods can be manufactured at lower costs in countries like Mexico and China.

"Every chain needs to make a choice: be efficient, or be responsive," explained Fraticelli. "A supply chain can't be both. Many medical supply chains have chosen to be more efficient by manufacturing in China, thus which is more economical. Unfortunately, that means that they are less adaptable in crisis situations."

A crisis situation is certainly where we find ourselves today. When the coronavirus, and the disease it causes, COVID-19, first began to spread throughout China in early January, the nation shut down entire provinces to contain the infection, thus disrupting the supply of goods to the rest of the world. China has now begun the slow recovery process, reopening factories and resuming shipping goods. Unfortunately, the rest of the world is now dealing with the pandemic, and nations are shutting down ports of entry (United States) or quarantining its entire populace (Italy).

"There was a big supply disruption when the virus first started spreading in China," said Fraticelli. "We've now moved into a demand disruption due to panic buying and quarantines. There are spikes in certain areas, drops in other areas. It's a mess."

Hoopes believes it will take a longer time to reach equilibrium than most people realize.

"You can think of the global supply chain as a series of arteries and veins that keep the economy moving, and China as a pumping heart that keeps the flow moving," she continued. "The original work stoppage was a 'blockage' of sorts. The subsequent shutdowns around the world are significant injuries to the system. But the system is resilient and will get running again. Alternate sources and alternate routes for providing goods and services to meet market demand will be developed. The system won't be the same after this crisis, but it will likely be healthier as a result."

Hoopes continued by explaining what the future of the [global supply chain](#) may look like and what the consequences will be for the consumer. "The current crisis will undoubtedly have manufacturers reconsidering their single-source supply networks, and there will be a long-term move to reduce dependence on a narrow geographical area," she said. "There is obviously some discussion about bringing the production of goods critical to our economy back to the U.S.—pharmaceuticals, etc.

However, manufacturing was moved to China for a reason—the labor costs there are low enough, and the availability of labor high enough—and that transporting finished goods halfway around the world to our markets is still the most cost-competitive option.

She continued, "Prices may increase for [consumer goods](#) in the short term if these strategies have to be changed. An alternative strategy might

be to develop parallel sources of supply with China in areas of the world with lower labor costs than the United States, such as Mexico or Eastern Europe. This would provide some risk mitigation for the future while leaving the established expertise in China intact."

Hoopes believes, however, that our supply chain relationship with China will remain healthy. "China will still be a major player in the supply chain. Our economy and theirs are inextricably linked."

What can consumers do to help the return of supply chain equilibrium? Hoopes recommended patience.

"Consumers can follow the example of companies by planning their purchases, such as through subscription purchasing on Amazon, and reducing the risk of stockout by diversifying their sources of supply. It is important to understand that goods are still being produced, even though demand has spiked. There is no shortage of goods, just a delay in refilling shelves. The replenishment cycle is what's being tested, and companies will do what they can to find alternate ways to get goods to where they're needed."

BIT Department Head Robin Russell stated that times of crisis are when consumers learn the "true essence" of a company's leadership.

"Consumers receive COVID-19 messages from companies every day. Read them, and then decide if it is a company that you wish to continue to support when the crisis abates."

She added that companies have learned from this crisis that they need to better understand their supply chain and the ramifications of their decisions. "Companies need to look at the full supply chain—your supplier's supplier, their suppliers, and their suppliers' suppliers, on down through 10 tiers of the [supply chain](#) rather than just one or two tiers."

Russell continued, "Do I think this crisis will spur more companies to do the type of contingency planning necessary to prepare for the next crisis? I wish but seriously doubt it. We had the Japanese tsunami, the SARS epidemic, Ebola, and the 2008 recession to sharpen our preparation for the next big crisis. We are now beginning to see which companies were able to do so."

Provided by Virginia Tech

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