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An Analysis of The West Coast Port Congestion Post-Pandemic

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ABSTRACT

As the global economy recovers from the COVID-19 pandemic, the two major west coast ports in the United States, Port of Los Angeles and Port of Long Beach, have been suffering from severe congestion, thus heavily impacting the supply chain in the United States. While imports continue to grow, it is urgent for public sectors and businesses to develop strategies to cope with congestion and minimize its subsequent impact on the supply chain. This thesis will seek to understand the underlying factors leading to the congestion by analyzing publicly available publications and data as well as evaluating the strategies adopted by businesses and public sectors in response to the issue. This thesis concludes with seven recommendations to help businesses adapt to the congestion and assist in future prevention. The recommendations proposed include investing in infrastructure expansion, subjecting antitrust regulations to the shipping and transportation industries, establishing the office of freight at the state or federal level, supporting cargo redirection to other ports, encouraging capacity increases in Canadian and Mexican ports, providing aid in response to zero-emission policies, and improving welfare to relieve labor shortages.

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Chapter 1

Introduction

The COVID-19 global pandemic has caused global supply chains to suffer from issues such as supply shortages and international transportation congestion. In the United States, two major ports on the west coast, the Port of Los Angeles and the Port of Long Beach, have experienced severe port congestion causing inflation, a shortage of key supplies, and prolonged supply chain lead times which have posed a threat to businesses while consumers are waiting for goods. As of September 2021, nearly seventy container ships were waiting to offload their cargo outside the ports of Long Beach and Los Angeles. The waiting time in the Port of Los Angeles has increased to nine days, which is the highest record ever observed. Big corporations such as Amazon and Target have been able to predict the issue from happening so that corresponding strategies have been adopted years ago to get their supply chain prepared; however, it is not the case for most smaller businesses.

While the issue has been rapidly spreading and widely covered by the media, there are theories and studies regarding the factors that could have contributed to transportation congestion. Examples of potential factors include domestic driver shortage, unprecedented import growth, the California emission standards, etc. Equipment shortages, capacity limits, and logistical chokepoints throughout the entire supply chain have created the backlog of container vessels and marine terminals slowing trade at U.S. West Coast ports (Pacific Maritime Association, 2021).

This thesis will focus on compiling information from publicly available sources such as news articles, company blogs, and supply chain research journals in order to gather up-to-date news and information regarding the issue. The research will also investigate whether a correlation exists between the transportation congestion and the government policies such as the California Emissions Standards as well as information such as port infrastructure within and near the United States to analyze the potential root causes of the transportation congestion on the west coast. In order to analyze strategies that have been successfully employed so far by companies or domestic shippers, this thesis will also look at industry and company reports on the current countermeasures to the problem and evaluate their effectiveness as well as implementation difficulties.

This thesis will be constructed by first providing an overview of the transportation congestion issue and the threat it has posed to the general supply chain in the United States. The subsequent chapter will discuss and evaluate existing studies regarding the potential root causes that have been leading to the current transportation congestion issues. Following will be the chapter that examines the feasibility, effectiveness, and replicability of approaches that are currently or have been employed by companies, ports, and the government that intend to cope with the congestion issue. Lastly, the thesis will end with a conclusion section that addresses recommendations and methodologies that shippers in the United States could take to relieve the status-quo and apply when similar scenarios happen in the future.

Methodology

The methodology of this thesis is to utilize and analyze publicly available data, articles, journals, and reports published by media, companies, and governments.

Chapter 2

Background

Under the continued influence of the COVID-19 pandemic, the world trade pattern and global transportation have changed dramatically. In order to understand how urgent the port congestion issue is, it is crucial to gain understanding of the background when the issue took place and the rationale why the issue is awaiting to be resolved. This chapter will give an overview of U.S. ports, the effect of the pandemic on the U.S. Economy as well as information about the west coast congestion with its follow-up influences.

Overview of U.S. Ports

Ports are indispensable nodes in the global supply chain as they serve as bridges between inland and overseas transportation. A port is an area including warehouses and fulfillment centers and provides the management of freight flows. By location, ports can be divided into coastal ports and inland ports. As a hub for cargo transportation and trade flow, the types of materials transported through ports are mainly divided into containers, dry bulk cargo, and liquid bulk cargo. Containers are the main way of freight transportation by sea; the main types of dry bulk cargo include industrial raw materials like coal and metal ore; liquid bulk cargo is mainly for crude oil, A port is competitive if it can facilitate international trade for shipping companies and provide flexible, efficient, and safe services. However, ports could also become or cause bottlenecks in the supply chain in situations such as a decrease in the service level.

With global trade gains increasing relevance to the U.S. economy, ports have become an important part of the U.S. national economy and intermodal transportation system. As of 2020,

world trade volume and trade value have increased by an average of four percent and five percent respectively (WTO, 2021). More than ninety-five percent of the goods entering the United States arrive by ship, and more than 360 commercial ports across the country help transport these goods to the destinations of communities across the country (the United States Environmental Protection Agency, “Ports Primer”). Over ninety-nine percent of the country’s overseas cargo by volume and sixty-five percent by value are handled by U.S. ports (AAPA, 2013). In addition to creating economical values, ports are also valued for their roles in boosting local employment, national defense, and so on.

Based on data published by the U.S. Department of Transportation in 2020, fifty ports are ranked among the top twenty-five maritime ports based on overall cargo tonnage, dry bulk cargo tonnage, or Twenty-foot Equivalent Units (TEU). Forty-six are located within the contiguous United States, two in Alaska, one in Hawaii, and one in Puerto Rico (see Figure 1).

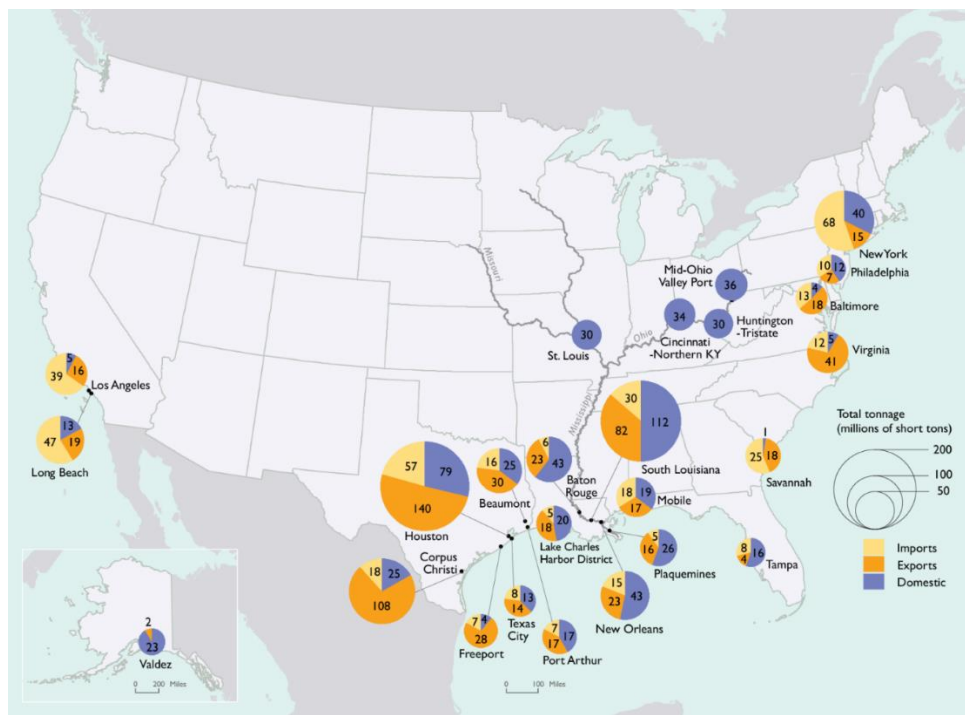


Figure 1. Top 25 U.S. Ports by Total Tonnage: 2020

The Port of Los Angeles and the Port of Long Beach, now accounting for approximately fifty percent of total U.S. imports from Asia, have become the most important ports of the U.S. economy in the past century with the expansion of economic influence to Asia. "More than seventy percent of U.S. imports from Asia in 2020 were concentrated in just three gateways: Los Angeles-Long Beach, New York-New Jersey, and Savannah" (Mongelluzzo, "US-Ports: Asia Import Growth", 2021). When ships are arriving at the ports, they join the queue and are divided into two basic groups: one group are the ships occupying the designated anchorage, and the other group will wait further offshore until one of the anchorages is open. When the ship arrives at the berth, the crane will take out the containers one by one and put them on the truck in the yard, then transport them to the transfer area and wait for the truck to pick up the goods or load the train. The trailer on which the container moves is called the chassis. In the past year, they have been short in supply because the capacity of the chassis pool has been exceeded. Containers leave the port by truck chassis or railway. Los Angeles has about 116 miles of wharf railway and six railway yards. Trucks with chasses line up at the gate and do one of three things: put down an empty container and pick up an imported container, which is an efficient so-called dual transaction, consign empty or full containers for export and then leave with an empty trailer, or enter the traction chassis to pick up the complete container. Empty outbound containers are also stacked on real estate that can be used for inbound containers.

Influence of the Pandemic on the U.S. Economy

The impact of the COVID-19 pandemic is unprecedented in a wide range of aspects. The disruption brought by the pandemic to the lives of people around the world and the economic

growth of countries since 2020 is unparalleled. The U.S. economy fell into recession in the second quarter of 2020, and its gross domestic product (GDP) decreased by 31.2 percent, and then rebounded rapidly to 33.8 percent in the third quarter of 2020 (U.S. Department of transportation, 2021).

The COVID-19 pandemic has also brought a significant shift in demand for goods and services. The volume and value of imported goods have been increasing at an unprecedented rate since 2021. Towards the end of 2021, as holiday seasons approach and the efforts for recovery from the pandemic, imports to the United States reached a record-breaking value of \$304.4 billion in November 2021 with commodity purchases increasing the most by \$12.3 billion, consumer goods increasing by \$3 billion, and services increasing by \$1.1 million (U.S. Census Bureau, 2022). As the volume of imported goods transported through waterborne vessels surges, U.S. ports are exposed to enormous stress.

With the pattern of the pandemic getting less predictable, airlines have been canceling flight services and reducing air cargo capacities, in turn forcing manufacturers to switch to waterborne transportation even with higher cost and longer lead time; therefore, waterborne vessels gradually became the main mode of international freight transportation during the pandemic. From 2019 to 2020, the international freight value of various modes of transportation to the United States decreased by \$752 billion, and the tonnage decreased by 233 million tons (U.S. Department of Commerce, 2021). In 2020, forty percent of the international freight with a net value of over \$1.5 trillion and seventy percent of the freight weight, which is close to 1.5 trillion tons, were transported through vessels. From January 2021 to October 2021, the value of monthly U.S. international freight transported by ships increased from \$139 billion in January 2021 to \$170 billion in October 2021 (Bureau of Transportation Statistics, 2021).

Disruption at the West Coast

As imports drastically increased, congestion at import destination ports exacerbated, notably at the ports of Long Beach and Los Angeles in California. The top twenty-five U.S. container ports had their average container vessel dwell time increased to 31.5 hours from 28.1 hours in 2020, with 6,537 observed vessel calls, 21.8 percent down from the same period in 2020 (U.S. Department of Transportation, 2022). The congestion started in 2020 and worsened as the pandemic progressed, with the projection to continue. On October 25th, 2021, about seventy-five vessels arriving at the Port of Los Angeles were delayed, which was almost twenty percent more than were waiting one month ago (“2021 Port Congestion Report”, 2021). The Port of LA Operations Report indicated that on average it took 20 to 27.3 days for container vessels to reach a terminal to unload their containers, as of December 27, 2021 (Port of Los Angeles, 2021).

At ports on the west coast, especially the Port of Los Angeles and the Port of Long Beach, ships were unloading much slower than expected due to the insufficient speed of containers arriving at the terminals moving inland. Vessels have to stay in port for weeks, waiting for space to become available in warehouses and container yards in the area. As noted in the previous section, the volume of imported goods has broken the records since the COVID-19 pandemic has driven an e-commerce boom. However, when containers filled with imported goods are unloaded, they often have nowhere to go because of a lack of yard and warehouse space to store them and other policy factors. The situation worsens when factors such as a shortage of truck drivers occur at the same time, which will be further discussed in the next chapter of this thesis.

Impact on the Supply Chain

The impact of the port congestion is indeed reflected in the everyday life of all people in the United States, divided into three categories: customers, businesses/retailers, and shipping sectors.

1. Customers

The most significant influence on the customers is the inability to purchase goods and services as well as the time delay in receiving their orders. While the import price and the shipping price increase, consumers are confronting higher prices and shortages of necessary goods needed for everyday life and the holiday seasons.

2. Businesses/Retailers

For retailers and domestic businesses, they are now required to hire additional shipping sectors to transport their goods and place orders several months in advance, paying much higher rates and ordering in larger quantities for increased safety stock than they have in the past to ensure enough inventory will be on hand and prevent running out of goods. Because of the prolonged holding time, perishable products could be spoiled. Production lines for some manufacturers must be slowed down or even stopped because it is no longer feasible to practice just-in-time inventory. The worst-case scenario happens if the retail goods are delayed and eventually arrive when the corresponding selling seasons or holiday seasons have passed. For example, Nike claimed that the port congestion “delayed the flow of inventory by more than three weeks” (Safdar and Chin, 2021). The businesses and retailers are exposed to huge losses in profit because of the higher price of carrying goods and missed sales due to below optimal inventory levels.

3. Shipping Sectors

For the domestic shipping sectors, the shipping rate and import rate have increased tremendously. More transport capacity and equipment for the volume of trade are needed as vessels and containers are getting stuck in congested ports. However, the construction and allocation take much more time to be built and implemented while the vessels are continuously queuing up. Because of the lack of space and the insufficient inland transportation capacity to get all the containers to the Midwest, containers in the U.S. are often shipped back empty, instead of being made available to ship more U.S. exports, in turn posing a further negative effect to the global trade.

The negative effects induced by the port congestion are not limited to the ones listed above. Businesses are losing money every day while making expenditures to cope with the situation. Consumers are suffering as goods and services needed are not in stock or of long lead time to arrive. The congestion could have threatened the bottom lines of those who rely on foreign outlets to sell their products and hindered the economic growth of not only the United States but also the rest of the world.

Objective and Scope

The effects of the port congestion are much more enormous than one might expect, especially when the pandemic continues to take place and the economy is still relatively unstable. This thesis will explore the underlying causes leading up to the current situation and evaluate existing

strategies to alleviate congestion. The objective of this thesis is to present trends and feasible proposals to domestic shippers and businesses that are looking into resolving the issue.

The next chapter of this thesis will further discuss and analyze factors that have played a role in leading to the west coast port congestion.

Chapter 3

Leading Causes of Port Congestion

In order to develop strategies to deal with the west coast port congestion, the first step is to understand the root causes or factors that lead to the current situation. This chapter will discuss the leading causes from two aspects – infrastructure and labor.

Infrastructure

1. Ports and Warehouses

With the increasing number of imports as specified in the earlier chapter, one significant issue immediately exposed is the lack of unloading capacity at the two west coast ports. The Port of Long Beach has been mired in a backlog of records for several months. Each ship carries an average of seven thousand containers, an increase of seventy percent over the average of about four thousand containers before the pandemic (Rivero, 2021).

At the same time, with the growth of e-commerce and the influx of container imports into the U.S., the storage demand near major ports has surged, making storage space more difficult to find and more expensive, adding new pressure to the already tight supply chain. In the logistics intensive Inland Empire of Southern California, about ninety-eight percent of the warehouses have been fully occupied, while the vacancy rate in the whole western United States is 3.6 percent. Maritime terminal operators at the ports of Los Angeles and Long Beach are particularly concerned about the situation of 1.8 billion square feet of warehouses in Southern California, as the supply chain collapse that occurred last fall began in the import distribution center and quickly moved to the port (Kay, 2021). Due to the shortage of warehouse space, some freight

companies even began to store goods in containers, because container transportation is cheaper than renting storage spaces. In the meantime, the ports were running out of place to store containers full of goods.

In addition to the capacity issues at the ports, the limited operation hours at the Port of Los Angeles and the Port of Long Beach also played a crucial role in worsening the situation. Prior to September 2021, the ports have only two shifts for longshore workers and are closed on Sundays while thirty percent of trucking appointment slots for transferring cargo go unused each day. There are options for overnight shifts, but they are too expensive, and they are not quite helpful since most DCs are closed at night. Consequently, it is almost impossible to keep up with the schedule as containers cannot be picked up as quickly as possible, considering that the ports in Asia and Europe that are sending the goods are on a 24/7 schedule.

2. Inland Transportation

2.1. Truck

One common way to transport the containers inland is using trucks. When containers arrive and get unloaded at the port, drivers would come to pick up the containers and get them to the corresponding destination. If drivers are not picking up the containers efficiently enough, more and more containers will be stuck at the ports, thus further hindering the unloading speed of the ports and exacerbating the port congestion.

In addition to the issue of driver shortage, environmental policies enacted by the California government have made it more difficult for drivers to even get into the two ports. In 2020, California passed a landmark regulation requiring more than half of all trucks sold in the state to achieve zero emissions by 2035, which is expected to improve local air quality, control

greenhouse gas emissions, and significantly reduce the state's demand for oil (California Air Resources Board, 2021). A following rule passed by the California Department of Motor Vehicles calls for the majority of trucks, including those that service ports, to have a 2010 or newer engine by 2023. Some trucks with older engines had to comply with the regulation by 2020.

The truck transportation at two West Coast ports is heavily affected by the emission standards. The average service life of these trucks cannot exceed three years in order to pick up or transport containers at these two ports, resulting in almost half of the fleet of trucks used to enter and leave the port with containers are now prohibited from doing so. Most private truck owners or truck drivers are now unable to pick up containers from either Los Angeles or Long Beach because their trucks are unable to meet the emission standards and they can hardly afford purchasing new trucks while containers are constantly replenishing and waiting for trucks to pick up goods.

2.2. Railroad

The shortage of intermodal rail cars has become the main cause of congestion at the ports of Los Angeles and Long Beach, as well as in other west coast ports. The dwell time of rail cars at the terminal has doubled to about ten days, indicating that the shortage of rail cars has increased significantly (Mongelluzzo, "US Importers", 2021). From April 2021, the shortage of rail transit has had a greater impact on the freight abortion of North America's largest import channel, compared to the shortage of labor and chassis.

Another important inland transportation is the railroad. While the demand for rail freight experienced a decline in the earlier time of COVID-19, it rose significantly in 2021, even

exceeding the level that the current railway transportation capacity can handle. Imports arriving on the west coast over the summer increased congestion in inland areas, and mid-west regions were overwhelmed by the backlog of the containers. On the west coast, the railway dwell time in San Pedro Bay surged from nearly eight days in January to 11.2 days in April (Pacific Merchant Shipping Association, 2021). In July 2021, service between the West Coast and its Global IV gateway in Chicago even got suspended for a week by Union Pacific in an effort to improve congestion at the inland intermodal terminals (Leonard, 2021). The operations in Chicago were also confronted with the problem of lack of chassis.

While the current freight railroad has been overused, it is projected by the U.S. Department of Transportation in 2021 that freight activity in the U.S. will further experience a fifty percent increase by 2050. (see Figure 2)

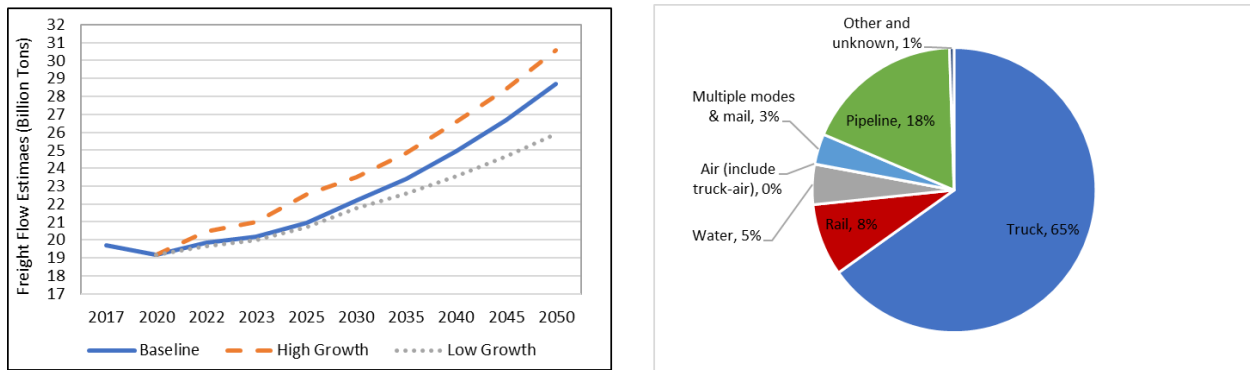


Figure 2. Freight Growth Scenarios by Year 2050

Therefore, it seems to be of more necessity to improve the railroad capacity in the United States in an effort to cope with the drastically increasing freight activity within the next few decades.

Labor

Unfortunately, infrastructure capacity is not the only cause of port congestion. One reason why the U.S. supply chain cannot handle so many goods is the severe shortage of workers needed to transport them. Although unionized dock jobs are well paid, the essential problem is the lack of workers downstream of the supply chain, which are those who need to handle the goods after they leave the port such as truck drivers and warehouse workers.

The trucker shortage in the United States has been in place for years now. The issue has been worsened by the pandemic as older truckers are retiring during the pandemic, truck driving schools have temporarily closed, and, more importantly, the difficulty of the job has never eased. It is estimated that in 2022 the truck driver shortage will hit a historic high of around 90,000 drivers, which is calculated by measuring the difference between the number of drivers available in the market and the number of drivers needed based on freight demand (American Trucking Associations, 2021). As forecasted into the next two decades, the shortage could surpass 160,000 in 2030. (see Figure 3)

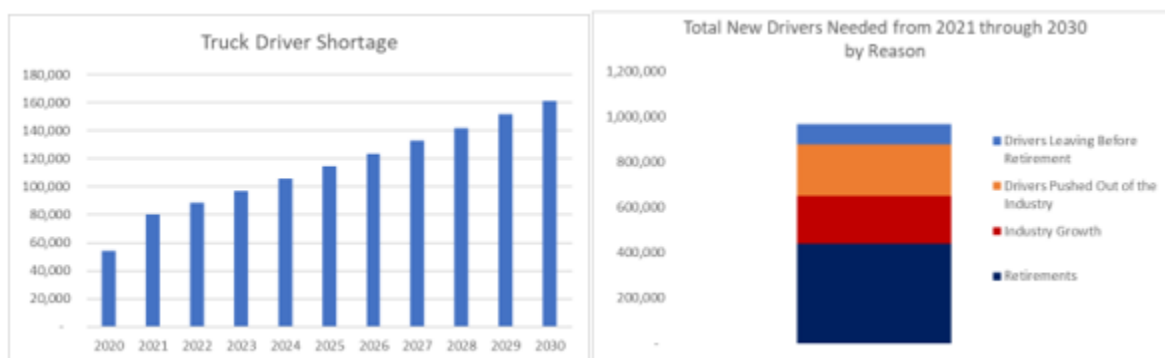


Figure 3. Projected Driver Shortage by 2030

It is also estimated that nearly one million new drivers must be hired into the industry over the next decade in order to keep up with the demand as older drivers retire for various reasons (American Trucking Associations, 2021). Although measures such as increasing equipment orders and raising driver wages have been taken to deal with this situation, it is still difficult to catch up with demand as the freight market recovers in the expanding economy.

Even when the cargo reaches its destination, there might be too few workers to handle the freight, since warehouse workers also are in short supply nationwide. Once containers are unloaded, the issue of worker shortage at rail operations is waiting ahead, hence resulting in repeated delays and congestion in all aspects of the intermodal transportation system.

While congestion is still in place as of the beginning of 2022, businesses, governments, and a lot more institutions have enforced actions and changes to relieve the situation. The next chapter of this thesis will discuss the variety of strategies undertaken, the effectiveness of those actions, and their projected impact on issues detailed in this chapter.

Chapter 4

Strategies and Solutions

To respond to the transportation congestion, public sectors and companies have implemented strategies to relieve the situation. This chapter will discuss the kind of strategies implemented and their corresponding effects.

Public Policies

As the congestion continues to exacerbate, President Biden launched the Supply Chain Disruptions Task Force in June 2021 with a focus on resolving logistics bottlenecks to the economic recovery across the country, leading to a series of public and private commitments (The White House, “Recent Progress.”, 2021). Below are a few major public policy changes introduced in an effort to ease the situation.

1. Extended Port Operation Hours

Instead of opening for limited shifts every week, the Port of Long Beach extended its operation hours to 24/7 in mid-September 2021, followed by the Port of Los Angeles adding additional night shifts and weekend hours. By extending port operating hours, more time is allowed for the domestic shippers to enter the port and move the cargos out of the docks (The White House, “Recent Progress.”, 2021)

2. Reduced Fee for Truck Drivers

During normal periods, the truck drivers must follow a system named Pier Pass by paying a flat fee if they would like to pick up cargo during off-peak times such as the nights and weekends. In order to relieve the status quo and quickly transport the waiting cargo on the docks inland, proposals to waive the fee to financially incentivize the truck drivers have been under consideration. On November 10, 2021, the West Coast MTO Agreement (WCMTOA) announced the Traffic Mitigation Fee would be lowered to \$78.23 per TEU and only charged on weekdays during the daytime shifts from December 2021 to January 2022. On February 14, 2022, because of the regulatory clearance by the Federal Maritime Commission (FMC), WCMTOA further lowered the rate to \$78.23 per TEU (PIERPASS, 2022).

3. New Incentives for Off-peak Businesses

BNSF Railway and Union Pacific Railroad announced new incentive plans in 2021 to encourage international intermodal customers to have their containers delivered to their Los Angeles-area terminals during off-peak hours such as the weekends to ease supply chain congestion on the West Coast. For example, in October 2021, Union Pacific announced a \$60 rebate on weekends for each container dropped at the Intermodal Container Transfer Facility in Long Beach, following BNSF's \$50 rebate per container for boxes brought to the terminals on the weekend since September (JOC, 2021).

4. Grants for Pop-up Container Yards Near Ports

In addition to the two west coast ports that have been experiencing record-breaking levels of volumes, the Port of Savannah also observed a surge in the number of arrivals. In order to support the Port of Savannah to better accommodate the increasing arrivals and ensure sufficient

storage space for the incoming containers, together with the Department of Transportation, the Georgia Port Authority distributed over eight million dollars in building five pop-up container yards in Georgia and North Carolina, which could take more than half a million containers over a year (The White House, “Recent Progress.”, 2021).

Business Strategies

The west coast port congestion has exerted an enormous negative impact on the businesses that are waiting for their products or materials to fulfill their consumer’s needs. While public sectors and the government strive to resolve the issue, businesses have also been actively taking actions to reduce their product lead time and minimize their loss from the congestion.

1. Shifting to Other Ports

Identified earlier in Chapter 2, one of the primary causes for the congestion is that the majority of imports from Asia enter the United States at the Port of Los Angeles and the Port of Long Beach. As imports continuously increased, the number of containers and cargo was exceeding the maximum capacity of the two ports. Therefore, businesses such as Walmart and Amazon have been spreading their ocean container imports to other ports in or near the United States, such as Houston, Norfolk, and Savannah. In addition, Amazon has adjusted its import routes by having more containers sent to the Port of Baltimore since Amazon possesses four distribution centers nearby (Kulisch, “GSCW.”, 2021).

2. Purchasing and Chartering Ships

Although the congestion has been quickly worsening, some huge companies have been able to predict the occurrence of the current situations and make early investments to have their own cargo ships, which now provides such businesses with much more flexible import and helps them avoid the wait time on the west coast ports. The most well-known case is Amazon. Amazon has been chartering private cargo ships, making its own containers, and even leasing planes to exert high-level control over the shipping of its products. On October 5, 2021, a cargo vessel, named the Star Lygra, arrived at the Port of Houston with Amazon containers while many other businesses were suffering from the west coast congestion (Schoolov, 2021).

Following Amazon, an increasing number of large companies have invested in purchasing and chartering their own vessels to import freight from Asia to North America for their businesses, including Costco, Walmart, Target, Ikea, The Home Depot, etc. Although the investment appears to be huge, with their own cargo vessels, companies are able to efficiently avoid the most congested ports and control where their containers go at a much lower cost compared to shipping through a third party. For example, according to Richard Galanti, the Chief Financial Officer of Costco, by chartering private vessels, Costco has avoided spending six times the normal price with a third-party shipper (Taylor, 2021).

3. Renting Pop-up Yards Near Ports

One of the issues with port congestion is that there is not enough warehouse space near the ports. When the containers arrive at the dock, there are not enough drivers to pick them up and there is nowhere to store them, thus leaving them waiting on the dock and taking up dock spaces. Therefore, another strategy implemented by companies, such as Walmart, is to rent additional pop-up yards near the ports of Los Angeles and Long Beach to help improve the

import cargo flow and prevent containers from getting stuck at the ports. Walmart's new overflow yards provide the retailer a storage space to store their merchandise and wait for the next available shipment for redistribution in the United States (Kulish, "Walmart rents.", 2021).

4. Pivot to Air Cargo

In response to the disruption in maritime transportation, businesses have also made investments and shifted some of their resources to air cargo. Compared to maritime shipping, air cargo tends to be much more expensive for businesses. The advantages of shipping by air include shorter shipping time and exemption from the risk of congestion, which makes air cargo highly appealing to businesses as their consumers have been waiting for their products to arrive. However, because of the limited capacity on a plane, air cargo is hardly capable of transporting large quantities of goods. According to Ocean Audit, a converted Boeing 777 can carry about one-fifth of a million pounds of cargo, while the small cargo vessels chartered by Amazon could hold one-hundred and eighty times that. Consequently, despite the fast speed of air cargo, the unit cost of shipping by air could be too high for businesses to afford. An example of companies that pivoted to air cargo, again, would be Amazon. Based on available reports, Amazon has been leasing at least ten long-haul planes to get their cargo of the highest margin goods directly from China to the United States (Schoolov, 2021).

5. Simplified Distribution Routes

For retailers that have limited control over their shipping options and must wait for their goods to be picked up from the two west coast ports, one way to minimize the lead time is by cutting down the steps to get their products from the port to the stores. For example, one of the

options is to skip the large distribution centers that such businesses rely on when there is no congestion (Waters, 2021). Instead, changing to some smaller and lightweight distribution centers, in this case, could help reduce the lead time as products could potentially be shipped to the corresponding stores more quickly.

6. Extended Off-peak Working Hours

Following the launch of the Supply Chain Disruptions Task Force by the president, ports have extended operation hours and reduced rates for picking up containers from the ports. Therefore, businesses and shipping sectors also adjusted their working hours to move the containers out of the ports as soon as possible.

For example, UPS committed to increasing its operation to 24/7 and was estimated to be able to move up to twenty percent more containers from the ports than usual. FedEx also increased its nighttime operation hours with both trucking and rail use to maximize the volume of containers that could be moved out of the docks. Such changes were expected to double the volume of cargo that gets moved out at night.

Moreover, businesses such as Walmart and The Home Depot also made commitments to utilize nighttime hours and other off-peak periods to efficiently reduce congestion. For instance, Samsung committed to moving almost sixty percent more containers out of the ports by operating 24/7 over a ninety-day period. Similarly, Target also made commitments to moving approximately sixty percent of its containers from the ports at night over a ninety-day period (The White House, “FACT SHEET: Biden Administration”, 2021).

7. Incentives for Increased Labor

As detailed in Chapter 3, the labor shortage has been a serious problem for all segments of transportation in the United States, including the ports, truck drivers, railroads, etc. In order to recruit more labor, businesses have made changes to their salary structure with an increase in bonuses to attract people to apply for jobs.

For example, Amazon provided a sign-on bonus of up to three thousand dollars to all the seasonal employees that it hired in 2021, which totaled around 150,000 workers. Amazon has also been successful in planning ahead to cope with the potential problem of insufficient warehouse capacity as it opened more than 250 new facilities in the United States in 2021 and hired sufficient seasonal workers to support the operation of new facilities (Schoolov, 2021).

It is evident that the government, ports, and businesses have devoted a lot to relieve the congestion. However, to the majority's surprise, as of March 2022, the west coast congestion is still in place and the situation is not much better, especially for smaller companies or retailers that are unable to afford practicing strategies illustrated above. The next chapter of this thesis will discuss the reasons for which the congestion is still severe after months of efforts and propose recommendations for further actions to be taken to help with the problem.

Chapter 5

Conclusion

It is evident that public sectors and businesses have been striving to relieve port congestion and bring inbound transportation back on track. However, while efforts and investments are continuously made, the situation on the west coast seems to have only been slightly alleviated. According to the Marine Exchange of Southern California, the number of cargo ships waiting at the ports of Los Angeles and Long Beach was at forty-eight as of March 18, 2022, down from a peak of 109 on January 9, 2022, which could be a result of the new queueing system at the ports and the Lunar New Year factory closings in Asia (Marine Exchange of Southern California, 2022).

As identified in Chapter 4, public sectors and the government have been focusing on working on changing the operational aspects related to the problem such as the opening hours of ports, while key problems like insufficient infrastructure capacity and labor shortages remain unresolved. Large businesses have also been employing a great number of strategies intending to avoid the west coast ports. However, most of the strategies implemented by such huge corporations can hardly be utilized by the smaller size businesses who cannot afford the extended lead time, not to mention purchasing cargo ships or containers.

Future Recommendations

With the purpose of further resolving the congestion and preventing congestion from reoccurring, this thesis will end with the following recommendations for future improvements.

1. Invest in infrastructure expansion

To address issues such as railcar shortages and limited railroad capacity, investments are needed to increase goods movement capacity on rail and roadways serving ports and at port terminals. In addition, instead of having multinational companies build pop-up storage spaces, public sectors and governments should plan for expenditure in expanding not only the ports but also the surrounding storage facilities or off-terminal staging areas for temporary container storage purposes, considering the projected drastic increase in imports for the next few decades.

2. Subject antitrust regulations to the shipping and transportation industries

For years, transportation industries have been dominated by a few large corporations. For example, for the international container shipping industry, the ten largest companies are currently dominating over eighty percent of the entire industry, which has led to drastic price increases and hindered the growth of domestic businesses that require imports or exports (The White House, “FACT SHEET: Executive Order”, 2021). To prevent the few dominant shippers from charging exorbitant fees in times of congestion, the Federal Maritime Commission (FMC) shall subject the large container shippers to antitrust regulations. Similar regulations are already applied to other transportation industries, such as motor, air, and rail.

3. Establish the office of freight at the state or federal level

In order to better coordinate among ocean, rail, and motor carrier modes transportation, it would be necessary to establish a state-level or even federal level office to be in charge of implementing policies related to congestion, managing infrastructure investments, and strengthening the overall resilience of freight transportation in the United States.

4. Support and aid for cargo redirection to other ports

While big corporations have been able to switch to other ports in or near the United States to avoid congestion, the corresponding cost increase makes it impossible for smaller businesses to practice similar strategies. As a result, the government and public sectors shall establish funds and aids to assist more businesses to utilize other ports for freight import with minimal financial concerns.

5. Encouragement for capacity increase in Canada and Mexico ports

As specified in Chapter 2, the majority of imports from Asia to the United States have been through the two ports on the west coast. However, instead of switching to ports in other parts of the United States, a more cost-efficient option for businesses could be utilizing certain ports in Canada and Mexico that are closer to the two west coast ports, such as the Port of Prince Rupert, the Port of Ensenada, etc. Considering the trade agreement between the United States and Canada as well as Mexico, while investments are made for U.S. port capacity increase and infrastructure building, encouragement shall also be given to Canada and Mexico to advocate an increase in port capacity in an effort to further relieve import pressure on the west coast ports.

6. Support and aid in response to zero-emission policies

Since the problem of truck driver shortage is in place, to help the truck drivers in the industry to enter the west coast ports and encourage more people to become truck drivers, support and aid need to be provided to assist those in need to possess trucks that align with the California zero-emission standards, thus allowing more trucks entering the ports and increasing

the pace of transporting containers to their end destinations instead of sitting on the docks waiting to be picked up.

7. Improvement in welfare to relieve labor shortages

In addition to truck driver shortages, all segments of the domestic supply chain have been exposed to the problem of labor shortage, especially under the influence of the pandemic. Similar to the practice of Amazon, better welfare plans and career prospects should be devised and advertised to attract more younger generations and potential labor force to enter the related industries. Assistance and financial aid shall be planned to help people possess the skills and equipment needed for fulfilling the corresponding roles.

In addition to the above three primary directions for further improvement, while the exemplified strategies mentioned in Chapter 4 might not be duplicatable for most businesses, smaller-sized companies shall minimize the impact of future port congestion on their businesses by implementing strategies such as diversifying their supply chain through avoiding single-sourcing or single port of entry. Supply chain resiliency must be improved, and it is necessary for businesses to adjust purchasing plans based on their financial condition and plan ahead by means such as making orders in advance and in larger quantities, using other ports if feasible, purchasing available storage space near the ports, etc.

In conclusion, the west coast port congestion has exerted undeniable effects on the supply chain within the United States for over a year now. While the situation at the west coast port seems to be improving and the number of imports for the earlier section of 2022 is expected to experience a much more modest increase, the customer demand for goods will continue to rise,

which means that congestion will persist if the fundamental issues with the congestion are not addressed.

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