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EASTERN KENTUCKY UNIVERSITY

*Made in China? Analyzing the Decline in Offshoring to the PRC*

Honors Thesis

Submitted in Partial Fulfillment

of the Requirements of HON 420

Spring 2023

By

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*Made in China? Analyzing the Decline in Offshoring to the PRC*

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This paper will primarily discuss globalization, primarily around the movement of manufacturing in and out of the People's Republic of China (PRC). This thesis analyzes both qualitative and quantitative data in order to estimate the true motivators for moving manufacturing to China (i.e., offshoring), and reasons why not to move manufacturing to China, or even reasons to move manufacturing back from China (i.e., reshoring). This thesis also considers potential alternative options for countries in the case that a company may be looking to outsource manufacturing but may still want some of the advantages of offshoring their manufacturing. This thesis thus argues that the decision to outsource manufacturing goods to China was made only considering potential short term gains in cost-cutting due to less expensive Chinese labor and resources and the speed at which Chinese manufacturing could begin, but did not consider long-term disadvantages of basing manufacturing in a very distant place, relying on a handful of incredibly busy ports, and relying on manufacturing from a country in a diplomatically difficult position with the United States of America. Instead, a more holistic approach to global supply chain management should be embraced that more seriously considers not only short-term but also long-term advantages and disadvantages to offshoring production to any country, the PRC in particular.

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## **Introduction**

In supply chain management and in international business the People's Republic of China (PRC) has become a central part of the global economy. Owing to its massive population and rapid industrialization, decades of inflows of foreign direct investment and foreign offshoring has made China the center of international manufacturing and logistics. Almost every electronic device we interact with in our daily lives is comprised heavily of Chinese parts. However, as different demographic trends and more sophisticated supply chain management methods have been used, firms have been increasingly forced to evaluate the risks and disadvantages to offshoring production to China. Offshoring is defined as moving one the internal processes of a company (in the case of China, this is usually manufacturing) to a foreign company, with these operations performed in that country. Outsourcing on the other hand is very similar, but the company instead moves an operation to a domestic company. A company can also reshore, which is the act of moving an operation back to a home country, reversing a decision to offshore. By first understanding why firms offshored in China in the first place and then analyzing each of these risks and issues, we can understand the advantages of Chinese manufacturing and why those advantages have mattered less and less over time.

## **The Movement to China**

The offshoring of labor has represented one of the largest shifts in the American economy in the past century. Instead of an economy that is entirely focused around its own manufacturing, this offshoring has allowed us to shift this manufacturing all over the world. At the same time as this shift in our economy, another economy, on the other side of the world, was experiencing its own surge in industry and production. While this can be broadly applied to East Asia, China in particular has experienced this surge. As a result of this, China has become a magnet for firms interested in offshoring production. Everything from parts to electronics to plastic is now produced in droves in China, where it is then shipped across the Pacific, received in American ports, and then put on trucks to be sold across the country. There are a huge number of reasons for China to be such an attractive country, and this shift has been hugely consequential for the world both politically and economically.

One of the primary reasons for this shift is found in expenses, most famously in labor. In 1978, at the start of Deng Xiaoping's economic reforms, the average annual wages for urban Chinese worker were \$1,000.4. Even through these reforms, the average urban Chinese annual wage was still only \$5,487 in 2010. This is only a fraction of the minimum wage found in the United States, and as a result, a factory in China will only pay a tiny percentage on labor versus their American counterparts. Even when accounting for the lower productivity found in some Chinese factories, this is still an incredibly high ratio. Put another way, even if wages increased tenfold through this period, if the productivity increased at a higher rate, Chinese labor is still increasing in profitability. Alongside this, longer working hours are normalized relative to their American counterparts. While formally the maximum legal amount before overtime is 40 hours per week and only 36 additional hours of overtime permitted, colossal amount of overtime is both

permitted by factory managers and coerced out of Chinese workers. One study found that in 2010 in 11 export factories in China workers were working an average of 302 hours per month. Even if we subtract the 172 hours expected in a 40-hour work week with the 36 hours of overtime, that still puts these factories at working their workers over 90 hours in excess of legal maximums found in China (Chan & Siu). This disregard for labor regulations is increasingly normal practice in Chinese factories, particularly in factories focused around exports. These specific hours and numbers are also heavily dependent on the product being exported, but most of these numbers are still well over the legal limit. For example, that same study found that garment factories assign overtime at a higher rate than toy factories, though both factories allowed for over 60 hours more overtime than the legal limit. In general, Chinese export factories employ workers for less money and longer hours than their American counterparts.

There are multiple reasons for this, with one of the prominent ones being the historic mass urban migration moving into cities. Where the United States started to experience the rise of urban industry over 100 years ago during the Industrial Revolution, China had not yet industrialized. Instead, much of this urban sprawl began in the 1970s, and reached its height in the 1990s. The reasons for Chinese rural citizens leaving for cities were very similar to those of the Industrial Revolution, including increased opportunity and access to more amenities in cities. This has collectively created a huge movement of Chinese migrants desperate to work in urban areas, particularly on the coastline, where many Chinese cities are located. It is important to remember however, that these workers are often seasonal workers, living in temporary *hukou* (housing registration that allows a worker to live somewhere by living in housing owned by the Chinese government), and then moving back home to their rural homes, typically during the Chinese New Year. An important caveat however is that some workers choose to stay in urban areas and shift to

permanent urban workers. Some migrant workers may also change jobs during this rotation, and this is encouraged by the Chinese government, who encourage labor flexibility. Due to this constant migration, these seasonal workers can be difficult to account for in official statistics. These migrants, known as *nongminggong*, make up a large percentage of all urban workers, making up 210 million people in 2011 (Chan), making up a substantial sector of the Chinese economy. They are statistically younger than resident workers, with more of them being born after than 1980 than resident workers. Due to state education, many of them have still received a full education, though they still work as unskilled labor. These workers have allowed for a colossal urban sprawl, in some ways mimicking the huge population of immigrants that went into the United States during our industrialization.

Another reason for this inexpensive labor is found in the kinds of people who own these factories. While almost all factories focused on domestic production are Chinese, the Chinese export market is much more diverse. Many of the factories that produce goods for export (as a consequence of offshoring) are not directly owned by the Chinese, but instead are owned by foreign middlemen, especially those from Singapore, South Korea, and Hong Kong (while Hong Kong is not independent from China, it still practices such a degree of financial and political independence it is important to differentiate between China and Hong Kong in a business context). Most companies that offshore their production to China do not directly own the Chinese factories, but instead contract this ownership out to these middlemen, primarily because it is less expensive and more efficient than trying to establish relationships in China, establish a separate part of a company specifically for this, and then figuring out transporting goods across the ocean. As a result of this, these middlemen control production, pay, and hiring practices. While companies are not free from the responsibility of questionable conditions at the factories they subcontract with, it is

important to remember they often are not completely aware of these conditions and are ultimately concerned with the finished product. Middlemen often get away with labor abuses since they control large swathes of production and are thus able to leverage this into political influence. They also exploit corruption inherent in the Chinese authoritarian system, using bribes and connections to curtail the law. In combination with this, these exporters often work with agencies that advocate for these workers to gain control and limit their own accountability. It is important to remember however that not all of these middlemen are foreign, with some simply being well-connected Chinese firms. Intermediaries are not always bad however and are essentially required to succeed in offshoring manufacturing. Regardless of where we offshore, intermediaries in those countries are needed, and in China these middlemen exploit the Chinese system to avoid any form of labor law and coerce workers into dangerous working conditions for little pay. When combined with the inherently low price due to the volume of available workers, Chinese labor has previously been unrivaled in cost-cutting measures.

Another expense that is minimized in Chinese manufacture is in natural resources. While Chinese resources are inexpensive in general due to low labor costs found in refineries, it is also important to understand China is rich in some natural resources, and specifically focus on exploiting those natural resources. The best example of this is found in rare earth metals. Rare Earth Metals are a group of 17 different metals that have comparable properties and although not exceptionally rare in the earth's crust, large enough deposits to mine are. They are all soft, silvery metals that are vital to multiple industries, particularly electronics. Despite owning less than half of the world's rare earth mineral deposits, China produces over 90% of the rare earth minerals used (Hurst). For this particular example, there are multiple reasons for this disparity that translate to the wider Chinese market. Since labor is already cheap in China, the cost of mining goods in

China will start out much less expensive than in the United States. As discussed before, Chinese manufacturing experiences smaller wages and longer hours than its American counterparts, so it is cheaper to extract Chinese raw goods, even when there are fewer of them. They also have fewer safety regulations than their American counterparts, which helps Chinese firms cut costs in places it is illegal and unethical for an American firm to even attempt. A second reason is because of the relative proximity to factories. Since a large part of the world's electronics are produced in Chinese factories, extracting these goods in Chinese mines means that there will be a direct flow of raw materials from the refinery to the factory without needing to cross borders or oceans. They can also do this without paying any tariffs, and for a country embroiled in as many trade issues as China, this is vital for Chinese manufacturing. This in turn makes it even cheaper for Chinese firms to primarily use Chinese raw materials, even when quality or quantity is inferior to other sources. When combined with cheap labor, inexpensive resources provide a perfect combination of production for any firm interested in cost-cutting measures.

A third reason that is related but separate to costs of production is the time and cost of starting a factory. Factories and warehouses do not appear as we need them, and building one is highly expensive alongside the price of tooling up for mass production and acquiring necessary machinery. China has many engineers who specifically are hired for this task, and lower legal requirements for buildings mean they can be erected and started much faster to their American counterparts. In the USA, a company needs to meet a variety of specifications to even begin importing machinery and equipment, much fewer hiring workers. In China, factories are often pre-built when a foreign company puts out a contract due to how quickly and easily they can be built. When Apple decided on the company to contract for its largest plant where 70% of all iPhone's are made, they cited this as a central factor to their decision. Not only was this considered alongside

cost, but Apple Executives also noted this as more important than inexpensive production. While the speed of this production may lead to questions of quality in the long-term, this speed also leads to massive gains in the short-term, and due to inexpensive materials, a company can always just pick a different factory if some problem brings the factory into question. If we always consider time as money and speed can give a competitive edge, this increase in speed is invaluable for any firm. A product sitting in a warehouse will also cost money, so getting it moved out of China quickly is valuable.

All of these factors combine to make China one of the most attractive options for offshoring production in the world. China is now one of the largest exporters of finished goods in the world and is also responsible for some of the busiest ports on the planet. If we look at the 10 busiest container ports in the world, seven of them are Chinese, and the other three (Busan, Singapore, and Los Angeles) are directly involved in the transport of Chinese goods into their respective countries and across the world. As a consequence of this, the industrial situation in China plays a big hand in shaping the global economy. As mentioned, this situation peaked in the 2010s, with a huge variety of different goods making China an international center of industry.

## **Rising Costs of Chinese Production**

The low costs that have made China the most attractive option for offshoring in the past have increasingly been put in question by the trajectory of China today. The primary attractor for Chinese manufacturing was fantastically low costs, which are still unrivalled by the Western World. However, it is important to understand the reasons China had those low costs in the first place. China at the start of this offshoring had astronomically low standards of living, even in comparison to the broadly low standards of living in the Eastern Asia region. Inexpensive natural goods were indirectly caused by this, due to the low costs of the labor to extract these raw materials. However, as the Chinese economy shifts and takes a more central stage in the global economy, these factors are shifting. As urbanization creates a gigantic shift in the Chinese economy, the very low standards that allowed for this industrial, export-focused boom begins to slow down as standards of living shifts. Along with this, economic reforms that occurred in the 1980s have begun to take fruition, causing the standard of livings (and thus the expected wages) to increase. As these wages will continue to skyrocket, other regions will supersede China in cost-cutting measures. It is key to understand how these wages are rising and what this indicates about wider changes in the Chinese economy.

One of the first things that has increased the average rise in wages (and thus cost of labor) is the reforms that went on in China throughout the 1980s under Deng Xiaoping, who was leader at the time. Prior to this, China was ruled by a strictly Communist ideology under Mao Zedong, the first leader of the Chinese Communist Party and the People's Republic of China. These policies proved to be disastrous for China, creating widespread famine and poverty, particularly early in his leadership. While initially China traded and worked closely with the Soviet Union and the broader Warsaw Pact, ideological and geopolitical differences slowed and then stopped much of

this trade in the 1960s, although the now-unified China did experience some industrialization in this period and gained lots of global influence. The political ideology of Mao Zedong, Maoism, encourages autarky and views foreign trade as exploitative, leading to very little foreign trade under Mao. After Mao Zedong death in 1976 (and the leadership of his appointed successor, Hua Guofeng), Deng Xiaoping took power in 1981 and with his new leadership he carried a radically different image for China.

While Deng Xiaoping never denounced Maoism and remained a leader within the same party, his policies were radically different to his two predecessors. One of the key elements of Deng's new vision for China is its economic liberalization. Deng Xiaoping considered himself an economic pragmatist, with Deng Xiaoping considering financial incentive and competition as key tools in the further modernization of China. In order to do this with an economy the size of China, market systems were gradually introduced to different sectors of the Chinese economy and then evaluated based on whether they outperformed bureaucratic systems, starting with the Chinese agricultural sector throughout the early 1980s. Through this system, private enterprise was gradually introduced into the economy, now making up over half of the Chinese economy, where it had once been nonexistent. Openness to trade increased in this period, with China going from a closed, command economy to a heavily mixed economy, though it is still heavily authoritarian. For the first time in Chinese history, the state permitted some level of private enterprise and foreign investment, even if the system is still heavily influenced by state-run enterprises.

Through this system, the Chinese economy boomed. In 2006, the Chinese real GDP increased by over 13 times over since 1978. The HDI, a measure of the average human material wealth, increased in China by over 30% in the same period. Average Chinese wages began to eclipse other countries in the region, like Vietnam and Thailand. Because of the newfound

openness to foreign trade, China in the 1980s became a magnet to foreign direct investment, which in turn helped accelerate growth. This growth in turn helped increase industrialization, which allowed for more, varied industrial exports. As China industrialized, the large populations of migrant workers came along with it, seeking to flee for economic opportunity in larger cities. Economic growth in China as a result of this limited privatization proved to be unprecedented, and as a result, China became a center for industrial exports all over the world. Although not as fast as in Deng Xiaoping's time, China continues to have a quickly growing economy to this day.

As a result of this economic prosperity, the expected wages of the average Chinese citizen have grown simultaneously. One of the primary reasons for foreign direct investments into China was that labor and resources were incredibly inexpensive relative to Western countries. For example, the average Chinese salary was only 3% of its American counterpart in 1978. By comparison, the mean Chinese urban wage in 2010 was almost 20% of the American counterpart (although some migrant urban workers are not counted in the study) (Feng). It is now very similar to those of workers in places like the Philippines and Thailand, and substantially higher than in places like Indonesia and India. For most countries, this is not a problem, as productivity of labor continues to grow as a country's economy grows. By increasing the productivity of labor, a single hour of work becomes capable of producing more and more goods, making the labor of that person more valuable. When Chinese labor was some of the most inexpensive on the planet, its labor productivity was very low, but this was offset by low costs allowing companies to hire enough workers to make up this difference, and then continue to profit. While it is true that Chinese labor productivity has also increased in this period, it has failed to increase at the same speeds as these wages. The ratio of costs as a percentage of productivity was on average, only 30% in 1978, whereas in 2010 it was at 70%, showing that on average, factories are paying more for the same

amount of production. Chinese manufacturing has gotten more expensive and less efficient as time has gone on, to the point it is no longer the only option for inexpensive production.

Another cause of the increased expenses of Chinese production is the demographic shift and the slowdown of urbanization. One of the primary sources of inexpensive labor in China is found in large number of migratory workers, who move from farms in the interior of China to factories on the coast through the *Hukou* system. Statistically these workers are poorer, younger, and less educated than workers who generally work in low-skilled manufacturing. While the average wage has broadly increased for all Chinese workers, these workers still make less money than other workers. Due to the fact these workers houses are still registered in rural areas, they are incapable of using any of the social services of that city, limiting their economic opportunities there. Because these workers cannot access schools in Chinese urban areas, their opportunities for more skilled labor are substantially decreased. The growth rates for this migration have been decreasing since 1997. From 2008 to 2011 the percentage of workers who work outside of their province has decreased from 53% to 48%. (Zhang)

Another reason for this demographic shift is the gradual slowing of fertility rates. As any country develops there is a proportional decrease in fertility, as the drivers to have a lot of children slowly cease to exist. However, the speed in the decrease in Chinese fertility rates are otherwise unprecedented, partially due to the size of the Chinese population. One of the many reasons for this rapid increase is found in the One Child Policy, which was in effect from 1980 to 2016. Under this policy, every family was forced to have only one child, primarily over fears due to excess population density. However, this policy led to substantial changes in Chinese demographics. The proportional drop in fertility rates was one of the fastest in human history. This is partially because of the colossal scale of Chinese demographics. China has the highest population on the planet, at

1.393 billion people, or 18.47% of the highest population. While India is a close second (With India standing at 1.353 billion people), it does not have the same colossal industry as China. As a result of this, any demographic transition in China leads to colossal ramifications, at the highest scale on the planet.

This population is especially high on the coastline, where most of the export-oriented production happens and most of China's migrant workers go to. It is important to understand that this migration is not a permanent trend, and if production moves outside of China, this shoreline-focused industrialization can slow down. The slowdown in internal migration will impact these areas the largest since they are the most reliant on migrant workers. In the past, the constant in-out movement of migrant workers has been central to the function of these factories due to low wages and poor conditions, so a slowdown in this movement directly translates to their workforce, which leads to higher prices, thus exaggerating the problem.

As a result of these newfound demographic factors, the high and soaring population that China has relied on for the lowest labor prices in the world has slowed down. A combination of the Chinese economy entering a new phase and poor population decisions has led to a Chinese labor force that is shrinking. This has combined with the necessary steps for an economy to develop, which has also created a massive shift in the Chinese economy. It is important to understand that this shift is not instant, and these demographic changes may take years or even decades to permanently change China, though these processes have already begun happening, and these trends will continue in the future (assuming there are no other fundamental changes in the Chinese economy). Together, these have created a broad increase in labor costs, which has destroyed one of the primary motivators for offshoring labor to China.

## Questions of Quality Control

Despite low costs being such a key advantage in the success of Chinese offshoring, it is important to understand that cheap labor comes at a cost. Inexpensive labor is often unskilled, which is important for lowering costs, but can also jeopardize another key element of a sustainable, long-term supply chain: quality. Quality essentially measures how well a manufacturer can keep up with the specifications of designers, and it is a central part of any operation. Quality is the responsibility of everyone involved in production, from refining, to machining, to assembling, to transporting. It is a constant process, with improvements and checks on the quality of parts and products being made all the way to the point of sale. Due to a variety of factors, Chinese manufacturing may struggle to maintain the same quality of manufacturing as its Western counterparts, which poses a serious question about what the true costs of this offshoring is. Like most decisions in operations management, this is a tradeoff, so understanding these costs are fundamentally required for successful production.

The first reason quality control may struggle in China is due to the inherent issues with quality control in offshoring. Quality control can be difficult to control in a domestic operation, with international industrial operation only exasperating these issues. Transfer of knowledge and expertise is difficult across international boundaries, and every country's workers will have different skills and expertise, which is influenced by a variety of domestic factors including education and already-existing industries in a given country. A certain basis of knowledge is required for a factory or operation to work at a low quality risk (as in the risk for quality issues is low), and this knowledge needs to be cultivated in every country that production occurs in. In one study, 30 different medicine factories originating from the USA and Puerto Rico (while not a foreign country, Puerto Rico's manufacturing is different enough to be "foreign" relative to the

mainland United States) were all inspecting on the same quality standard. It was found that there was a statistically significant difference between American and Puerto Rican factories, with American factories scoring consistently higher than their Puerto Rican counterparts (Gray). While it is true that this is only true due to the unique situation of both the US mainland and Puerto Rico, this is not a unique example. It is generally true that goods produced offshore will have more issues with quality control since the good quality practices that a company may have relied on were created in their home country and these practices may not translate well to a foreign context.

Not only does this rule hold true for offshoring to China, but these quality issues are also especially pronounced in China. China is heavily reliant on unskilled migratory labor in manufacturing, particularly in export-oriented factories. These factories are also run by managers who frequently disregard safety regulations and specifications, even if they are translated correctly (which is not a guarantee). Many companies who offshore Chinese manufacturing are also often actively investing in cutting costs wherever feasible possible, including in labor, materials, and in quality control measures. Consequently, dysfunctional parts are more likely to occur, and they are less likely to be found while in China. Combined with the huge quantity of product they are producing and then moving, and it makes export-oriented factories in China especially vulnerable to quality control issues. These quality issues are also not caught in these factories due to the disconnect between Chinese and American manufacturers. At a broad scale, Chinese quality control is not yet up to the same standards of American manufacturing, though it is gradually improving. When a quality control issues does happen, the massive scale of production and late timing in discovering the issue means it has likely impacted thousands if not millions of products. In a world where it may take months to receive a shipment of goods from China, these quality control issues are increasingly unacceptable.

It is important to understand that quality control is not an externality to consider alongside costs, but a cost in and of itself. While good quality control might have an upfront cost, it saves millions of dollars in the long term. Quality issues are first best stopped by prevention, though if it has already happened, expenses can be minimized if the issue can be caught as early as possible. The longer this issue is allowed in the production line, the more time and money has been invested in the defective product, only for it to be later be recalled and that additional time and money wasted. If an issue isn't caught at this stage and makes it onto the sales floor, the consequences can not only balloon in costs but can also be disastrous for the consumer.

An excellent example of this is found in Toyota. In the late 2000s, Toyota actively invested in cutting their costs, especially in their parts produced in China. As a result of this decision, over 10 million cars were found to have faulty accelerator pedals and floor mats that could cause these pedals to stick. Although Toyota attempted to recall vehicles with this defect, it was already too late. By the time it was discovered, over 12 million cars had been impacted, and a class action lawsuit had been filed. The litigation from this lawsuit would cost Toyota over \$7 billion, one of the largest quality-control associated lawsuits in history (Mann). This would take Toyota years to recover from financially and would permanently damage the public's trust in Toyota manufacturing. Even though this issue was most likely only the fault of a handful of factories, the failure to catch it led to colossal repercussions. Toyota had practiced a "double standard", encouraging thorough and constant improvement on parts through the *kanban* and *kaizen* systems, but the disconnect and communication issues with their Chinese factories alongside aggressive cost-cutting measures practiced there made these specific factories lacking in serious quality controls. While their assembly was capable of throwing out parts that were out of spec, they could not feasibly catch every example among millions, and may have had no other choice but to

continue production. While it may be easy for us to see the problem today, Toyota likely did not know about this issue until it had already left these factories, forcing them into unsustainable damage control. Quality is a serious concern at every step of manufacturing, and good quality practices can save a company billions of dollars. Chinese manufacturing practices alongside with the inherent risks of offshoring makes this a serious risk of production in China.

## **Crowded Ports**

Cargo vessels are continually one of the primary methods in which the international economy flows. While there are multiple methods to export and import freight, cargo vessels continue to be one of the primary methods of shipping products anywhere in the world. There are multiple reasons for this, though they all focus around the fact that cargo vessels are one of the most efficient ways of moving enormous volumes of cargo for incredibly low prices. Due to the international standardization of shipping, this cargo can go from any port to any other port on the planet. This development helped create international business as a concept, facilitating much of the rise of offshoring and foreign direct investment that happened during the 1980s and 1990s.

At the same time, China's rise as a central of global industry happened, which led to a huge demand for shipping to move in and out of China specifically. Of the 10 largest cargo ships in the world (Komaromi), seven of them are on the Chinese coast, and the other three are within close vicinity of China. The strait of Malacca continues to be one of the largest chokepoints in the world due to its proximity to Chinese exports. Shipping over the oceans is ideal for Chinese manufacturing especially, since they are moving colossal quantities of goods that are inexpensive and will be needed cyclically, so supply chains can be planned around the relatively slow times to receive cargo, though it is receives in large enough quantities to mitigate those issues. Space on these vessels is rented per shipping container, so a manufacturer is incentivized to fill a container as much as possible. For this process to work, incredibly precise timing is required, and any interruption could disrupt the entire supply chain.

As a result of the COVID-19 pandemic, supply chains were disrupted around the world. Starting in 2019, the COVID-19 pandemic spread from China across the world, creating one of the largest international pandemics seen in recent history. As a consequence of this pandemic,

governments all around the world took measures to prevent the increased spread of this pandemic. While a wide variety of prevention measures was chosen, one of the most common and most drastic measures chosen by a government was the decision to go into lockdown. These lockdowns at their most basic entailed closing the majority of businesses and institutions unless they were deemed essential by the government (“essential business” entailing businesses people need to survive in the short term, like hospitals and grocery stores). It was reasoned that by closing most businesses, people had fewer reasons to go outside, thus creating a sort of quarantine. Some offices and schools were able to transition to a virtual setting and retain functionality, though many jobs that entail manual labor were forced to close altogether. Even the businesses that were allowed to continue often had limitations on the number of staff allowed. Many businesses (especially small ones or ones with tight margins) could not withstand the financial stress of the lockdowns and went out of business before they could open again. In the process, multiple factories, warehouses, and other large business operations were closed for months. One of the businesses most heavily impacted by this was the shipping industry, especially ports and warehouses in the direct vicinity of ports.

While ports in the United States were still allowed to run (due to the importance of products being able to reach consumers), the staff sizes and length of shifts were heavily regulated, lowering the output of each of these ports. Since this occurred globally, every port was impacted by this, though not always proportionally. This also impacted the vessels themselves, who had to wait longer in ports to be loaded up and leave ports. In a vessel that ships freight, every company that needs its products shipped buys cargo space on the ship, so the ship often cannot leave until it carries all of the freight it is obligated to carry. From January to June 2020, the majority of the world maritime chokepoints (70.2%) experienced significant slowdowns in international shipping.

Throughout the COVID-19 pandemic, the entire planet experienced slowdowns in shipping. In the pandemic's strictest periods, freight vessel traffic was decreased by almost 10% (March). While that may not at first seem substantial, it is important to understand the size and quantities of these vessels. Almost 80% of international exports are shipped over the world's oceans, so a 10% drop would reflect a substantial drop in the economy of the entire planet. The study in traffic is also done by number of freighters, and not necessarily by tonnage. Each of these freighters carries hundreds of millions of pounds of freight and is often a factory that is entirely reliant on one or a handful of freighters to get resources and parts needed for production.

Despite this decrease in shipping, ports and warehouses still could not keep up. Ports across the world were inundated with freight that often did not show up on time due to these decreases in traffic. Due to decreased staff sizes and hours, freight began to pile up in these ports, with no one to recover this throughout the pandemic. This led to some of the popular ports in the world being filled with freight, leading to longer wait times which only further exasperated these problems. This problem was also geographically isolated in the United States, since most of the freight was coming across the Pacific Ocean in China and landed in the west coast, particularly in California, where pandemic rules and limitations were very strict. Since it was so difficult for products to leave ports on the west coast in time, this had a cascading effect across the United States, creating shortages across the country. Due to the importance of the United States in international trade, this also created shortages across the planet, alongside worldwide shortages.

China's position during the COVID-19 pandemic was unique due to the disease originating in central China. COVID-19 was first discovered in Wuhan, a city located in the central Hubei district populated by over 11 million people. This pandemic spread rapidly due to the high population density of the city, and due to the central location of Wuhan (sitting between two

significant rivers), there was substantial transport and travel that went through Wuhan. This meant that COVID-19 spread to other cities throughout China long before the Chinese government could react, and due to each of these cities being highly populated, this quickly meant that millions of people within China had COVID-19. As a result of this, China was forced to act quickly, and was one of the first countries in the world to institute nationwide pandemic measures, including staff limitations and social isolation. This was particularly challenging due to the enormous population sizes and the number of migrant workers who had not been tracked in Chinese systems. Where most of the world (including the USA) had only begun these measures in the spring of 2020, China had issued quarantine controls for the entire Hubei province in January, which was incrementally followed up with nationwide measures.

This meant that one of the centers of global industries and commerce since the 1980s had now experienced a nationwide slowdown in production and migration, one of the first examples of a quarantine at this scale in modern history. China has the largest population on the planet, and to attempt to quarantine this gargantuan population is unprecedented. The slowdown of production and ports mentioned before was only exasperated in China due to the scale of production and export. The Chinese economy had developed around worldwide export due to the massive amounts of foreign direct investment into the country, so these worldwide slowdowns crippled the Chinese economy, and thus severely damaged every economy reliant on theirs. These factors combined showed one of the primary downsides of offshoring all of our manufacturing to a place on the other side of the Pacific Ocean, creating some of the largest and longest shipping routes on the planet: extreme vulnerability to supply shocks. A supply shock is defined as any external event that suddenly causes a substantial spike or drop in the global supply of a commodity or service, or of commodities and services in general. COVID-19 served as a perfect example of what one of these

supply shocks can do. Where this system of outsourced trade and importing from China had been optimized prior to the pandemic, tight margins, complex supply chains, and just-in-time expectations created very little flexibility. COVID-19 halted the function of this system entirely, and accidentally served as a catalyst for substantial economic change.

COVID-19 served as a catalyst for reconsidering global supply chains. By exposing the weaknesses in being so reliant on China, firms across the United States were forced to reconsider their relationship with offshoring, especially with offshoring to China. There has since been a drive to localize supply chains, creating less complex supply chains that will be less vulnerable to supply shocks and thus easier to manage. While costs may initially increase due to reliance on more expensive labor, firms may end up paying less than before by considering more factors than just the raw cost of labor and resources. By understanding the variety of costs that go into offshoring especially, supply chain managers can get a better picture of the real costs behind offshoring, and then reconsider their options and act accordingly.

## **Anti-American Chinese Business and Government Practices**

While Chinese manufacturing practices have shown to be inefficient and indirectly impact foreign businesses, they also participate in business practices that are directly hostile to these foreign businesses, especially those in the United States. It is important to remember the Chinese economy does not work like its western counterparts, still being heavily reliant on government intervention, with enterprise and government intermingling via state owned enterprises and strict regulations. When combined with a general hostility to foreign companies this creates a business climate hostile to foreign businesses. China also has a serious, generally hostile, and volatile relationship with the United States, with the two countries being hostile to each other for as long as the PRC has existed. Despite low costs of labor, China is an untenable option for international business, with a command economy, anti-business political system, and hostility to the United States.

The Chinese economy is still a command economy, with heavy state intervention stifling some markets and political rights entirely. China is an authoritarian state relative to the United States, with a heavy emphasis on the absolute control of the Chinese Communist Party (CCP). This is the only political party that has any say in government decisions, suppressing all others. The CCP is the official ideology of the Chinese state, and through it the Chinese government exercises totalitarian control. This same concept holds true for the Chinese economy as well, with the state still operating control over every sector, with much of this being done via state-run enterprises (The only exception to this rule is Hong Kong, which is an autonomous region, exercising its own political system within China).. Some industries are entirely monopolized by the Chinese government this way, including energy, finance, and various parts of agriculture. Other sectors are not exclusively owned by the Chinese government but are still dominated by state-run

businesses. This is primarily done for political reasons, allowing the Chinese government to control entire economic sectors through autocrats at the behest of the Chinese government. This allows the Chinese government to exercise absolute influence by simply making itself the primary market force in any given part of the economy.

Economic control is also enforced in China through a powerful bureaucracy that enforces strict and sometimes arbitrary regulations. The Chinese state operates a complex bureaucracy that has very little accountability due to the lack of judicial oversight. Bureaucrats can essentially destroy any company they are hostile to, incentivizing companies to offer heavy bribes to these officials. The complexity of the bureaucracy means this is typically done for multiple officials, who in exchange allow firms to disregard some regulations (most notoriously in labor law). This is part of the reason most firms who outsource production in China make use of middlemen from South Korea and Hong Kong, as they already have the necessary political connections to do business in China. This is also done because the Chinese government is generally antagonistic towards foreign businesses, as they do not directly control them (those foreign companies sometimes do things due to demands from the Chinese government). Not only does the CCP use markets to dominate the Chinese economy, but it also makes use of complex bureaucracy to legally enforce this.

Part of the reason that the Chinese government is specifically hostile to American businesses is due to the two countries having troubled diplomatic relations. Ideologically, this is because the US government is a capitalist, liberal democracy whereas the Chinese government is a command-driven authoritarian state. This difference has its origins in the history of the Chinese state, which has its roots in the Cold War. After World War Two, China was in a state of civil war, with the two sides being the Republican Kuomintang and the Communist CCP. The US

government supported the Kuomintang while the Soviet Union supported the CCP, and after an extensive and brutal civil war, the CCP was the victor, declaring the People's Republic of China in 1949. The Kuomintang fled to the island of Taiwan, where it declared the Republic of China that continues to this day in Taiwan. This is why the existence of Taiwan is another point of contention between the two countries, with the PRC repeatedly threatening to invade it and the USA supporting it (another reason is the importance of Taiwanese semiconductors to the global electronics industry, with Taiwan making up a large part of this trade). This meant that the USA was considered an ideological enemy for the Chinese government from its very inception. While this initial tension softened as the Chinese economy liberalized and the CCP drifted from the Soviet Union, this core opposition to the USA remained, with the government staying generally antagonistic towards the USA. After the collapse of the Soviet Union in 1991, there was initial optimism, but this relationship quickly soured as the PRC became a geopolitical rival to the USA. This relationship only became more intense as the Chinese government became more antagonistic towards the USA under current leader Xi Jinping.

This tense relationship between the two governments expresses itself in business via trade restrictions and disagreements. The USA and the PRC are currently locked in a trade war, leading to skyrocketing costs of doing business with each other. A trade war is a type of economic conflict between two countries in which they both raise tariffs against each other's products, only to retaliate against the other's tariffs by increasing theirs. This very quickly spirals into a situation where both countries are using their economies as geopolitical weapons, vying for global economic influence. Regardless of the cost of transportation, the base cost of importing anything into the USA from China is raised heavily by these tariffs. This is done deliberately to discourage trade between the two countries, and in the process creates another issue for an American business

wanting to offshore operations in China. There is also the serious possibility that the Chinese government could seize and American firm's assets if tensions continue to grow. Due to the amount of control the Chinese government wields in its economy, there would be very little the American firm could do as recompense. The combination of a command economy a negative diplomatic relationships makes it very hard for an American firm to do any business in the PRC, serving as another reason for the decline in offshoring there.

## **Total Cost of Ownership: A Holistic Approach**

The primary motivator for production in China in the past has been low labor cost which incentivized pursuing every cost-cutting measure possible. Every decision made around offshoring decision made in the past has focused around minimizing every cost, even to the point of cutting corners on key elements of quality, disregarding questionable human rights practices, and ignoring diplomatic tensions between China and the United States. This was done to take advantage of demographic trends caused by Chinese industrialization that allowed for astronomically low costs of production. However, this was never the ONLY concern in supply chain management. A supply chain is complex and multifaceted, and simplifying it pure labor costs ignores key elements of an effective and economically sustainable supply chain. The best concept to explain the complexities and multi-faceted considerations of supply chain management is the concept of Total Cost of Ownership (TCO). Total cost of ownership is a broad and modern purchasing philosophy that seeks to account for and consider every single cost and risk tied to a supply chain (Ellram). With these considered, we can glean a more complete understanding of the costs of offshoring manufacturing and raw material acquisition to China.

Total cost of ownership as a philosophy seeks to find the true cost of any given purchasing decision by accounting for every cost and risk behind that decision, and then prioritize those costs and risk based on size and importance. Where in the past the main or even exclusive consideration was the literal, final price of purchasing and owning a good, TCO instead looks at every element. Instead of just cost this can include, but is not limited to, the cost of transporting the item, the opportunity cost lost by doing that, the potential costs in quality control, the cost of holding a product or asset in a warehouse, maintenance, and the costs of internal management and security. Total cost of ownership uses the power of thorough and precise accounting to get a complete

picture of what they are really paying for an acquisition decision. This also uses economics to consider economic costs that are not always accounted for by a company, including opportunity cost. While this might just seem like financial nitpicking, it is important to remember that these costs and risks are substantial as the post-COVID landscape has proven. Every second a product has to travel overseas or sit in a warehouse is another second it cannot be sold, and thus potential loss of revenue. These costs are inevitable and the cost of doing business, but by accounting for them we get a more accurate idea and can make choices based on costs other than the upfront bill (Ellram).

China provides an excellent example of where the total cost of ownership can give a company better insight. While the upfront costs are low, once we consider the additional cost of tariffs, time spent overseas, and costs of incrementally putting our products in warehouses, the cost quickly doubles or even triples. In extreme cases, it is higher than simply producing the good in a country closer to the United States. TCO also considers the risks of unsustainable practices, quality concerns, low Chinese productivity, and the long-term costs of rising costs in China, which ultimately makes total offshoring of manufacturing to China seem less economically viable and much riskier than what was traditionally thought when these decisions were first made in the 1980s. That is not to say that Chinese firms do not have advantages in producing some items, but only that the absolute advantage that is currently associated with Chinese manufacturing is an oversimplification and a mistake.

A key reason for why the decision to outsource production to China was the perspective of international business when these decisions were first made. When the decision was first made to begin offshoring production to large Chinese manufacturing, not only did the concept of total quality of ownership not exist, but supply chain management as a study also did not exist. Supply

chain management as a term was only first coined in the early 1990s, when the advantages of Chinese manufacturing were overwhelming. Before this, supply chain management was not thought of as a separate business function, instead lumped into other parts of the business. Consequentially, the long-term management of supply chains was not fully considered, and decision-making was reduced to racing for the lowest possible costs. Total cost of ownership also could not exist at that time since the tools available were not precise or available. Modern supply chain management practices are heavily reliant on technology that allows a firm to track the amount of a good in a location and the exact moment it came there, underwent production, and left. Exact and accessible navigation tools have allowed transportation countries to optimize their routes, allowing for Just-In-Time (JIT) operations. More advanced machinery has allowed for greater productivity in production, enhancing output, and helping make some production decision viable. When combined, TCO is a modern tool supply chain managers can use to accurately make production decisions and help us reconsider decisions made without all of the necessary tools.

Total cost of ownership is a modern solution to the problem of what the true cost of production is, using modern tools and practices to get a holistic understanding of cost and risks, where some of these risks may have been considered a footnote in years prior. By considering every cost that goes into acquisition and production, we can more accurately pick whichever option optimizes the balance between cost and risk, fitting the needs of our specific firms. These tools have allowed firms to reconsider their options when looking where to outsource or whether to outsource at all. In the process, they have gleamed a more realistic view of Chinese manufacturing and can make more realistic and efficient business choices in the future. Due to total cost of ownership, not only is more than initial costs considered, but those initial costs can also be more accurately understood.

## Conclusion

China has been the center of international production for almost 30 years and has skyrocketed onto the global market. Due to an enormous population and a low standard of living (especially in the 20th century), expected wages were incredibly low in China, making Chinese labor some of the most inexpensive on Earth. Where there were little prior opportunities to invest in China, the reforms of Deng Xiaoping allowed for mass investments into Chinese manufacturing simultaneously, spiking FDI. This also had the indirect effect of making Chinese raw materials inexpensive, allowing every level of Chinese manufacturing to be inexpensive. This labor was also inexpensive due to mass movements of migrant laborers from the country to cities, creating an enormous social class looking for manual labor. As a result, firms from all over the globe have chosen to outsource their production to China, and most supply chains on the planet integrate Chinese manufacturing. In assessing the risks and disadvantages of manufacturing in China, we get a more accurate picture of Chinese manufacturing. Increased industrialization has had the effect of making Chinese labor more expensive than it was in the past, with Chinese labor rising in cost faster than its increase in productivity. The movement of migrant workers has slowed down due to a rapidly declining fertility rate, partially due to increased development and partially due to the One Child Policy. Quality control was always exceptionally risky in Chinese factories, with some of the largest quality issues ever happening due to reliance on Chinese factories that did not keep up with specifications. COVID-19 showed the world that sourcing most of our manufacturing from one region concentrated in a handful of large ports thousands of miles away. This system failed to survive the supply shock that was COVID-19, with supplies running months behind being stuck in ports and warehouses. This served to show the inflexibility of China-oriented supply chains and how one shock could destroy this system. Extreme

diplomatic tensions also make outsourcing in China risky, with the USA and the PRC being involved in decades of disagreement and conflict. This has created a trade war between the two countries, with tariffs running so high between the two that the cost savings of inexpensive labor is offset by the cost increase through these tariffs. Firms in China also have very few property rights and are heavily controlled by the government through state-owned businesses, monopolies, and an elaborate bureaucracy that selectively enforces strict regulations. Where business owners failed to completely grasp the risks and additional costs of outsourcing in China, by integrating the idea of TCO into our decision making we can more accurately balance and understand the risks and costs of these decisions. These factors are unlikely to improve in the future, due to their inflexibility and the heavy hand of the CCP in the Chinese economy.

However, it is important to remember that none of the changes in China described will change the world economy overnight. Supply chains are complex and making any fundamental change will take years. Alongside this, it is inevitable that a country with over 1.3 billion people will have a lower expected wage than the USA due to simple mathematics, though that does not guarantee they will be the most viable option. While these demographics will most likely not change overnight, forward-thinking supply chain managers are already looking past China as the exclusive option, looking all around the world for alternatives using TCO to get a more accurate picture. It will be the challenge of years to come to consider our options and help improve the world economy, where manufacturing will include more than China.

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