

Jackson Fox
Professor Scrimgeour
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Covid-19 Snarls the Supply Chain Pipeline

A globalized world relies heavily on the supply chain. This backbone of our economy is certainly behind the scenes for many. Ordering a package on Amazon might be as easy as two clicks and two days away, but many people really do not understand this complex, nuanced, and fragile chain of custody that exists for every product we consume. Supply chain management is an integrated system that *organizes* the flow of goods/services, information and financials, from the raw materials- manufacturer- wholesaler- distributor- retailer- to the consumer, in order to meet expectations and achieve profitability. In Jonathan Haskel's *Capitalism without Capital*, intangible investment is strongly tied to *organizational* investment, which includes the deployment and monitoring of a supply chain. Thus, he would argue, investment in fluid and resilient supply chains will create value for firms in the intangible economy. By the other side of the same token, the macroeconomic effects of COVID-19 have demonstrated that failing to properly implement a functioning supply chain can disrupt firms tremendously.

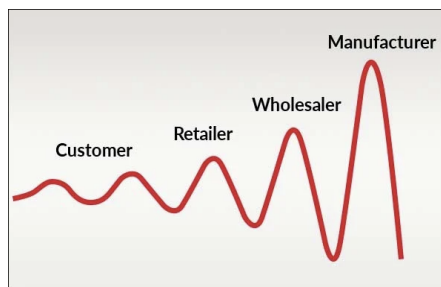
The world's largest companies leverage intangible investment very well. Among these investments is a supply chain. Everyone has an iPhone these days, but how did it all happen so fast, and why does Apple continue to deliver? Haskel says that Apple "ha[s] invested to create valuable organizational assets outside their own firms," he continues, "the remarkable Apple supply chain that Tim Cook was responsible for developing is clearly a long term source of value for Apple, allowing it to bring products to market extraordinarily quickly" (51). Apple spends a large amount of time and money

behind the scenes to make sure that every step of producing an iPhone as well as other products, from the manufacturing, to distribution, and assembly, are all seamless. What this creates for the consumer is trust that Apple will be able to deliver a quality product as demanded. News media may share a story of people waiting overnight in crazy long lines to be the first to get their hands on the new iPhone, but these stories never seem to cover the back end of Apple being unable to handle the demand or a product shortage. Because Apple has such a highly functioning and resilient supply chain, they are able to keep up with strong demand during difficult years of transportation capacity shortages and border closings. Retaining customers is easy for Apple when they are always able to deliver product, so consumers are unlikely to choose a competitor. Through consistent product quality, speed to market, and customer retention, Apple's intangible investment in its well oiled supply chain machine creates immense, long term value for the company.

Another example of a company who utilizes intangible investment mentioned by Haskel, is Starbucks Corp., who "[have] leveraged effective branding, operating processes, and supply chain to allow it to spread across the world" (67). What makes Starbucks unique is not the coffee nor the free wifi, but intangible assets such as their supply chain, critical for maintaining consistent product quality. A global supply chain for a food giant such as Starbucks is heavily dependent on demand forecasts for coffee beans, in which various climate and geopolitical factors influence the market prices. For Starbucks, ensuring they can source enough beans and transporting them across the globe, all while maintaining consistent quality and temperature, comes at a price point that makes or breaks profits. Therefore, a well optimized supply chain is a critical component of Starbucks' successful business model. Remember, just as Starbucks

would suffer without fresh coffee beans to roast, Apple would make no money if they couldn't sell you a phone, or Nike without sneakers on the shelf, etc. Supply chain management is critical to ensuring product is available and of consistent quality, factors which drive customer loyalty and satisfaction, increasing firms profits and facilitating long term value. Haskel says "build[ing] and maintain[ing] distinctive assets," (186) is critical for firms. Incorporating a fluid, technologically optimized supply chain is certainly a "distinctive asset" worth protecting and growing. The supply chain is an engine for unlocking potential decreases in marginal cost, as well as a tool that increases customer satisfaction and long term value.

When covid-19 hit the United States in early March 2020, all of a sudden the "supply chain" was thrust into the spotlight when the shelves ran out of toilet paper and the shift to shipping online goods began. The economy underwent sharp changes in aggregate supply (AS) and aggregate demand (AD) when scared consumers panic bought all sorts of goods at news of a superspreading coronavirus pandemic. The efficiency of the supply chain is very reliant on adequate demand forecasting from multiple parties, each one requiring their own additional lead time. Therefore, even small changes in consumer demand can have a very large impact on raw materials providers, a phenomenon in logistics called the Bullwhip effect (Lee et al. 1997).



Covid-19 caused a profound snap of demand. The graphic above only depicts soft changes in customer demand, but the environment of

March 2020 was much more severe. Based off of models developed from Jones, *Macroeconomics* (2021), See Chart 1 and 2.

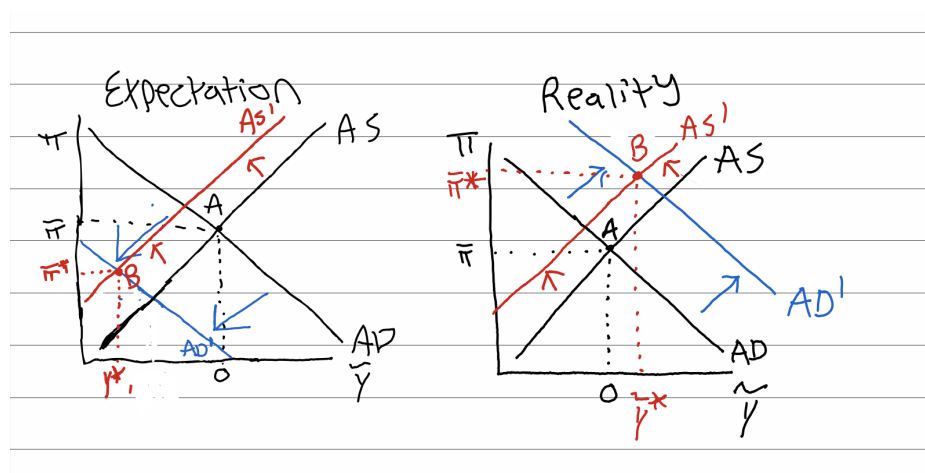
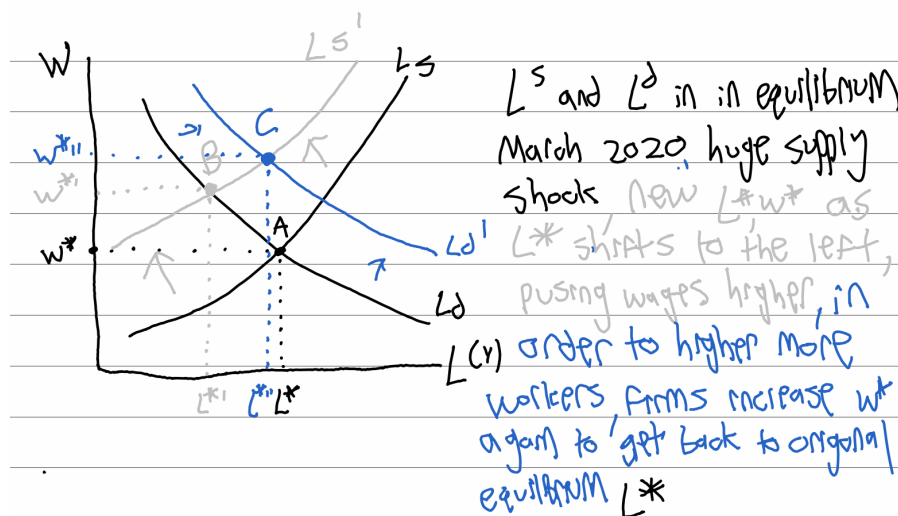


Chart 1, left, represents expectations of AS and AD during the beginning of Covid-19 in February 2020. Chart 2, right, represents the actual changes to AS and AD during the beginning of Covid-19 in March 2020. It was assumed that AS would fall equally in both the expectation and reality graphs because Covid-19 would create employee health related slowdowns in production regardless. Despite expert demand forecasts, which projected consumer spending to drop sharply, consumer spending exploded with retail panic buying and a shift to online goods. Notice how in Chart 2, the new equilibrium point is the complete opposite direction of the expectation. The difference in consumer expectations between the expected inflation and actual inflation was very large. This could create even more inflation. Such a large change in inflation is further kept going by a moderate increase in short run gdp ($\sim y$). All this demand and production was a sore sight to logistics operators, who connect all the players in the supply chain now reshuffling their order boards and delivery dates racing to meet new consumer expectations. Faced with a raging bull whip after a record rebound of demand, the effect exacerbated many challenges already apparent in the supply chain.

In America, there was no standard for employee safety practices and lots of fear about the potential ramifications of the virus. The supply chain labor force was no stranger to this fear, and was subsequently impacted by its own variety of Covid-19 related labor issues. Largely in the background, people didn't pay too much attention to American supply chain workers: Truck drivers, Longshoreman, Captain, Warehouseman Pilot, etc. See Chart 3 Below for a look at wages and employment during Covid-19.



As the stock of workers falls, L_s shifts to the left. Firms raise the wage rate in an effort to hire more workers to, to get back to L^* , shifting L_d to the right, but they are still left with fewer workers than before Covid-19 hit. The new equilibrium point C shows that less workers are in the labor force and that those workers are making higher wages than before. Fed-Ex President and CEO Fred Smith told the New York Times that Fedex was “40,000 package-handlers short,” and that it took “a great deal of effort” to get to where they need to be. He reasoned that maybe “if I’m getting a government check, there’s less incentive to go into a warehouse” (2022). Mr. Smith uses common sense. He criticizes

the media for not connecting the two, calling them “divorced from the world we’re living in.” With record demand, allowing the labor supply to fall critically low was not an option for Smith. To compete with the stimulus checks that paid more than their workers' original job, spending large amounts of capital on labor was critical for a firm like Fedex. The checks boosted the intensity of the labor shortages already building up at logistics firms.

The perfect ‘storm’ that has been brewing is as follows: shortage of supply chain labor due to covid 19 fear and stimulus checks, followed by an unexpected and record spike in consumer demand for goods and container services. Representing 40% of all US container imports, the Ports of Los Angeles and Long Beach got pummeled by a crush of containers carrying everything from face masks and gloves to tires and holiday toys (T.W.H. 2022). Workers at the ports of LA faced a covid outbreak and were only operating at 50% capacity, beyond them, a shortage of truck drivers, and finally beyond them, understaffed and gridlocked warehouses. All pieces in the supply chain were being moved out of turn. The saying that ‘people make our economy move’ is certainly true in the supply chain, because with less labor, less work gets done. As 90 container ships queued in San Pedro Bay, CA, billions of dollars of goods idled just miles off shore (Anguiano 2021). With peak shipping season underway the traffic jam became a global problem, allowing for large ocean carrier services to raise and even gouge freight rates. Seen all over Fortune 500 earnings reports, “supply chain challenges” and inflation drove major losses for firms in 2021 and into 2022 (Buchwald 2021). The ‘storm’ is now global in nature and very severe. In order to get their goods to market, some firms had to absorb crippling transportation or materials costs, or extended lead times. In an inflationary priced market, with lots of demand, little labor and short capacity, similar

psychological patterns to retail panic buying occur. Some spread too thin, like Peloton, who ran into idle container and product recall issues during the busy holiday season, simultaneously creating a PR nightmare and a 80% YTD stock decline in 2021-2022 (Cox 2021). When containers stop moving, the flow of capital in a firm can be killed. Understanding and optimizing a supply chain is a critical piece for firms to survive major global events such as the pandemic.

Large firms like Amazon or Home Depot, who were able to afford their own chartered and agile services to get their products to market, protected themselves from some of the rising rates. Amazon was able to capitalize on its large data collection to optimize their supply chain, shifting to a vertically integrated model of supply chain management (Schoolov 2021). While smaller players were less lucky, with hands tied or out of the ring, they sat in traffic and prayed they wouldn't have to dump dead inventory. When Haskel talks about "organizational investment and tech investment" (82) going hand in hand, certainly a firm like Amazon is ahead of the game using data in a supply chain to create value for its customers. With all intangible assets, data might be the king; it appears to be critical for companies looking to optimize their supply chains, bring value to customers, or prevent loss. Firms are willing to jump through hoops to get their product to market, going to show the power and importance of a well oiled, friendly and flexible supply chain. Modernizing and digitizing the supply chain during a new era of post-covid logistics will see the creation of very valuable intangible assets for some firms, and consolidation of others.

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Jargon:

Crush: A “crush” of containers. Too many containers that you can't operate.

Gridlock: Operations standstill because all capacity is unmovable.

Lead Time: Time from order placed to expected delivery date, varies per section of supply chain

Demand Forecasting: Future consumer demand data generated for supplier, manufacturer, distributor, wholesaler, retailer, from consumers. Used for lead time.

Peak Season: Varies by mode, for oil its winter, for container its busy in the summer to meet demand for the christmas rush, for package delivery it's november and december