May 2022

Second Order Disruptions
China COVID Lockdown Analysis

Report Produced by the Interos Inc. Business Analyst Team

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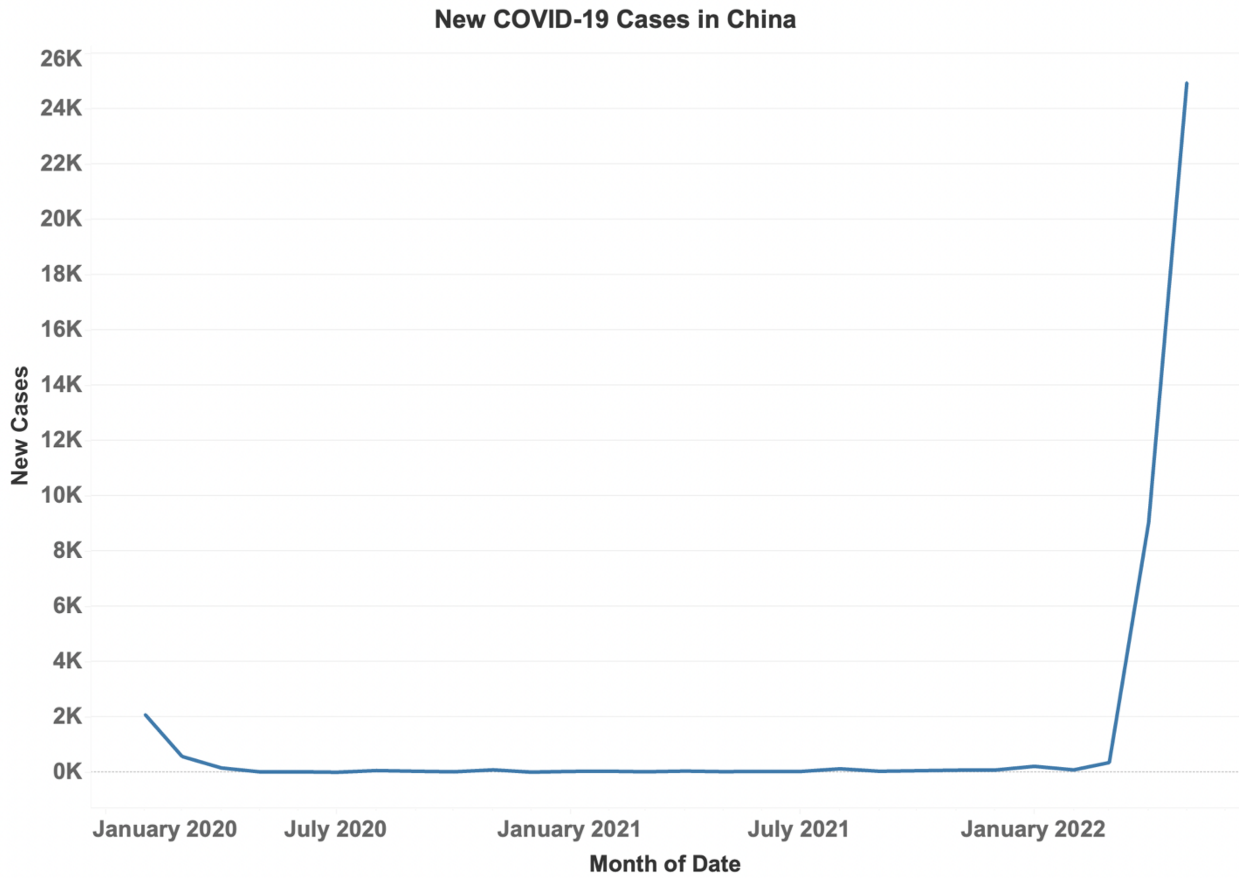
Executive Summary

Key Findings

- *Despite 76% of cargo being moved from ports by truckers, the road freight in China is operating at 20% capacity because of zero-Covid policies and binding government restrictions and regulations.*
- *Vessels waiting outside of Chinese ports accounts for about 27.7% of all vessels waiting outside ports globally.[1] The number of vessels outside Chinese ports increased by 195% since February 2022, almost doubling its congestion in the span of two months.[2]*
- *Road freight in China is an extremely fragmented and inefficient means of transporting goods as 90% of truckers operate individually and are subject to a myriad of restrictions that impose severe cost, logistical, and operational limitations.*
- *Rail freight in China faces a shortage of shipping containers and present vulnerabilities to severe Covid restrictions, geopolitics, and trade fluctuations.*
- *Most airports in key ports and towns reached storage capacity or have suspended operations of air freight due to covid restrictions and capacity limitations.*
- *A global shortage of shipping containers is further impeding the movement of goods from Chinese ports into mainland China. The trade deficit where exports outnumber imports exacerbated the shortage as a halt of exports and imports meant not receiving empty shipping containers back from other countries.*
- *Shipping costs could see a momentary drop in rates but are expected to surge when the Shanghai lockdown is lifted. Manufacturing hubs reliant on Chinese imports are suffering, and consumer product companies are quickly burning through their supplies as shipments are deferred.*
- *When the Shanghai lockdown is lifted and resumes normal port operations, ports in the United States and Europe will likely see a massive surge in imports that is expected to overwhelm port capacities. This will create long backlogs and further compound already existing equipment and labor issues.*
- *The Shanghai lockdown, and any further lockdowns enacted by China's government, will exacerbate global inflation, and negatively affect key industries' output including semiconductors, automotive, commodities and consumer products.*

Overview

The strict lockdowns and zero-covid restrictions being implement across cities in China, particularly in Shanghai, have halted the movement of goods as well as manufacturing operations across the country. This has resulted in shortages of goods, overflowing ports, and labor shortages. Imports and raw materials are no longer being moved to mainland China where the manufacturers process those goods into consumer products. As a result, prices on goods coming out of China are increasing and causing even greater backlogs on air, sea, rail, and road freight. Labor shortages from containment efforts are also impeding the processing of goods since factories do not have the staff to operate at capacity, further exacerbating the shortage of goods. An inventory shortage could also further inhibit the manufacturing of goods as companies do not have the raw materials available to resume operations, even if the restrictions were lifted.



Domestic Logistical Disruptions

COVID Impact

Despite 76% of cargo being moved from ports by truckers, the road freight in China is operating at 20% capacity due to zero-Covid policies and binding government restrictions and regulations.

Truck drivers face severe scrutiny and regulations from the zero-Covid policies being implemented. The restrictions have dropped the amount truck drivers on the road so that only about 20% of Shanghai's trucking capacity is operating.[3] Covid testing, quarantines, and licenses given from the government make truck delivery much more complicated and caused major shortages of drivers willing to transport cargo away from the ports. For long-distance freight truckers, transporting goods has become considerably arduous as COVID-related protocols now include negative covid tests, Covid tests that are only valid for 24 hours, and permission to use only a few routes to travel.[4] Truckers are also not allowed to travel to ports and cities experiencing COVID-19 outbreaks, which would include the busiest ports in China.[5] Additionally, drivers now intentionally avoid high-contamination areas since contracting the virus would indefinitely result in two or more weeks of no income. Ningbo and Zhejiang province require truck drivers to show a health pass to enter the region as well as a negative nucleic acid test that is less than 24 hours old.[6] Cargo will not be accepted if drivers come from medium to high-risk areas within the last 14 days. These regulations increased the cost of transportation by about 50% between Beijing and Tianjin and into Shanghai from neighboring cities.

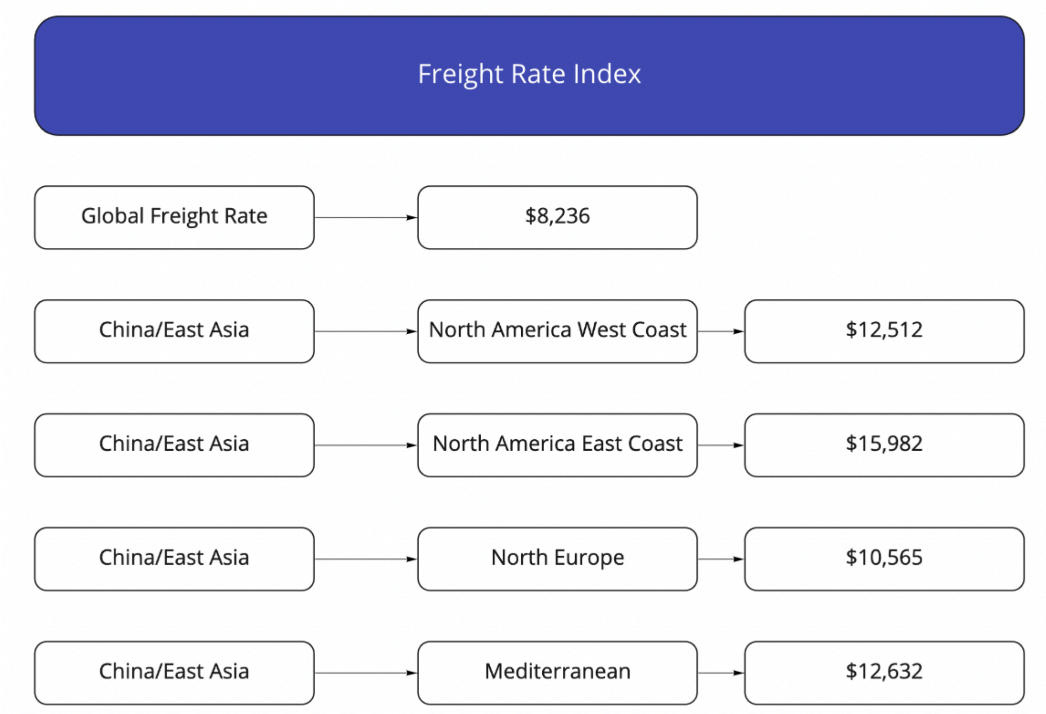
Sea Freight

Vessels waiting outside of Chinese ports accounts for about 27.7% of all vessels waiting outside ports globally.[7] The number of vessels outside Chinese ports increased by 195% since February 2022, almost doubling its congestion in the span of two months.[8]

With ports closed or at surpassed capacity, movement of goods via sea freight presents its own set of challenges, making sea freight an improbable alternative to moving goods inland.[9] Seven of the ten largest ports in the world are in China, indicating an industry dominance in terms of sea freight traffic.[10] The visual below includes the rank and location of China's biggest ports.

Major Chinese Port Locations

However, this also indicates major concentration risk in the event of shutdowns. Despite their size, Chinese ports are experiencing massive backlog and keeping a lot of cargo out at sea as no space currently elsewhere in China. About 20% of the world's roughly 9,000 active containers are anchored outside congested ports.[11] Vessels waiting outside of Chinese ports accounts for about 27.7% of all vessels waiting outside ports globally.[12] As of February 2022, Chinese ports had 260 vessels waiting outside the ports. However, that number jumped up to 506 vessels in April 2022.[13] The number of vessels outside Chinese ports increased by 195% since February 2022, almost doubling its congestion in the span of two months.[14] Surging prices for shipping containers also presents a major obstacle to the movement of goods by sea freight. Shortages of shipping containers emerged because of stoppage of exports around the globe. In Asia, however, the shortage of containers is much more concentrated than other ports around the world.[15] As a result, Chinese exporters are having to pay two to three times more than pre-pandemic costs to ship anything[16]. The Freight Rate Index measures market rates for freight for different shipping lanes. Displayed by the visual below, the freight rate out of China are much higher than the global average and the highest among other shipping lanes.



Road Freight

Road freight in China is an extremely fragmented and inefficient means of transporting goods as 90% of truckers operate individually and are subject to a myriad of restrictions that impose severe cost, logistical, and operational limitations.

Imported goods arriving into Shanghai, the country's largest port, currently struggle to reach mainland China as a result of COVID-19 restrictions, regulations, and work requirements, resulting in much of the backlog the Shanghai port is currently experiencing.[17] The backlog comes from the severe dependence on road freight to move goods out of the port into manufacturing facilities inland. Currently, 666 companies are 'white-listed' to resume operations in a closed-loop management system, meaning employees are quarantined in their work environments. Most of the companies on the list are semiconductor, biopharma, and manufacturing companies.[18] A third of the companies on the list are automotive companies that include Tesla, Volkswagen's partner SAIC, German auto supplier ZF, and China's Yanfeng Automotive Interiors.[19] Even with permissions to operate, most companies are operating at only a fraction of their capacity, further damaging the long-term health of businesses in lockdown.[20]

Freight transported by road accounts for close to 76% of all movement of goods in China, meaning the trucking industry makes up one of the most vital components in the logistical operations portion of China's domestic supply chain.[21] However, the trucking industry is extremely fragmented and inefficient. About 90% of truckers operate independently, meaning they own their own truck and operate on contracts from companies needing goods transported to and from their facilities.[22] Several economic factors result from such heavy market fragmentation. Firstly, this creates an information/communication problem between truckers, suppliers, and manufacturers. Open-source intelligence indicates that truckers have no way of knowing where the demand is since there is no sole coordinating agent. This leads to inefficiencies and long lead times when sending and receiving goods. Different regions of China have different rules and regulations, further complicating coordination. Secondly, wages for truckers decrease since drivers possess no bargaining power due to their independent operating status. Further complicating the situation is the fact that drivers will consistently underbid each other in order to win contracts in a bid to secure consistent work.

The national average salary for a trucker in China lies just under $20,000 USD.[23] Although it is above the national average of $15,000, independent truckers have to incur all the costs when transporting goods.[24] Toll roads in China rank as the most expensive in the world and pose as additional costs on the transportation of goods. This further lowers the profit margin for drivers and impedes the delivery of wares.[25] Drivers also must cover their own fees and costs incurred from meeting all regulations and being compliant, costing up to half of what the trucker would make.[26]

Rail Freight

Rail freight in China faces a shortage of shipping containers and present vulnerabilities to severe Covid restrictions, geopolitics, and trade fluctuations.

The railways in China do not provide an alternative for the movement of goods into mainland China due to high cost and several vulnerabilities to other factors such as the geopolitics and shipment regulations of other countries. Since railways are intercontinental, foreign regulations, and border restrictions affect the movement of goods. There are two main routes for rail freight out of China where one goes through northern China into Siberia to get to Europe and the other goes through Kazakhstan to get to Europe. However, trade restrictions and a myriad number of sanctions placed on Russia render both these routes obsolete as shipments coming through Russia to neighboring countries face severe hindrances and restrictions because of the ongoing war in Ukraine.[27] If rail shipments move out of China, there are several dependencies that can prevent shipments from returning. This would in turn result in a loss of shipping materials/containers and raw materials required for the manufacturing of end-user products. Like sea freight, movement of goods by rail closely depends on the availability of shipping containers. Currently, the backlog on ports due to closures and backlogs have left many rail freight companies without any way of shipping or moving goods, highlighting a vulnerability within rail freight.

Air Freight

Most airports in key ports and towns reached capacity or have suspended operations of air freight due to covid restrictions and capacity limitations.

Several key airports suspended operations. Available information indicates that air freight does not appear to be a viable alternative to domestically transporting cargo in China to and from ports. Airports are also pausing movement of goods through the air and keeping cargo from being unloaded. Freight is being diverted from Shanghai into neighboring ports and airports but capacity in the surrounding cities is quickly filling up.

- Guangzhou and Xiamen airports have already suspended trucking services to Shanghai, Ningbo, and Hangzhou airports.
- Nanjing airport suspended import operations while Zhengzhou currently experiences seven days of backlog and takes three to four days to turnaround processing.
- Shanghai airport has suspended all truck services, air cargo services, and most flights as well as requiring a government permit to travel to other locations.[28]

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International Impacts

Overview

China's "zero-COVID" strategy, including the most recent Shanghai lockdowns, will have long-lasting effects on the world's supply chains. The lockdown will likely exacerbate inflation issues by reducing the supply of consumer goods and rising the rates on cargo shipments from China to western ports. The lockdown will also overwhelm ports in the United States and Europe with a surge of shipments once the lockdown is lifted. Additionally, the ongoing lockdown in Shanghai, as well as the movement restriction orders elsewhere in China, have reinvigorated many western firms' desires to diversify their supply chain out of China. These effects are likely to be continue being absorbed by the global economy up to through the first half of 2023.

Current impact

Shipping costs will see a momentary drop in rates but are expected to surge when the Shanghai lockdown is lifted. Manufacturing hubs reliant on Chinese imports are suffering, and consumer product companies are quickly burning through their supplies as shipments are deferred.

As an immediate effect of the Shanghai lockdown, shipping from Asia to the United States has become cheaper. Since the Shanghai lockdown was imposed on March 12, global shipping rates have fallen 6%.[29] However, Shanghai's port is expecting a surge in shipments once it reopens as there are currently over 500 ships stranded at its gate.[30] A.P. Møller - Mærsk A/S (MAERSK, Res ID: 6bc52d91-4398-4ca2-8bc5-1c4bbfb33cd7), one of the world's largest container shipping line and vessel operators, has estimated that transport costs will rise substantially once the lockdowns in China are lifted.[31] In contrast to the temporarily reduced shipping rates, Shanghai's air freight rates have doubled.[32]

In addition to the shipping disruptions the Shanghai lockdown is creating, European and American companies are reporting that half of their logistics, warehousing, and supply-chain operations are being adversely impacted by the lockdowns occurring in China.[33] Prominent firms with their operations affected include Volkswagen AG (resilience ID: fc82b7d5-6332-41df-8bc0-8ff8180037c9) and Apple iPhone producer Pegatron Corporation (resilience ID: d8300157-be29-4734-ad54-b7c63ffd0428).[34] Furthermore, nearby manufacturing hubs in Vietnam and Cambodia are suffering from a shortage of Chinese components for their electronic and textile manufacturing industries, and pharmaceutical companies in India such as Abbott India Limited (resilience ID: d25ff21a-d947-4c84-b4b6-cc967453183a) and Mankind Pharma Limited (resilience ID: 571b5a38-6b03-4abb-9ccf-7bc27a8997c1) are facing limited supplies.[35]

Shanghai's lockdown is also causing an immediate effect on commodities with oil and iron being affected the most, as manufacturers are delaying orders of raw materials. As a result, China's commodity market is experiencing a steep drop in prices, with China's oil demand at its lowest point since the Wuhan lockdown. Iron prices additionally fell by a reported 6%.[36]

Short-term impact

If the Shanghai lockdown is lifted and resumes normal port operations, ports in the United States and Europe will likely see a massive surge in imports that is expected to overwhelm intake capacities. This could create long backlogs and further compound already existing equipment and labor issues.

An important reference to analyze is last year's lockdown at the Yantian port of Shenzhen, and how it caused logistical disruptions for the United States and Europe. In May of 2021, over 100,000 shipments were not allowed to enter or exit the Yantian port, which resulted in containers accumulating in factories and warehouses. Several weeks after the port opened in Shenzhen, ports in the United States and Europe experienced severe congestion and backlogs, that have only been cleared since the end of Q1 2022.[37]

The Shanghai lockdown is likely to have an even stronger effect on ports in the United States and Europe, as Shanghai is the biggest container port in the world and this year's lockdown is much more heavily enforced by Chinese port authorities and the central government.[38] Furthermore, Shanghai's lockdown is affecting all forms of transportation and manufacturing in the city, causing the effects to be more widespread than the Yantian case which was primarily isolated to the port and production hubs.[39]

If the Shanghai lockdown is lifted and resumes normal port operations, then ports in the United States and Europe will likely see a drastic surge in imports potentially overwhelming their intake systems and procedures. Major American ports such as Long Beach and Los Angeles are already at full capacity due to lack of equipment, labor negotiations, and existing backlog from COVID-related supply chain issues.[40] With 20% of the world's 9,000 container ships (1,800 ships) sitting in congested ports, and 30% of that backlog (540 ships) being solely placed in China (Shanghai being the port most affected), western ports are expecting these ships to add to the surge once Shanghai's port resumes operations.[41] Additionally, the ongoing disruption of consumer products being shipped from China to the United States or Europe has firms emptying their reserves of products. This will eventually prompt them to replenish their stock as soon as shipping operations resume to counteract any incurred losses.[42]

With the Long Beach and Los Angeles Ports expecting to be heavily congested following the released container ships from China and increased consumer product orders, there will likely be a high level of imports diverted from the West Coast to marine terminals at the Port of New York and New Jersey.[43] These two ports are also already experiencing shortages of equipment and labor, which will only be further compounded by the expected increase in shipments.[44]

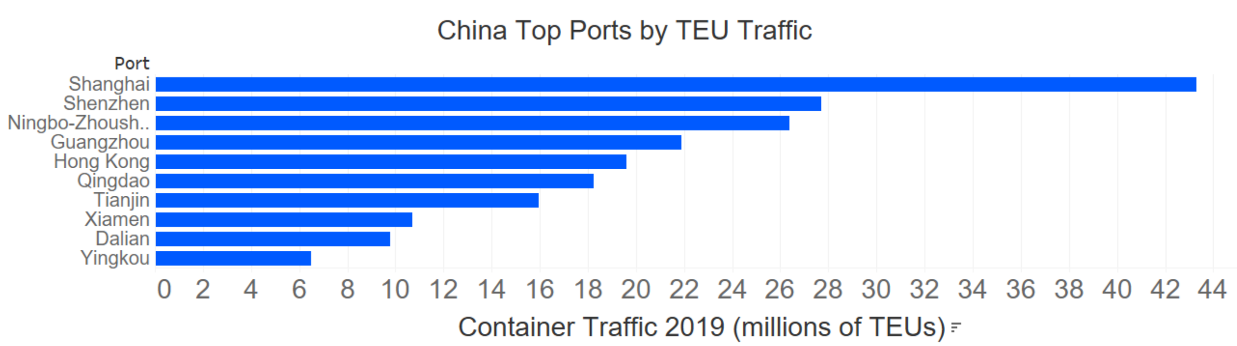
Long-term impact

The Shanghai lockdown, and any further lockdowns enacted by China's government, will exacerbate global inflation, and negatively affect key industries' output including semiconductors, automotive, commodities and consumer products.

One of the strongest long-term effects that will manifest as a result of the Shanghai port lockdown will be further price inflation on goods that are heavily reliant on Chinese sourcing and shipping, specifically those that rely on commodities such as copper and aluminum to be manufactured. As manufacturers in industries such as electronics or automobiles are deferring purchases of raw materials due to Shanghai's lockdown, commodities have temporarily become cheaper, but will become more expensive as a surge in orders return at the onset of Shanghai's economy opening.[45] Additionally, domestic logistical shortcomings are expected to further compound a supply shortage of commodities due to COVID-related restrictions that have impacted the movement of people and goods between provinces/cities. For example, one copper and aluminum fabricator in Tangshan has already reduced output due to a lack of raw materials as a result of trucks experiencing difficulties in reaching the plant given lockdown controls.[46] As the key technology manufacturing hub in the city of Shenzhen is placed under lockdown, orders will again begin to be deferred and pile up until it reopens.[47] The city of Guangdong has also been placed under movement restrictions and mass testing as of 28 April 2022. If Guangdong's restrictions severity is increased to match that of Shanghai's, the supply shock will only be further exacerbated.[48]

The lockdown of Shanghai has caused delays estimated to be at least several months for shipments going to semiconductor manufacturers and automakers in the US and Europe.[49] The full impact is yet to be known, as 45 cities are under lockdown measures of varying severity.[50] It is estimated that 1.3 trillion USD worth of Chinese inputs are used in the electronics and automotive sectors by the rest of the world, with Japan, South Korea, Vietnam, India and Germany being the most exposed countries.[51]

While the Shanghai lockdown is having a drastic effect on shipping logistics worldwide, China still has seven of the world's ten biggest container ports (Shanghai, Ningbo-Zhoushan, Shenzhen, Guangzhou, Qingdao, Hong Kong and Tianjin). While slow to react, the other major Chinese ports listed are beginning to coordinate to import and export containers that have been diverted from Shanghai.



Sum of Container Traffic 2019 (millions of TEUs) for each Port.

Interos Resilience Entities of Interest (EOI)

Manbang Group (PUBLIC LIMITED COMPANY)
(Resilience ID: d359cfce-90bc-4c2f-9c3a-7d9a89e4dada)
Manbang Group provides truck hailing services. It connects truck drivers with shippers; and provides an after-service platform, which includes truck fuel, auto insurance, auto financing, and other services. Manbang Group was formerly known as Full Truck Alliance Group. The company was founded in 2017 and is based in Guizhou, China.

A.P. Møller - Mærsk A/S (PUBLIC LIMITED COMPANY)
(Resilience ID: 6bc52d91-4398-4ca2-8bc5-1c4bbfb33cd7)
A.P. Møller - Mærsk A/S operates as a shipping company worldwide. The company's operations are divided into four principal geographical regions: Europe, North and South America, Asia, and Other regions. The A.P. Moller - Maersk Group comprises approximately 1,100 companies.

Volkswagen AG (PUBLIC LIMITED COMPANY)
(Resilience ID: fc82b7d5-6332-41df-8bc0-8ff8180037c9)
Volkswagen AG, together with its subsidiaries, manufactures and sells automobiles primarily in Europe, North America, South America, and the Asia-Pacific.

Pegatron Corporation (PUBLIC LIMITED COMPANY)
(Resilience ID: d8300157-be29-4734-ad54-b7c63ffd0428)
Pegatron Corporation, together with its subsidiaries, engages in designing, manufacturing, and selling computer, communication, and consumer electronic products worldwide.

Abbott India Limited (PUBLIC LIMITED COMPANY)
(Resilience ID: d25ff21a-d947-4c84-b4b6-cc967453183a)
Abbott India Limited operates as a pharmaceutical company in India. It offers pharmaceutical products for various therapeutic areas, such as women's health, gastroenterology, metabolics, central nervous system, pain management, nutritional supplements, vitamins, insomnia, vaccines, consumer health, etc

Mankind Pharma Limited (PUBLIC LIMITED COMPANY)
(Resilience ID: 571b5a38-6b03-4abb-9ccf-7bc27a8997c1)
Mankind Pharma Limited formulates, develops, commercializes, and delivers pharmaceutical products across the globe. The company offers antibiotic, antifungal, NSAIDs, gastrointestinal, anthelmintic, cardiovascular, dermal, erectile dysfunction, and other categories.

Concluding Remarks

China's most recent "zero-COVID" associated lockdown in Shanghai has significantly affected logistical operations in China. Backlogs at ports have begun to intensify, as lockdown restrictions have affected truckers' ability to operate. As of 2022, 76% of cargo is moved by truckers in China, but as of now only 20% of truckers are able to operate. Additionally, 90% of truckers in China operate individually and incur all the costs associated with moving goods, resulting in uncoordinated efforts and inefficiencies in managing the restrictions from lockdowns. As ships are not able to load/unload containers at the port of Shanghai, there is also a shortage of available containers, causing prices for sea, rail, and truck freight to rise. Additionally, major airports are facing restrictive capacity limitations, due to redirected cargo traffic from shutdown ports.

The most recent lockdowns in China are also having a major impact on international logistics and manufacturing. The Shanghai lockdown has renewed western based firms' desires to diversify their supply chain out of China.[52] When manufacturers were faced with lockdowns in China at the outbreak of COVID in 2019, there were not many options for finding alternative suppliers. Now that the world is open and China remains as the last major economy pursuing a "zero-COVID" strategy, manufacturers have begun to evaluate other options in Southeast Asia, South Asia, and Latin America.[53] Once China lifts the Shanghai lockdown, western ports will face a surge of cargo shipments that will likely overflow their capacity and create further backlogs. Additionally, the shortage of consumer goods and rising shipping costs resulting from the Shanghai lockdown are adding further inflationary pressures on the global economy.

While many of the effects of China's "zero-COVID" strategy are already being absorbed by the global economy, they are likely to continue for the remainder of 2022 and into the second quarter of 2023. It will be crucial to continue monitoring China's domestic restrictions on movement of goods and its primary port activities or traffic.

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