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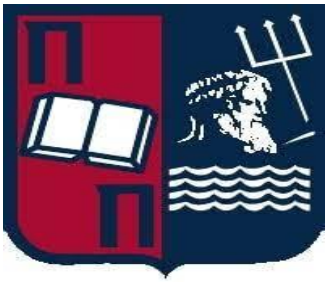

DEPARTMENT OF MARITIME STUDIES

MSc in SHIPPING MANAGEMENT

THE GEOPOLITICAL EFFECTS ON THE SHIPPING MARKET – THE CASE OF UKRAINE

MND20044 Oikonomou Stella – Mavreta

A Thesis

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EVALUATION COMMITTEE

This Diploma Thesis was unanimously approved and graded by this M.Sc in Shipping Management' Thesis Defense committee as typically appointed by the relevant authorities of the Department of Maritime Studies, University of Piraeus.

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ABSTRACT

The main aim of this Master's dissertation is to analyze and provide information about the geopolitical effects on the Shipping Market and examine in depth the case of the Russian Invasion of Ukraine. The Thesis in a first place will make a brief induction into the shipping market, provide an analytical presentation of the four shipping markets and the main factors that influence the freight prices. Also, it will make a historical contest in previous evidence where geopolitical facts affected the world's shipping balance. Finally, it will make extend research on how Ukraine war changed shipping freight prices.

Key Words: freight rate, geopolitical effects, shipping market, Ukraine war

ΠΕΡΙΛΗΨΗ

Κύριος στόχος της διπλωματικής εργασίας είναι η ανάλυση και παροχή πληροφοριών σχετικά με τις γεωπολιτικές επιπτώσεις στη Ναυτιλιακή Αγορά και η σε βάθος εξέταση της περίπτωσης της Ρωσικής Εισβολής στην Ουκρανία. Η διατριβή θα κάνει μια σύντομη εισαγωγή στη ναυτιλιακή αγορά, θα παρέχει μια αναλυτική παρουσίαση των τεσσάρων ναυτιλιακών αγορών και των κύριων παραγόντων που επηρεάζουν τις τιμές των ναύλων. Επίσης, θα κάνει μια ιστορική αναδρομή σε προηγούμενα τεκμήρια όπου γεωπολιτικά γεγονότα επηρέασαν την παγκόσμια ναυτιλιακή ισορροπία και τέλος θα κάνει μια εκτεταμένη έρευνα για το πώς ο πόλεμος της Ουκρανίας επηρεάζει τις τιμές των ναυτιλιακών ναύλων.

Λέξεις κλειδιά: τιμές ναύλων, γεωπολοτικές επιπτώσεις, ναυτιλιακές αγορές, Ουκρανία, πόλεμος

Contents

1. Introduction

Economists are aware of the significance of maritime transportation in the early phases of economic development. Businesses require access to larger markets and produce more products than they can sell locally as productivity increases. Global actual economic activity and commodity demand are inextricably linked to shipping freight rates (Kilian, 2009; Kilian and Zhou, 2018). According to Alexandridis (2018), between 80 and 90 percent of global commodity commerce is facilitated by the commercial shipping industry. It considerably contributes to national welfare and development by adding roughly $380 billion to the global economy through freight rates alone.

The market for freight rates is complex. Shipowners, operators, and charterers are market participants who are exposed to substantial price risk. There are numerous reasons for freight rate fluctuations. From a long-term perspective, vessel supply determines the maritime services supply curve. Consequently, information regarding vessel availability, production, and disposal has a direct effect on equilibrium price levels. The demand for shipping services is significantly correlated with the demand for commodities requiring transportation. The greater the utilization of products in industrial production, the higher the demand for delivery services. As a consequence, the equilibrium freight rate level responds to changes in industry-specific demand and economic expansion as a whole.

Freight rates are typically deemed a part of the commodity market from a financial standpoint. However, freight rates have characteristics that distinguish them from the majority of other markets. In contrast to all other main traded commodities, freight rates are service costs, not production costs. Consequently, they are fundamentally non-storable, rendering simple cost-of-carry valuations of freight rate futures contracts impossible. Moreover, the freight rate spot market is extremely volatile, posing substantial risks to shipowners and charterers, resulting in a substantial demand for hedging.

Given the genuinely global nature of the shipping industry, Stopford (2009) predicts that geopolitical risk and economic policy uncertainty will have a significant impact on freight rates. Shocks to geopolitical risk and economic policy uncertainty result in a decline in global industrial output (Caldara and Iacoviello, 2019) and a decline in investment rates (Gulen and Ion, 2016). These negative economic effects will reduce the overall demand for maritime transportation and the revenue sources of shipping companies (although the effects of GPR and EPU on freight rates can be quite distinct, as will be demonstrated below).

The paper will provide a comprehensive analysis of the factors that influence transportation freight rates, focusing on geopolitical factors, in order to draw a conclusion about the current situation as a result of the Ukraine conflict.

The rest of the paper is structured as follows.

Chapter One provide an introduction to four shipping markets

Chapter two presents the factors influencing the formation of freight rates on maritime shipping markets, the demand for maritime transport and the maritime supply

Chapter three makes a historical overview of the main geopolitical effects in shipping freight

Chapter four gives an overview of the impact of war in Ukraine.

1.1. The Four Shipping Markets

Nowadays, sea transport services are provided by four closely related markets, each trading in a different commodity:

a) The freight market trades in sea transport,
b) the sale and purchase market trades second-hand ships,
c) the newbuilding market trades new ships, and
d) the demolition market deals in vessels for scrapping.

Beyond this point, there is no formal structure, which is an important point that requires a warning. The fact that traders behaved in a particular manner in the past is no guarantee that they will do so in the future. Due to the fact that markets are comprised of individuals conducting business, the best commercial opportunities frequently arise when the market behaves in an unpredictable manner. For instance, ordering ships during the apex of the market cycle is typically a poor business decision, but if few ships are ordered for whatever reason, the rule does not apply. Business decisions must be based on a comprehension of market dynamics, not on abstract economic principles.

Because the same shipowners trade in all four markets, their activities are highly interrelated. When freight rates increase or decrease, the resulting change in sentiment ripples through the sale and purchase market and then into the newbuilding market, with the balance accounts of businesses trading on the various markets serving as a

link. Figure 1.1 illustrates this in practice. The industry balance sheet, which is a consolidation of company balance sheets, is located in the middle of the chart. As the four shipping markets (represented by the squares) react to trade cycles, cash flows enter and exit the balance sheets of various shipping companies. The freight market (market 1) generates freight revenue, the shipping industry's primary source of currency. In reality, this market consists of three segments:

a) the voyage market which trades transport for a unique voyage,
b) the time-charter market which hires out the ship for a fixed period, and
c) the freight derivatives market which deals in forward contracts settled against an index.

The freight rates obtained in these markets are the driving force behind the activities of shipping investors. The remaining revenue flow is contributed by the demolition market (market 4). The sale of ancient or obsolete vessels for scrap can be a lucrative endeavor, particularly during economic downturns. The function of the second market (sale and purchase) is more subtle. An investment in a pre-owned ship is made through a deal between a shipowner and an investor. Although money is exchanged, because the investor is frequently another shipowner, the deal has little impact on the industry's cash reserves. Trading in goods on the freight market is the sole true source of riches. In the market for new building (market 3), cash flows are trending the other way.

These cash movements between the four markets drive the shipping market cycle. At the start of the cycle, freight rates rise and money starts to move around, enabling shipowners to pay more for previously owned boats. Investors are drawn to the new construction industry when prices climb because it seems like a better investment. With their expanding financial coffers, they place numerous orders for additional ships. When the ships arrive at the market a few years later, the procedure is reversed. Declining freight rates lower cash flows just as investors start making payments for new construction. Owners who are unable to pay their bills on a daily basis are forced to sell their boats on the secondary market. The asset play market for shipowners with healthy balance accounts has just begun. Extreme situations, as those of 1932 or 1986, result in modern ships being sold at a discount. However, because there are rarely discounts available during short recessions, shipowners who employ the "buying low

and selling high" method frequently find themselves unsatisfied. Older ships won't receive any trading deals, leaving desperate owners little choice except to demolish their ships. As more ships are destroyed, the supply gets smaller, freight costs go up, and so on.

The cashflow between marketplaces governs and coordinates the entire business activity. The market uses money as a "stick" and "incentive" to steer behavior in the desired direction. Shipowners, whether they like it or not, take part in a process that establishes the value and earnings of the ships they trade. A crucial component of this competitive process is the ongoing entry and exit of businesses from markets. One of the main goals of the market cycle is to drive away inefficient companies so that new, effective ones can join and take market share. In this approach, the market mechanism steadily improves its efficiency, and the market's top players frequently change.

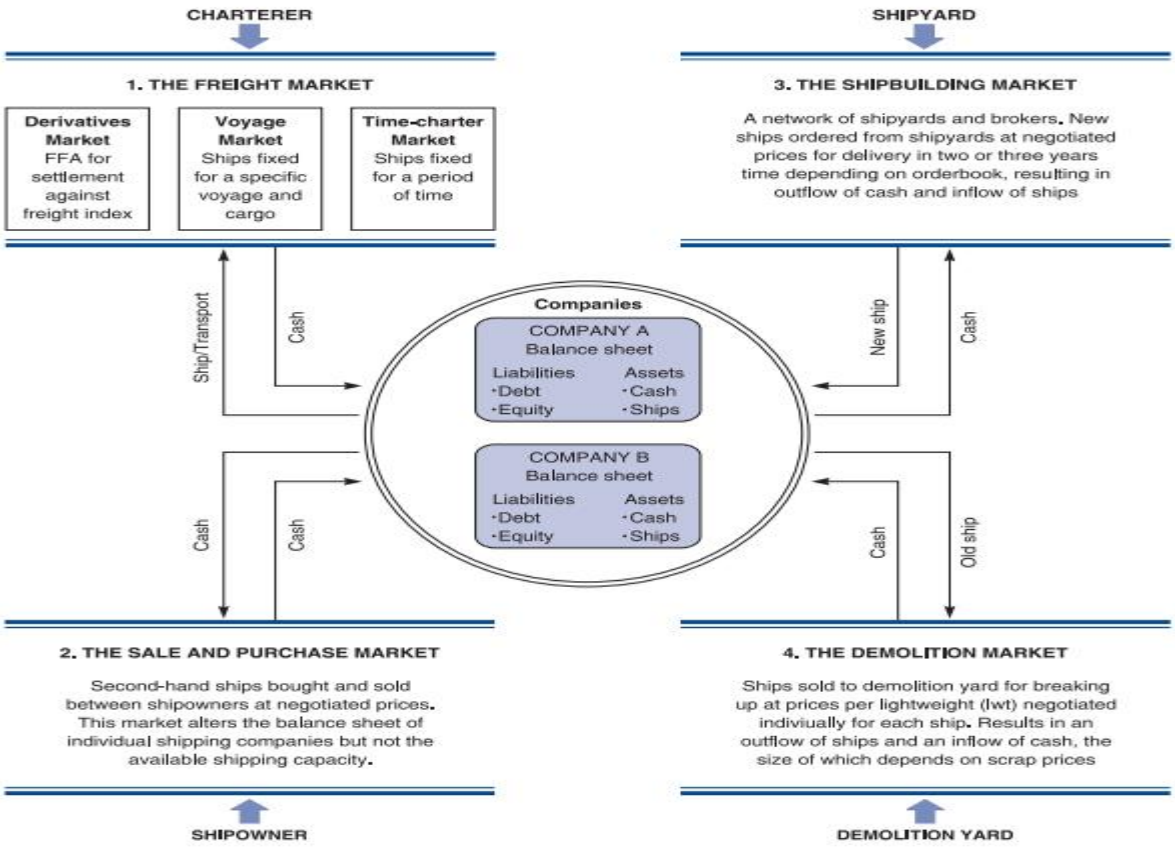


Figure 1.1: The four markets that control shipping

Source: Martin Stopford, Maritime Economics 3rd edition 2007

1.1.1. The Freight Market

The original freight market, the Baltic Shipping Exchange, started trading as a commodity and shipping exchange in the middle of the nineteenth century, though its functions had been carried out by the Baltic Coffee House for a considerably longer period of time, albeit in a less structured manner. Even though the majority of transactions now take place over the phone, via email, and through messaging services rather than on the Baltic maritime floor, the freight market is still a place where maritime cargo is bought and sold. The cost for transporting and delivering goods in a specific condition is referred to as freight and is paid to a carrier. The demand for the commodities carried, which is impacted by the competition between replacement items, drives shipping, much like it does for other modes of transportation. Vessels competing on a given route include those supplying alternate supply areas, other carriers operating on that route, air transport, and, for coastal services, inland transit. Various ships today each have their own niches in the freight industry.

The owner of the ship hits the market with an empty ship. The ship has a specific speed, cargo capacity, size, and equipment for handling cargo. The date and place of availability shall be subject to any applicable contractual obligations. Depending on his chartering strategy, the shipowner may opt to charter the ship for a short or extended period of time.

The owner (or charterer) will frequently designate a shipbroker to act as his representative. It is the broker's duty to ascertain what goods or ships are offered, what the owners or charterers anticipate to be paid or paid, and what is reasonable in light of the present market conditions. They use this information to haggle for the best deal for their customer, often in tough competition with other brokers. In addition to these, brokers also offer dispute resolution, freight and demurrage accounting, and post-installation processing. Some captains and shipowners handle these duties on their own. But to do this, a staffing and administrative structure that can only be supported by huge enterprises is needed.

As a result, the vast majority of owners and charterers work with one or more brokers. Brokers often gather in transportation hubs because brokerage is an information-

intensive industry. Although New York, Tokyo, Hong Kong, Singapore, Piraeus, Oslo, and Hamburg are also important cities, London is still the largest.

1. Voyage Charter *Master instructed by:-* Owner	2. Time charter *Master instructed by:-* Owner for ship and charterer for cargo	3. Bare boat *Master appointed by:-* Charterer
***Revenue depends on*:** **Quantity of cargo & rate per unit of cargo**	***Revenue depends on*:** **Hire rate, duration and off-hire time**	***Revenue depends on*:** **Hire rate & duration**
Costs paid by owner:	**Costs paid by owner:**	**Costs paid by owner:**
1. Capital costs Capital Brokerage	*1. Capital costs* Capital Brokerage	1. *Capital costs* Capital Brokerage
2. Operating costs Wages Provisions Maintenance Repairs Stores & supplies Lube oil Water Insurance Overheads	*2. Operating costs* Wages Provisions Maintenance Repairs Stores & supplies Lube oil Water Insurance Overheads	Operating costs: note that under bare boat these are paid by the charterer
3. Port costs Port charges Stevadoring charges Cleaning holds Cargo claims *4. Bunkers, etc* Canal transit dues Bunker fuel	Voyage costs: note that under time-charter and bare boat contracts these costs are paid by the charterer	
4. **Contract of Affreightmen**t (COA): cost profile same as voyage charter		

Source: Compiled by Martin Stopford

There are four typical forms of contractual arrangements, as shown in the table above, and each one allocates expenses and obligations a little bit differently. In a voyage charter, the shipowner agrees to transport a certain cargo on a particular vessel for a per-ton fee that covers all expenses. A variation on this topic is a contract of affreightment, in which the shipowner agrees to convey consistent tonnages of cargo for a fixed sum per ton that, once more, includes all expenses. The time charter is a contract between the proprietor and charterer to rent the ship and crew for a daily, monthly, or annual fee. In this case, the shipowner is responsible for capital and operating expenses, while the charterer is responsible for voyage expenses. The owner continues to handle the ship, but the charterer directs the captain on where to go and what cargo to load and unload. In a bareboat charter, the ship is rented out without a crew or operational responsibilities, so the

owner pays only the capital costs. This is essentially a financing arrangement that does not require the owner to have ship management expertise.

The contract of affreightment (COA)

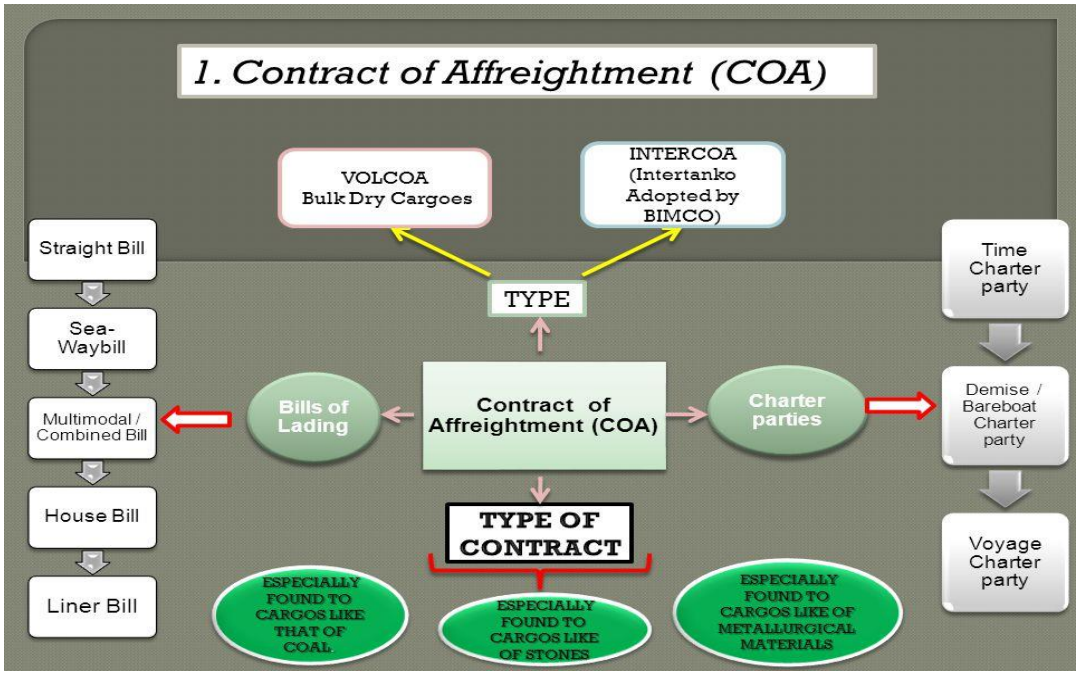
The intricacies of the affreightment contract are rather convoluted. A contract of affreightment refers to a formal arrangement entered into by a shipowner and a charterer, wherein the shipowner assumes the responsibility of conveying goods on behalf of the charterer either by utilizing the ship's cargo-carrying capacity or by granting the charterer access to said capacity for the purpose of transporting goods during a designated voyage or series of voyages, or for a predetermined duration. The party involved in the agreement hereby expresses their consent to remunerate a predetermined sum, commonly referred to as freight, in exchange for the conveyance of merchandise or the utilization of the vessel.

The act of leasing a ship involves the transfer of custody and control to an individual or entity for a predetermined duration. The person who engages in the leasing of vessels in such a manner undertakes the responsibilities and obligations typically associated with the shipowner during the designated period. The legal agreement by which a maritime vessel is leased is commonly referred to as a charter party. Nevertheless, it should be noted that this particular agreement does not fall under the category of a contract of affreightment. The purpose of this statement is solely to provide clarification regarding the differentiation between a specific kind of charter party, commonly referred to as a "demise" of the ship, and another type of charter party that functions as a contract of affreightment.

This facilitates the shipowner in strategizing the optimal utilization of their vessels. The individual in question possesses the ability to engage in the practice of cargo transference between various vessels, thereby facilitating the establishment of an optimal operational framework and consequently leading to a reduction in the prevailing charter rate. The individual in question may possess the capacity to effectively coordinate the transportation of return cargoes, thereby augmenting the overall operational efficiency of the vessel. Organizations that possess expertise in the realm of Certificate of Analysis (COA) may designate themselves as "industrial shipping" entities, as their primary objective revolves around the provision of a service. The utilization of contractual agreements (COAs) signifies a heightened

dedication towards attending to the needs of the shipper and delivering a streamlined service, owing to the inclusion of a long-term commitment.

The predominant focus of COA business lies within the realm of major dry bulk cargoes, specifically iron ore and coal, which are primarily supplied to the steel mills of Europe and the Far East, constituting the principal clientele. The challenge inherent in the negotiation of Course of Actions (COAs) lies in the inherent uncertainty surrounding the specific magnitude and temporal distribution of cargo shipments, which are seldom pre-determined. The quantification of cargo volume can be expressed in the form of a range, denoted as "minimum quantity x and maximum quantity y tons". On the other hand, the determination of timing may be contingent upon generalizations, such as the stipulation that "The shipments under the contract shall be evenly distributed over the contract period".



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i. The time charter

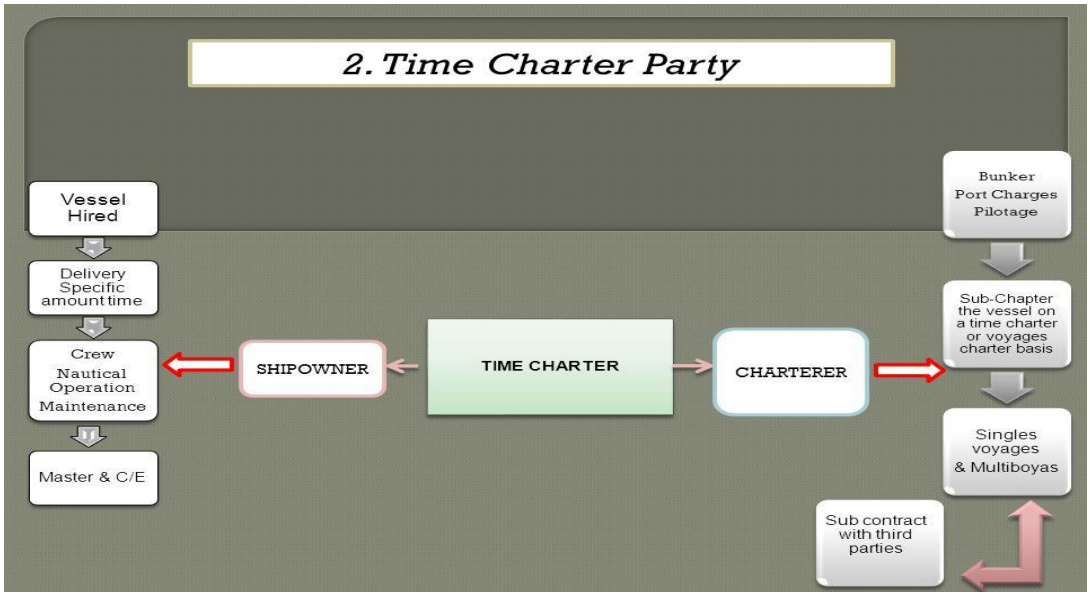
A time charter arrangement confers upon the charterer the prerogative of exercising operational authority over the vessels employed for the transportation of their cargo, while concurrently vesting ownership and managerial responsibilities in the shipowner. The duration of a charter period can range from a singular voyage, known as a trip charter, to an extended timeframe spanning months or even years, referred to as a period charter. The shipowner persists in bearing the financial burden associated with the vessel's operational expenses during the duration of its charter agreement. However, it is the charterer who assumes the responsibility for overseeing the commercial activities of the vessel and bearing the financial burden associated with each voyage, including expenditures related to bunkers, port charges, canal dues, and cargo-handling expenses. The shipowner possesses a lucid foundation for formulating the ship's fiscal plan through the utilization of a time charter, as he possesses experiential knowledge regarding the ship's operational expenditures and is remunerated with a predetermined and unchanging daily or monthly charter rate. A commonly employed practice in the realm of maritime commerce involves utilizing a protracted contractual agreement, known as a long-term charter, procured from a prominent corporate entity, such as a steel mill or an oil company, as collateral to secure a loan intended for the acquisition of the requisite vessel for conducting trade activities.

Despite their apparent simplicity in theory, time charters are inherently intricate in practice and entail inherent risks for all involved parties. The charter-party encompasses the precise details of the contractual arrangement. It is imperative for the shipowner to furnish comprehensive details pertaining to the velocity of the vessel, the rate at which fuel is consumed, as well as the capacity of the cargo hold. In the event that the vessel does not adhere to the prescribed criteria, the conditions of engagement shall be subject to alteration. The charter party shall additionally delineate the conditions wherein the vessel is deemed 'off-hire,' encompassing instances of exigent repairs or the non-fulfillment of charter hire payment by the charterer. Long-term charters also encompass matters pertaining to the modification of the hire charge in the event of vessel inactivity, as well as the stipulations governing the termination of the agreement by the charterer,

particularly in cases where the owner demonstrates inefficiency in the operation of the ship.

The allure of subcontracting can be attributed to a trinity of factors. Initially, it is noteworthy to acknowledge that the shipper, despite lacking the desire to transition into a shipowner, is compelled to employ a vessel that falls within his jurisdiction due to the exigencies of his trade. Furthermore, the practice of time chartering may prove to be a more cost-effective alternative to outright purchasing, particularly in instances where the owner can capitalize on reduced expenses resulting from diminished overheads and the possession of a larger fleet. This phenomenon can be identified as a contributing factor behind the extensive outsourcing of transportation operations by oil companies during the 1960s. Thirdly, the individual in question may assume the role of a market speculator, strategically adopting a position in anticipation of an impending alteration within the market.

The principal means by which the shipowner generates revenue is through the practice of time chartering to industrial clientele. The availability of time charters is subject to fluctuation based on the specific nature of the cargo being transported and the prevailing business conditions. During the early 1970s, it was observed that a significant proportion, specifically around 80%, of oil tankers that were under the ownership of independent shipowners were engaged in time charter agreements with oil companies.



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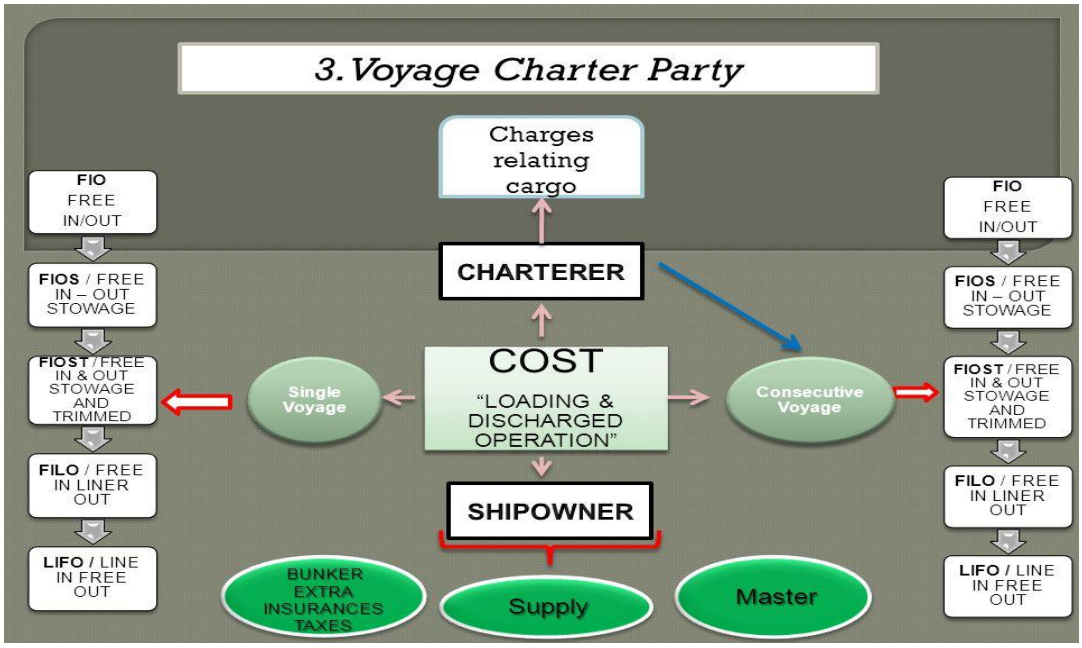
ii. The voyage charter

A voyage charter transfers a specific cargo between ports A and B at a predetermined cost per ton. When a trader requires freight transportation, he contacts his broker and lets him know. For the journey, the broker will reserve (charter) a ship at a set price per ton of goods. If everything goes as planned, the ship will arrive on time, load the cargo, convey it, unload it, and complete the transaction. The terms will be outlined in a charter-party.

There will be a claim if the journey is not completed in accordance with the charter agreement's conditions. The shipowner will levy demurrage, a fee set between the owners and charterers, if the charterer fails to load or discharge in accordance with the load/discharge rates outlined in the contract. Demurrage in this context refers to the time that the shipowner loses since the charterer didn't finish the necessary cargo operations by the specified/agreed-upon deadline. In contrast, the charterer can pay the proprietors "Despatch" at a set rate if the load/discharge procedures are finished earlier than the allotted period.

The difference must be paid to the shipowner before the vessel departs if the total freight payable under the bills of lading is less than the total freight that was chartered. The conditions of the bills of lading may need to be changed in order to establish the same comprehensive lien against the holder of the bills of lading, even while the charter-party provides a sufficient lien. If the shippers are not also the charterers, just the freight shown on the bill of lading and not the chartered freight is their obligation. They are not subject to a lien on chartered goods, unless the bill of lading clearly states otherwise. The master should decline to sign bills of lading for completely chartered freight that do not protect the shipowner's lien in order to avoid this problem. However, a provision in the charter party that necessitates his signature on the bills of lading as they are provided frequently causes issues.



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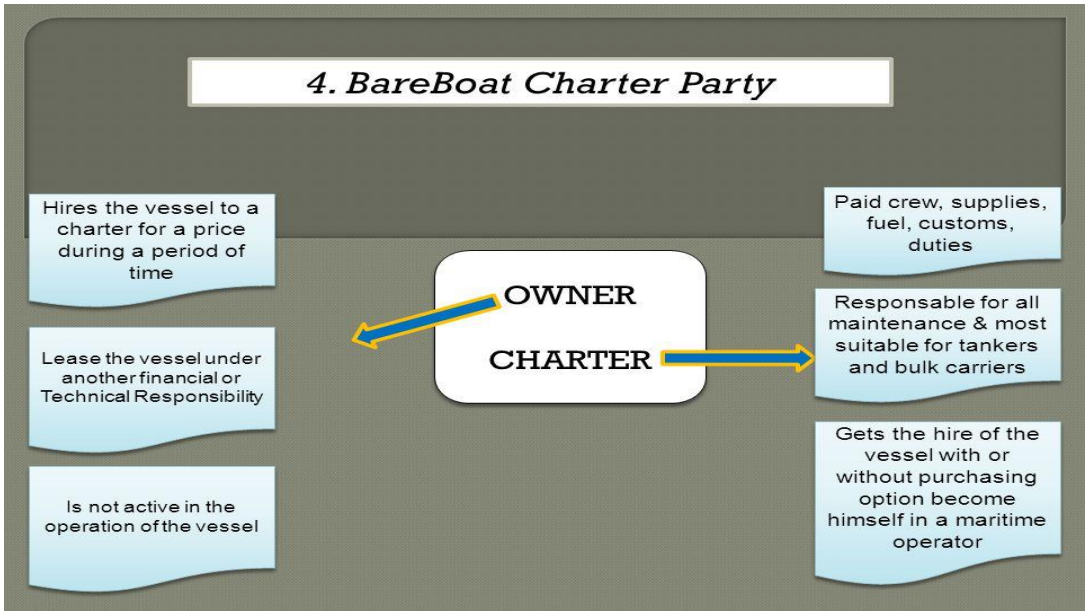
iii. The bare boat charter

Last but not least, a bareboat charter is discussed if a company wants all operational control over the ship but does not want to own it. In this arrangement, the investor, who need not be an experienced shipowner, buys the ship and leases it to the charterer for a set duration, usually between 10 and 20 years. The operation and travel costs of the yacht are the charterer's responsibility. The owner, who is frequently a financial entity like a life insurance company, is not actively involved in the vessel's management and is not required to have specific maritime knowledge. It is an investment, to put it simply. The nominal owner of the ship could benefit from a tax break while the transport firm makes no financial commitments. This is a typical lease transaction setup.



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The charter-party

After consensus has been achieved, a charter party is prepared to delineate the particulars of the transaction. The process of chartering a ship or negotiating cargo transportation is complex, requiring careful consideration of potential issues by the charter party. During a single journey, a multitude of mishaps can potentially transpire. There exists the potential for the ship to experience delays in its arrival for the purpose of loading, the occurrence of a port strike, or a mechanical failure while traversing the Atlantic Ocean. A comprehensive charter-party will delineate the legal obligations pertaining to cost allocation in each of the aforementioned scenarios. On the other hand, a substandard charter-party agreement may require substantial financial resources from the shipowner, charterer, or consignee to engage legal representation in order to pursue a claim for compensation.

The charter party or cargo contract holds significant importance in the shipping industry due to the reasons mentioned earlier. It is crucially important to meticulously compose this document in order to protect the interests of the parties involved in the contract. The creation of a new charter-party for each contract, especially in the case of voyage charters, is deemed excessively time-consuming. Consequently, the shipping industry has adopted standardized charter parties that are applicable to the primary trades, routes, and chartering arrangements. By employing one of these established and reliable standard contracts, the consignee

and shipowner can have confidence that the contractual provisions will encompass a wide range of potential scenarios in that specific trade.

1.1.2. The Freight Derivatives Market

Shipping markets have changed surprisingly little over the centuries. The freight derivatives market, however, is one of these rare instances of radical innovation. A derivatives contract is a legally enforceable agreement between two parties to compensate one another based on the outcome of a future event. The purpose of these contracts is to mitigate risk by compensating for the cost of large negative changes in the hedged variable. Freight derivatives are commonly employed by end-users, namely ship owners and grain warehouses, as well as suppliers, including integrated oil companies and international trading corporations, in order to effectively manage risk and safeguard against the fluctuations in prices within the supply chain. Similar to other financial instruments, market participants, including hedge funds and retail traders, engage in the buying and selling of freight contracts, thereby facilitating the emergence of a novel and enhanced market with increased liquidity.

Instances of freight derivatives encompass a variety of instruments, namely exchange-traded futures contracts, swap futures, forward freight agreements (FFAs), container freight swap contracts, container freight derivatives, and physically deliverable freight derivatives.

The instruments are aligned with the diverse freight rate indices provided by the Baltic Exchange and the Shanghai Shipping Exchange. In contrast, it should be noted that cleared contracts undergo daily margining procedures under the purview of the designated clearinghouse. Upon the culmination of each diurnal period, investors are bestowed with or find themselves indebted with the disparity that exists between the value of paper-based agreements and the prevailing market index. Prominent exchanges, namely NASDAQ OMX Commodities, European Energy Exchange, and Chicago Mercantile Exchange (CME), offer clearing services.

The utilization of freight derivatives has surfaced as a feasible substitute for shipowners and operators, petrochemical companies, trading firms, and grain

elevators to effectively handle the risk associated with freight rates, given the escalating volatility observed in shipping markets.

FFAs

The Forward Freight Agreement Broker Association (FFABA) employs the standard contracts for the purpose of facilitating the trading of Forward Freight Agreements (FFAs), which are widely recognized as the predominant form of freight derivatives. The fundamental elements of a contractual arrangement encompass the mutually determined trajectory, temporal aspect of finalization, magnitude of the contractual entity, and the mechanism employed for the resolution of any potential disputes.

The establishment of Free Freight Agreements (FFAs) within the transportation industry occurred during the initial years of the 1990s. Free-for-all agreements (FFAs) are commonly transacted through two primary channels: over-the-counter (OTC) trading and exchange-based trading. In the conventional paradigm, transactions are commonly characterized by their inherent privacy and are primarily facilitated through the establishment of a foundation built upon mutual trust. The termination of the contractual agreement occurs upon the date of settlement, whereby the vendor shall be obliged to provide compensation to the contract buyer in the event that the agreed-upon price surpasses the initially agreed-upon price.

In the circumstance wherein the mutually established price is lower than the settlement price, it becomes incumbent upon the buyer to provide recompense to the vendor for the disparity. The resultant value is obtained by multiplying the discrepancy between the settlement price and the contract price with either the cargo quantity or the voyage duration.

Freight derivatives, as is commonly observed, are predominantly traded in the over-the-counter (OTC) market, although their presence on exchanges is progressively gaining traction. The trading of Forward Freight Agreements (FFAs) is facilitated by the Baltic Exchange, which was formerly an independent entity but is now a constituent of the Singapore Exchange Group (SGX), operating within the jurisdiction of the United Kingdom. The FFA contract is additionally transacted on the wholly electronic Intercontinental Exchange (ICE).

By employing freight derivatives, enterprises can effectively hedge against shipping rate volatility and mitigate potential risks associated with future fluctuations. This particular technological advancement serves to enhance the navigational capabilities of maritime enterprises, freight intermediaries, cargo owners, and their respective clientele, particularly in the face of challenging maritime conditions.

1.1.3. The Sale and Purchase Market

The procurement and disposal of vessels is a fundamental component within the maritime sector. It encompasses significant financial resources, exceeding one hundred million USD. Proficiency in multiple domains of expertise is necessary, encompassing specialized knowledge pertaining to a specific vessel type and its operational characteristics, legal acumen, as well as adeptness in negotiation and transactional skills. To enhance efficiency and minimize conflicts, shipowners (sellers) and purchasers commonly engage brokers to oversee the sale and purchase procedure.

In addition to engaging in transactions within the freight market, shippers, shipping corporations, and speculators also actively partake in the sale and purchase markets. The shipowner offers a vessel for sale in the marketplace. In customary practice, the vessel is commonly transacted with prompt transfer, in exchange for monetary payment, and devoid of any unresolved contractual agreements, encumbrances, or maritime obligations. In certain instances, it is marketed with the advantage (or disadvantage) of a time charter. The underlying reasons for the shipowner's decision to sell may exhibit a range of motivations. The individual in question potentially adheres to a policy of replacing ships upon reaching a specific age, which the present vessel may have achieved. It is plausible that the ship is no longer deemed appropriate for the individual's trade activities. Alternatively, the individual may possess foresight regarding a potential decline in prices. Lastly, the 'distress sale' refers to the situation where the owner of a ship sells the vessel in order to generate funds for routine operational expenses. The purchaser may possess a multitude of objectives. In order to meet a business commitment, such as a contractual agreement to transport coal from Australia to Japan, it may be necessary for the individual to procure a vessel that possesses specific characteristics in terms of its model and capacity. Alternatively, the individual in

question may possess the role of an investor who holds the belief that the current circumstances are favorable for acquiring a specific type of vessel. In the aforementioned situation, the individual's requirements may exhibit greater adaptability, as their primary focus lies in the ship's investment viability rather than its intrinsic qualities.

Shipbrokers play a pivotal role in facilitating the majority of ship transactions, encompassing both sales and purchases. The shipowner requests his broker to identify a potential purchaser for his maritime vessel. It is possible for the ship to be allocated solely to a single broker; however, it is more prevalent for the vessel to be made available through multiple brokerage firms. Upon receiving the instruction, the broker will proceed to establish communication with clients who have expressed interest in acquiring a vessel of the specified type, utilizing either telephone or email as means of contact. In the event that the instruction is deemed exclusive, the individual in question will proceed to engage with alternative brokers in order to promote the ship to their respective client bases. Comprehensive specifications pertaining to the vessel, encompassing its hull structure, machinery, apparatus, classification, survey status, and overall equipment, are meticulously formulated. Concurrently, the brokerage firm will be receiving inquiries from potential buyers. In the event that the broker possesses vessels that meet the necessary criteria for sale within their own inventory, they will refrain from acknowledging inquiries made via alternative brokers. In the event that no suitable candidates are identified, the individual may proceed to actively search for appropriate candidates and initiate communication with their respective owners to ascertain their potential interest in selling.

Three stages comprise the sale and purchase of a ship: the negotiation and contract stage, the inspections stage, and the completion stage. It contains a number of significant issues and regulations at various stages. The article that follows will cover all of these phases of selling and purchasing a ship, as well as the essential elements.

1. Negotiation and contract stage

   The initial two steps in the sale of a ship are the contract and negotiation phases. Typically, brokers who have been appointed by both the buyer and the vendor

conduct them. In order to issue an invitation to offer, the buyer's broker will initiate a telex exchange with the seller's intermediaries. At this stage, the primary concerns of both parties are the pricing, the ship's specifications, and the lie days.

In accordance with this strategy, both parties will engage in price and contract negotiations. If both parties agree to the fundamental terms, a telex summarizing the terms discussed will be sent, with the details to be negotiated later. The summary telex allows for further discussion and negotiation of the contract's primary terms.

The formal contract for the transfer of the ship, a Memorandum of Agreement (MOA), will be drafted once all the details have been agreed upon through multiple communications. The Norwegian Sale Form is one of the MOA (NSF) standard form contracts. Nevertheless, the contract may be subject to conditions, such as obtaining approvals from directors or shareholders or acquiring licenses. After completing the sales form, the buyer will pay 10% of the deposit and will be able to appoint his own surveyor to inspect the ship.

2. Inspections stage

After the formulation of the contract, the inspection phase will commence. The inspection phase consists of two components: document inspection and physical inspection of the ship in motion. During the document inspection, the client will inspect the ship's class records and certificate records. The examination of records reveals the maintenance history and compliance with class requirements of the ship. Additionally, the buyer should examine the mortgage and maritime lien documents to avoid any damages or losses caused by a pre-delivery legal issue with the ship. Unless otherwise agreed, physical inspections are typically limited to the ship's exterior and journal.

It is best to employ a surveyor from a reputable company to inspect the vessel for, among other things, safety, certification, equipment, and engine problems. A sea trial is suggested.

3. Completion

The completion phase is the concluding phase of a transaction or purchase. It includes pre-delivery issues such as classification society inspection of underwater components, delivery of documents, and physical delivery of the ship upon payment of the remaining contract balance. The buyer can request underwater inspections, and if the Classification Society's surveyor does not require them, the costs will be incurred by the buyer.

Documents and physical delivery are typically managed at separate locations based on the location of the ship. The final inspection of underwater components takes place in the drydock of the port of delivery. The classification society's surveyor inspects the ship's hull and underwater components in order to issue a certificate of class for safety. Prior to delivery, the surveyor may recommend ship repairs that impact the seller's expenses. Occasionally, the buyer may appoint his or her own surveyor, who must be approved by the classification society, to conduct the underwater inspection while the ship is afloat.

The MOU outlines the necessary procedures for the transaction's ultimate closing. Required documents include the closing memo, minutes of the seller's directors and shareholders meeting, a certificate of good standing, a power of attorney, the bill of sale, certificate of class, any consents or licenses required by the government authority, and a certificate from the registrar of the ship's registry authorizing the sale.

In addition, if the buyer wishes to alter the flag, the seller is responsible for removing his name from the registry and removing the existing flag. The seller must also prepare for the cancellation of insurance coverage, the settlement of the mortgage, and the repatriation of the personnel. When the seller is prepared, the buyer will receive a Notice of Readiness. The buyer will then arrange for the payment of fuel or "bunkers" and stores on board, as well as notify his bank to finalize the payment on the actual delivery date.

The client must adhere to the following two procedures for terminating the sales and purchase agreement:

The buyer must first inform the vendor of the encumbrance. The buyer should then seek clarification on the seller's intent regarding the encumbrance by explicitly referring to the Seller's obligations under clause 9 of Sale Form 1993.

If the vendor fails to remove all encumbrances in a timely manner after the buyer has taken the preceding two steps, the buyer may terminate the contract.

1.1.4. The Newbuilding Market

How the market for new construction is distinct from the sale and purchase of existing structures. Although the shipbuilding market is closely related to the sale and purchase market, it is distinct in its own right. Both markets trade in ships, but only the newbuilding market deals in vessels that have not yet been constructed. They require construction. This has numerous repercussions. First, the specifications of the ship must be determined. When possible, shipyards will press the buyer to adopt a standard yard design. This shortens the negotiation process, reduces the strain on their design and estimating resources, and is typically less expensive to create than a custom design. Completely novel designs are difficult to negotiate because costs must be estimated early in the process, which entails a substantial risk. Buyers may make modifications to the yard layout, but these alterations are typically billed at an additional cost. Similarly, shipyards favor series orders for the same reason. Second, the contractual procedure is more complicated for such a large project. Furthermore, it is imperative to manage one's expectations as the ship's availability is projected to be within a timeframe of two to three years following the contract's commencement. It is important to acknowledge that during this period, circumstances may have undergone changes, necessitating a pragmatic approach. The individuals who engage in transactions within the emerging construction industry, namely customers and vendors. The consumer who engages in the new construction market may exhibit motivation stemming from a diverse range of factors. The individual may require a vessel that meets specific size and specification criteria; however, no suitable options are available within the used market. This phenomenon is commonly observed in situations where market conditions are restricted and there is a scarcity of high-quality ships available. As mentioned in the previous section, the prices of used items may exceed those of new items. Additionally, it is plausible that the utilization of these vessels may be attributed to a commercial enterprise. Typically,

the design of new construction projects for steel mills, power plants, LNG initiatives, and other large industrial endeavors is tailored to fulfill precise transportation needs. Several notable shipping companies currently adhere to a policy of periodically replacing their vessels, although this practice has become less widespread compared to previous eras, particularly when British shipping companies would routinely replace their fleets every 10 to 15 years. Finally, it is worth noting that speculators may be attracted by various incentives provided by shipbuilders who are in need of business, including competitive pricing and advantageous credit terms. Additionally, the potential for lucrative time charters may serve as a motivating factor for speculators, provided they are able to secure a suitable vessel.

The shipyards encompass a substantial and heterogeneous community. There exist approximately 300 prominent shipyards, along with a vast number of lesser-known shipyards. Yards of smaller scale, employing less than 200 individuals, specialize in the construction of vessels and fishing boats. Conversely, larger yards in South Korea, boasting a workforce exceeding 10,000 employees, are primarily engaged in the fabrication of container ships and gas tankers. While certain shipyards may have a specialization in a particular type of vessel, the majority of shipyards demonstrate a high degree of adaptability and are willing to compete for a diverse range of projects. During periods of economic decline, it is frequently observed that prominent shipyards engage in competitive activities encompassing a wide range of maritime assets, including floating production platforms and research vessels.

1.1.5. The Demolition (Recycling) Market

The demolition industry is classified as the fourth sector. This particular facet of the recycling industry, while lacking in glamour, is undeniably crucial, as it has become widely acknowledged. The mechanics of the subject matter are straightforward. The process bears resemblance to that of the secondary market, with the distinction being that the clientele consists of ship-dismantling scrap yards rather than shipowners. In instances where a ship owner encounters difficulty in selling their vessel for an extended period of time, they opt to list it on the market for demolition. Prominent brokerage firms possess a specialized division known as the 'demolition division' that focuses on this particular market. Due to their active

involvement in the market, these brokers diligently record recent sales and maintain constant awareness of the identities of buyers. Upon receiving instructions from the ship's proprietor, the broker proceeds to furnish interested parties with pertinent details concerning the ship, encompassing its weight, current whereabouts, and availability. The primary buyers consist of demolition yards, predominantly situated in the Far East region, including countries such as India, Pakistan, Bangladesh, and China. However, it is important to note that the majority of purchases are conducted by intermediaries who acquire ships through cash transactions and subsequently sell them to demolition yards. A significant portion of waste generated in Asia is commonly traded within local markets, serving as a readily available supply of raw materials for mini-mills or undergoing cold-rolling processes for utilization in construction activities. Therefore, the demand for steel is primarily influenced by the local steel market, with the potential impact of recycling facilities on demand also being a factor to consider.

Therefore, the prices exhibit significant volatility, with fluctuations observed between $100 per long ton (lwt) during the 1980s and exceeding $400 per lwt in 2007. Furthermore, the cost fluctuates depending on the ship's appropriateness for the process of dismantlement.

As various offers are received, the price gradually increases, leading to the eventual negotiation and agreement of a deal. Upon the conclusion of the transaction, the purchaser assumes ownership of the vessel and, in the event of acting as a middleman, facilitates its transportation to the designated demolition facility.

2. Freight rates on maritime shipping markets

The significance of maritime shipping within the context of maritime policy and broader national development is of paramount importance and should not be underestimated. The principal duty of this entity is to effectively address the fluctuating, dynamic, and inherently flexible requirements for maritime transportation.

The shipping industry employs diverse economic mechanisms to govern the interplay between supply and demand. With each cycle in the shipping market, novel prospects and risks emerge, leading to significant fluctuations in a shipowner's cash flow within a short span of months. Consequently, the market valuation of their fleet can experience substantial oscillations, often amounting to millions of dollars. The practice of shipping can be regarded as a skillful endeavor, wherein the adept individual must possess the capacity to discern and, ideally, anticipate the fluctuations that occur within the freight market. Individuals with the highest likelihood of success are those endowed with the capacity to discern instances wherein the collective participants within the market exhibit erroneous judgments.

Each maritime cycle exhibits distinct characteristics from an economic perspective, necessitating the development of a systematic elucidation of the generalized freight market cycles in order to comprehend the current state of the market. In practical application, the utilization of the supply and demand model is employed to address this matter within the realm of reality. This technique is commonly employed by economists to undertake an analysis of aggregate market consumption.

2.1. Factors influencing the setting of freight rates on maritime shipping markets

The dynamic nature of market fluctuations exerts a discernible influence on the intricate realm of freight rates. These rates, serving as a quantitative representation of the cost associated with transporting goods, are meticulously expressed as indices within each market sector. These indices are meticulously derived from the traded cargo, thereby encapsulating the prevailing conditions within the respective market. Alongside numerous other variables, it is noteworthy that the demand for maritime transport is influenced by a total of seven factors, while the supply within the maritime transportation market is influenced by a set of five factors. The demand for

maritime transport is influenced by various factors such as the global economy, international maritime trade, average attained profit, political events, transportation costs, demand elasticity, and competition. The supply side encompasses various factors, namely the global fleet and its corresponding productivity, shipbuilding activities, shipbreaking operations, and freight rates. In accordance with the scholarly work of Stopford (2009), Figure 2 aptly portrays the interplay and interdependence among the aforementioned variables. The composition in question is comprised of a tripartite structure, consisting of three distinct components. The three key components under consideration are as follows: firstly, the demand, denoted as model A; secondly, the supply, denoted as model B; and thirdly, the freight market, denoted as model C. The freight market, acting as an intermediary, facilitates the flow of monetary transactions between the demand and supply sectors.

The operational dynamics of this mechanism are characterized by a straightforward and uncomplicated modus operandi. From the perspective of demand, it is imperative to consider the influence of the global economy, which, by means of diverse industrial endeavors, generates commodities that necessitate the utilization of maritime transportation. The fluctuations in shipping distances and the evolution of distinct industrial sectors have the potential to modify the overarching trajectory of growth, consequently exerting an impact on the demand for maritime services.

The commercial fleet is indicative of a market characterized by a transportation capacity on the supply side that remains constant (Domijan Arneri, 2014). At any given temporal juncture, it is imperative to acknowledge that solely a fraction of the fleet possesses the capacity to be employed for commercial transactions, whereas the remaining vessels may be subjected to decommissioning or repurposed as a depot. The augmentation of the fleet can be achieved by means of shipbuilding, while its reduction can be accomplished through shipbreaking. The quantity of fleet transit is influenced not solely by the efficacy of ship management in relation to factors such as partial speed and waiting time, but rather it is also guaranteed by said management. Finally, it is imperative to acknowledge that the growth of the market's supply is undeniably influenced by the policies implemented by shippers, banks, and legal authorities.

The focal point of Figure 2, denoted as the shipping market model, revolves around the concept of freights. Freights serve as the manifestation of the delicate balance achieved when supply and demand in the market reach a state of equilibrium. The

interconnection between market equilibrium and freight within the shipping model is a pivotal economic relationship. Shipowners, as key actors in this dynamic, assume the responsibility of determining appropriate responses to various circumstances. The aforementioned model exhibits a discernible pattern of irregular crests and troughs within the transportation market cycles.

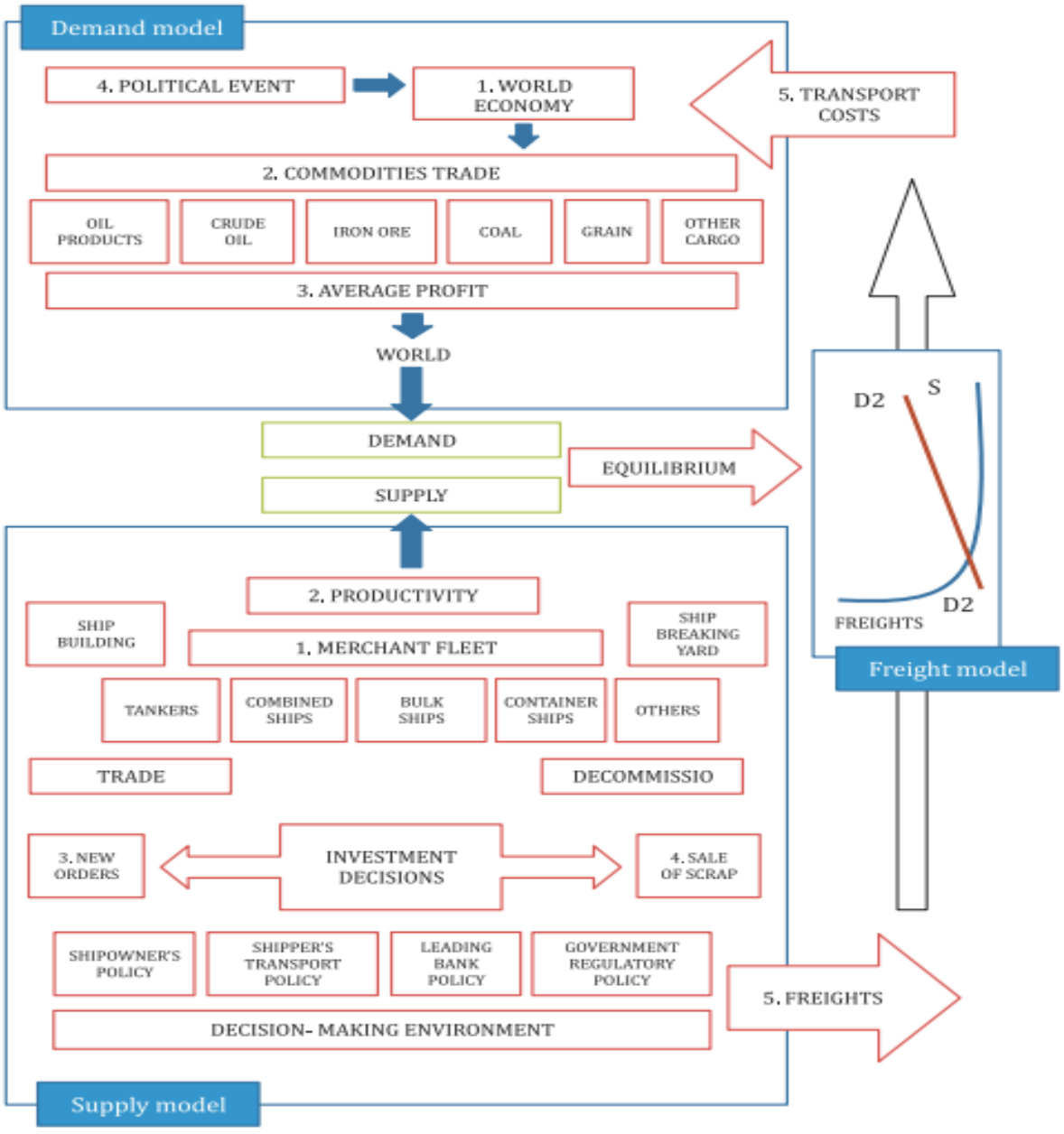


Figure 2: The shipping market model

Source: Martin Stopford, Maritime Economics 3rd edition 2007

2.2. Factors influencing the demand for maritime transport on the maritime shipping market

2.2.1. World economy

The global economy is the single most influential factor on ship demand. Since the majority of the demand for sea transport is generated by the global economy (import of raw materials for the manufacturing industry, trade in manufactured products), the growth of sea trade closely tracks the growth of the global economy (growth of trade).

Four distinct aspects of the global economy may influence the demand for maritime transport:

1. Alternating increases and decreases in the rate of economic growth characterize business cycles. Due to these fluctuations in maritime commerce, it is unlikely that the demand for maritime transportation will increase consistently. Changes in economic growth rate are mediated by maritime commerce, resulting in a cyclical demand pattern for ships. External and internal forces also have an impact on business cycles. Wars and extreme commodity price fluctuations are examples of external causes. In contrast, internal elements allude to the dynamic structure of the global economy, which produces cyclical activity as opposed to linear development. Even though they share many characteristics, no two business cycles are identical, and there is no accurate formula for predicting the future or past duration of a business cycle.

2. We must also examine the long-term relationship between the development of maritime trade and global economic expansion. There are three reasons to anticipate long-term adjustments in this manner:

• The domestic availability of raw materials may dwindle, prompting consumers to seek out foreign suppliers and causing imports to increase more rapidly than industrial output.

• Industrial development alters demand for bulk products, which account for a significant portion of seaborne trade. • The economic activity becomes

less resource-intensive, with a shift away from durables construction and stockbuilding and toward services, resulting in a lower demand for imported raw materials.

3. The occurrence of economic "shocks" also influences the impact of the global economy on seaborne trade. They differ from cycles in that they are unique, are typically triggered by a singular event, and have a significant impact on the shipping industry (1930s depression / Wall Street crisis 1929).

4. Economic disruptions have an effect on the global economy's influence on maritime commerce. They differ from cycles in that they are unique, frequently triggered by a specific event, and their impact on the shipping market is frequently severe (1930s depression / 1929 Wall Street Crash).

2.2.2. International maritime trade

International maritime commerce represents a significant segment within the shipping industry and is subject to the impact of worldwide economic patterns. In contemporary society, the prevailing phenomenon can be primarily attributed to the forces of demand, particularly emanating from larger and more influential consumers, namely nations boasting elevated economic standings. The shipping industry exhibits a notable susceptibility and responsiveness to any alterations in the course of worldwide trade. Due to the inherent variability in the volume of international trade, it becomes imperative for the demand for shipping capacity to adapt correspondingly. Shipping companies occupy a significant and arduous position within the global economy and trade, as their well-coordinated and consequently cost-effective maritime transportation serves as a driving catalyst for global economic activity and trade.

The depiction of supply dynamics and the condition of the ship capacity market can be more accurately understood through an examination of the structure and evolution of the global merchant fleet, which encompasses basic ship types, size, and age. The configuration of the merchant fleet is

contingent upon the amalgamation of maritime cargo, novel transportation technology, corporate objectives, and prevailing market conditions.

The present analysis seeks to differentiate between the immediate and prolonged effects of individual commodity transactions on the demand for sea transport. The principal short-term factors that exert influence are the seasonal effects and stock accumulation phenomena. These effects manifest themselves during the harvesting period for agricultural commodities, as well as in the consumption patterns of oil, which tend to be higher during the autumn and winter seasons compared to the spring and summer seasons. Both factors exert a significant influence on the demand for shipping services within a concise temporal window, specifically pertaining to the medium-term growth in demand and the employment prospects for particular categories of vessels.

The interconnections between maritime commerce and the industrial economy are subject to the influence exerted by the seasonal patterns associated with specific commodities. A plethora of agricultural commodities, such as those subject to harvests and subsequent price fluctuations, are prone to seasonal variations. The phenomenon of seasonality exerts a disproportionately significant influence on target markets. Due to the inherent complexities associated with orchestrating the transportation of seasonal agricultural commodities, shippers often find themselves heavily reliant upon contractual agreements with specific markets in order to ascertain the precise magnitude of tonnage demand. As a result, it can be observed that the contract market is more significantly influenced by fluctuations in the grain market compared to larger transactions, such as those involving iron ore. This is primarily due to the fact that the tonnage involved in iron ore transactions necessitates a greater accumulation through long-term contracts. Certain agricultural commodities, namely fruits, poultry, and dairy products, necessitate the implementation of cooling or freezing techniques. Consequently, the transportation and storage of these goods necessitate the utilization of specialized vessels and freezer containers.

Furthermore, it is worth noting that the advancements observed in specific commodity exchanges have a notable impact on the growth trajectory of demand for maritime transportation in the medium-term. The growth trajectory of particular commodity trades may deviate from that of the global economy at large owing to shifts in demand for said commodity (e.g., the transition from coal to oil as a principal energy source), alterations in the origins from which supplies of the commodity are procured (such as the emergence of new oil reserves in the North Sea and Alaska), modifications in production techniques, or the relocation of a processing facility. The pre-export refinement of industrial raw materials can exert a direct influence on the volume and nature of maritime cargo transportation.

Notwithstanding the inherent distinctiveness of every enterprise, it is imperative to acknowledge the existence of four overarching classifications of alterations that necessitate contemplation. Examples of these types of changes include shifts in demand for specific goods, alterations in the procurement sources utilized by suppliers, modifications arising from facility development relocations, which can directly influence the volume and nature of maritime cargo as well as the requisite vessel type, and adjustments in the transportation policies adopted by shippers.

2.2.3. Average profit

The determination of maritime transport demand is contingent upon the extent of cargo travel, colloquially known as the "average profit" of maritime trade. In the pursuit of determining the mean profit, it is customary to take into account the requisites of maritime transportation, namely the demand for such services, alongside the ton-miles circumstances. The latter are characterized as the product of the cargo tonnage conveyed and the average distance traversed. The closure of the Suez Canal, as an illustrative instance, engendered a notable augmentation in the spatial separation between certain ports, thereby instigating a concomitant upsurge in the exigency for maritime transportation and the subsequent amplification of the commercial domain in all instances.

The analysis of fluctuations in average profitability within the commodities trade necessitates the utilization of intricate merchant matrices, ascertaining the complexity inherent in this domain. The salient inquiry often revolves around the delicate equilibrium between the enduring and immediate profitability of suppliers.

2.2.4. The impact of political unrest on shipping demand

Political developments in the shipping business have specific features that, when they arise, can trigger quick and unexpected shifts in market demand. They have the potential to upend the shipping industry.

Every insight into the balance of shipping market development must consider the potential of major political facts. In contrast, the facts speak for themselves in anticipating the relevance of variable shipping demand behavior.

International Impact:

a) Suez Canal opening and closure
b) World War I & II
c) Tap line pipeline closure between Saudi Arabia and the Mediterranean
d) OPEC production cutbacks.

Localized impact:

e) Cuban crisis / sugar exports shifted to the Soviet Union and China.

2.2.5. Transport costs

The efficacy of maritime operations holds utmost significance in numerous advancements within the realm of maritime commerce. The transportation of raw materials from distant locations will only be deemed feasible if the costs associated with marine operations can be sufficiently minimized or if there is a discernible improvement in the quality of the end product that justifies the undertaking. This is precisely the underlying reason for the elevated transportation expenditures within the aforementioned sector.

Throughout the preceding century, notable advancements in efficacy, augmented vessel dimensions, and increasingly proficient maritime endeavors have engendered a consistent diminution in the expenses associated with transportation, alongside an elevated standard of service excellence. The advent of more cost-effective international transportation has had a profound influence on the dynamics of global trade. Additionally, this phenomenon gave rise to novel commercial pathways and facilitated the establishment of maritime linkages.

2.2.6. Elasticity of Demand

The phenomenon wherein the quantity demanded exhibits a degree of sensitivity in response to alterations in price is commonly denoted as the price elasticity of demand. Within the realm of maritime economics, the concept of demand elasticity pertains to the degree of responsiveness exhibited by the demand for diverse shipping services in the face of alterations in freight prices. The phenomenon of an increase in freight rates leading to a corresponding decrease in demand, and conversely, a decrease in freight rates resulting in a proportional increase in demand, can be observed.

The quantifiable responsiveness of demand to alterations in freight rates is ascertained by the subsequent factors:

a) The presence of alternative transportation modes, such as trains and airlines, is a notable aspect to consider. The greater the elasticity of demand for services rendered by a particular mode of transportation, the more readily these services can be supplanted by those offered by an alternative mode of transportation.
b) The quality and extent of the services rendered. When the level of service quality is exceptionally high, the responsiveness of demand to changes in price becomes relatively low, indicating inelasticity.
c) The temporal interval within which the process of adjustment takes place. The elasticity of demand increases proportionally with the duration of the adjustment period.

d) The determination of demand is contingent upon the actual income or fluctuations in income experienced by individuals. The demand for freight exhibits a greater degree of elasticity when it is inversely proportional to income, whereas it demonstrates a higher level of inelasticity when it is directly proportional to income.

2.2.7. Competition

Competition within the shipping industry or from other forms of transportation may have an impact on the demand for a particular shipping service. Demand will be determined by evaluating and comparing the following factors:

a) Service's level of quality
b) Service's frequency
c) Speed
d) Freight costs
e) Economies of scale
f) Reliability and efficiency

Customers in a free market evaluate the above factors and choose the service that best meets their needs.

2.3. Maritime transport supply

The oversight of shipping supply management is conducted by four discrete cohorts of decision-makers, specifically shipowners, charterers, bankers, and regulators. The central responsibility of shipowners encompasses the acquisition of new vessels, the divestment of outdated ones, and the formulation of strategies to maximize tonnage utilization. Charterers, conversely, possess the capacity to either undergo a transformation into shipowners themselves or exert their influence over shipowners by means of issuing time charters. Bankers, who hold a pivotal role, offer indispensable financial support to transportation operations, thereby conferring upon them the ability to exert fiscal influence on susceptible markets. In conclusion, it is the regulators who undertake the crucial task of formulating and implementing guidelines and policies that govern the intricate workings of the

shipping industry. The vulnerability of the supply side of the shipping model to modifications is particularly evident among this restricted group of decision-makers.

2.3.1. Marchant fleet

Owing to the typical operational duration of 25 years for commercial vessels, the annual attrition rate of the fleet remains relatively modest, resulting in the loss of only a fraction of the total maritime assets. As a result, the temporal dimension of market adjustment is measured in annual increments rather than monthly intervals. An integral element within the framework of the shipping market model pertains to the mechanism through which the supply adapts in instances where the demand for shipping fails to meet anticipated levels. The alterations observed in the merchant fleet three decades prior engendered a dual outcome characterized by an augmentation as well as a notable contraction. The process of adapting to these changes necessitates the alteration of the ship types within the fleet.

Based on the data from the year 2014, as reported by the International Shipping League (ISL, 2014), it can be observed that the global fleet is primarily composed of various types of vessels. The largest proportion of this fleet is represented by bulk carriers, including both bulk and OBO vessels, which account for approximately 44% of the total. Following closely behind are tanker vessels, encompassing those involved in the transportation of oil, chemicals, and liquefied gas, constituting approximately 35.4% of the global fleet. Containerships, which are responsible for the transportation of goods in standardized containers, constitute a significant yet comparatively smaller fraction, accounting for 13.5%. The general cargo fleet, comprising various types of vessels including conventional, special, car transport, frigo, and RORO vessels, constitutes a relatively minor proportion of the worldwide fleet, estimated to be around 6.7%. Finally, it should be noted that passenger ships, which encompass both passenger and cruise ships, as well as roll-on/roll-off (RO)

passenger ships, constitute a comparatively small fraction, comprising only 0.4% of the worldwide fleet.

2.3.2. Productivity of the merchant fleet

Despite the relatively small size of the merchant fleet, its operational efficiency allows for a certain degree of flexibility.

The fleet productivity (P) is determined by four primary factors. The velocity, a fundamental parameter, governs the temporal duration during which a vessel is engaged in traversing a given distance. According to scholarly research, it has been observed that merchant ships, despite being of superior quality, generally function at velocities significantly lower than their intended design speed due to a confluence of operational variables. The temporal variability of fleet speed necessitates careful consideration, as the introduction of new ships with diminished designed speeds will inevitably lead to a gradual reduction in the fleet's overall transport capacity. In the event of suboptimal maintenance practices, the progressive degradation of the ship's hull will inevitably lead to a substantial decrease in its maximum attainable operational velocity. The temporal duration allocated to a port visit holds significant importance, as it is contingent upon the operational capabilities of both vessels and terminals. The implementation of containerization has resulted in a significant reduction in the duration of vessels' stay within port facilities. The concept of deadweight utilization (DWU) pertains to the diminution in cargo capacity incurred as a result of various factors such as bunkers, warehouses, and other impediments that impede the ship from achieving full load capacity. Additionally, DWU encompasses the temporal aspect of a ship's voyage, encompassing both the duration spent at sea while laden with cargo, which can be further categorized into loaded days at sea, as well as unproductive days encompassing time spent in ballast, port, and other non-cargo carrying activities. Modifying the payload allocation at the aft section of maritime vessels has the potential to extend the duration of their laden voyage, particularly for ships engineered to accommodate versatile cargo transportation.

2.3.3. Shipbuilding

In conjunction with adapting to the dynamics of the shipping market, the shipbuilding sector is also intricately engaged in this transformative endeavor. In a broader context, it is imperative to consider the necessary adjustments to the delivery limit in order to effectively accommodate the inherent variations in demand that may occur over prolonged temporal intervals. The adjustment of the delivery limit presents a formidable challenge due to the protracted nature of the shipbuilding industry's business cycle. The process of ship delivery spans a duration ranging from one to four years, contingent upon the volume of orders residing within the order book. Anticipated orders are projected based on a comprehensive evaluation of prospective demand. From the vantage point of the shipbuilding sector, the classification of the vessel under construction assumes paramount importance as variations in the timely provision of distinct ship types exert a discernible impact on their prospects within the market. Based on the findings presented in the Shipping Statistics and Market Review (ISL, 2014), it is observed that the global order book experienced a notable surge of 13.4% in comparison to the preceding year, reaching a substantial magnitude of 93 million CGT (274 million dwt) at the onset of 2014. The current statistical analysis reveals that the proportion of tonnage presently being constructed in relation to the tonnage that is already in service stands at 17.1%. Further examination of this data reveals that bulk carriers account for 36.7% of the aforementioned tonnage, followed by tankers at 31.6%, and container ships at 20.0%. According to the International Shipping and Logistics report of 2014, it is evident that the nations of South Korea, China, and Japan collectively maintain a dominant position in the global shipbuilding market, accounting for a substantial 88% share (ISL, 2014: 116). The construction of tanker and container ships is predominantly led by Korea, whereas Japan primarily focuses on the construction of bulk ships. With respect to the concept of capital gains tax (CGT), it is noteworthy to highlight that these two nations collectively represent a significant proportion, specifically close to 66%, of the prevailing global order book.

2.3.4. Shipbreaking and operative losses

The determination of the growth rate of the merchant fleet is contingent upon the calculation of the proportion between newly delivered ships and fleet losses, encompassing vessels that have been sold for scrap or have been lost at sea.

The process of shipbreaking is of utmost importance in the realm of maritime operations as it serves the purpose of effectively eliminating ships from the market and facilitating the determination or anticipation of when a particular vessel will be dispatched to a shipbreaking facility. Moreover, this intricate matter poses a challenge to the evaluation of ship capacity enhancement. The reason for dispatching ships to breaking yards is predicated upon a myriad of factors, encompassing temporal considerations as delineated by Stopford (2009), technical obsolescence, breaking prices, expeditious earnings, and market prognostications. The age of a vessel constitutes the principal determinant in ascertaining the tonnage of a ship that is destined for the purpose of being rendered inoperable or demolished. As maritime vessels progress in their lifespan, they undergo a process of degradation, leading to an escalation in expenditures associated with regular repairs and maintenance. Consequently, owners of antiquated vessels are compelled to bear exorbitant expenses and allocate additional time towards both scheduled and unscheduled maintenance activities. The decommissioning of a ship is contingent upon the gradual progression of physical deterioration, rendering it impossible to establish predetermined temporal parameters for this event. The determination of the lifespan of a particular vessel, leading to its eventual decommissioning due to being surpassed by a more efficient counterpart, is contingent upon the phenomenon known as technical obsolescence. The determination to deploy a vessel for the purpose of breaking is additionally influenced by the highly volatile prices associated with said breaking, which are contingent upon the interplay between supply and demand dynamics. It is imperative to acknowledge that the act of shipbreaking is a strategic choice predicated upon the proprietors' prognostications concerning the prospective operational profitability of the vessel and its fiscal standing (Stopford,

2009). The occurrence of a concentrated phase of shipbreaking activities has the potential to engender a reduction in the monetary value of severed metallic materials. Assuming the perspective of a shipowner, it is postulated that there exists a belief in the imminent expansion of the freight market, notwithstanding the prevailing economic recessionary conditions. Given the circumstances at hand, it appears improbable that he will opt to dispose of the unprofitable vessels to scrapyards, as the prospective gains anticipated during the period of expansion are deemed satisfactory to warrant the occurrence of operational deficits preceding said expansion.

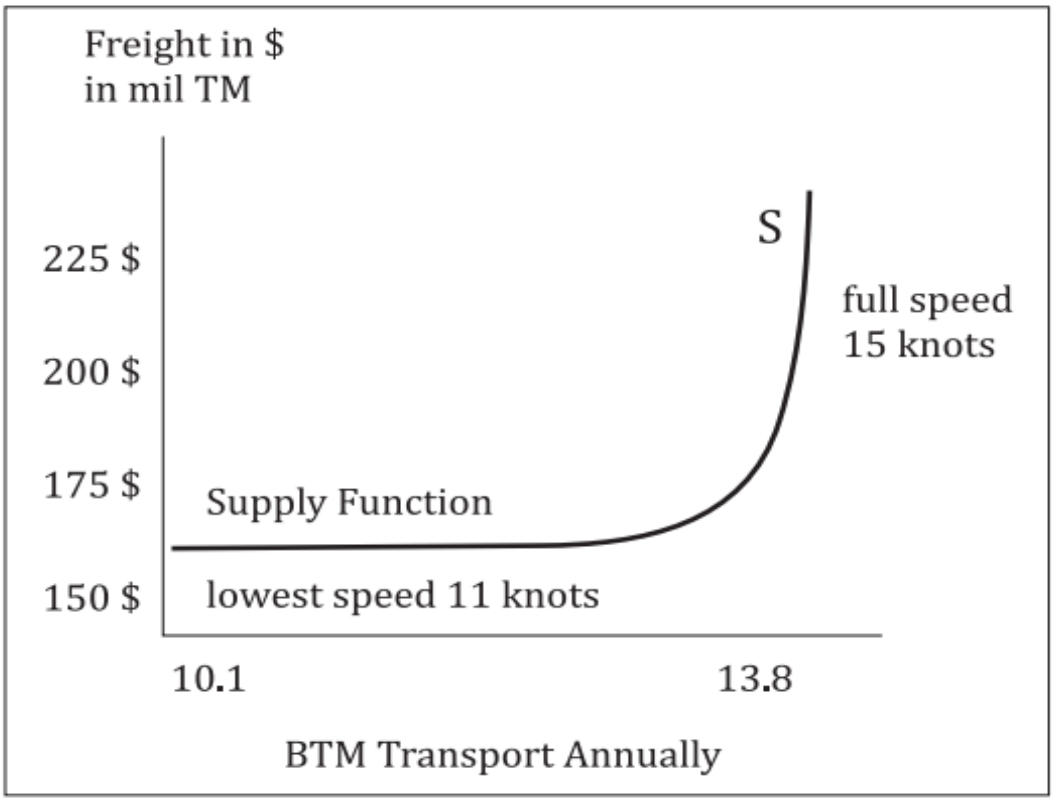
Based on the shipbreaking data provided by ISL in 2014, it was observed that a total of 44.73 million deadweight tons (dwt) of ships, with a minimum gross tonnage (gt) of 300, were dismantled within the period of January to December 2013. The breakdown of these ship types is as follows: tankers accounted for 13.6 million dwt (30.4%), The data reveals that bulk ships accounted for 21.38 million deadweight tons (dwt), which corresponds to 47.8% of the total. Container ships made up 6.08 million dwt (13.6%), while general cargo ships constituted 3.57 million dwt (8.0%). Passenger ships, on the other hand, comprised a significantly smaller proportion of the total, with a mere 0.08 million dwt (0.2%).

2.4. The level of freights in the maritime shipping market

Freight functions as the market's ultimate arbitrator, compelling decision-makers to adjust their capacities in response to short-term conditions and devise long-term cost-cutting strategies. Freight, in the context of maritime conveyance services, refers to the payment made to shipowners for providing said services. Its determination is contingent on the current structure of the transportation market and the complex interplay between supply and demand within that market (Glavan, 1992).

The freight market, which functions as an intermediary between the supply and demand forces, is the third component of Stopford's (2009) transportation market model. This system's operational mechanism is characterized by a straightforward

and uncomplicated approach. The negotiation process between shipowners and shippers involves establishing freight rates that precisely reflect the equilibrium between the market's supply of vessels and demand for cargo. The magnitude of freight will manifest an inverse relationship with the number of ships; that is, an abundance of ships will result in a decrease in freight, whereas a shortage of ships will result in an increase in freight. After determining the level of freight, shipowners and shippers make the necessary adjustments, resulting in a state of equilibrium within the supply-demand dynamics. To analyze this process thoroughly, we employ three fundamental economic concepts. supply function, demand function, and the price at equilibrium (Stopford, 2009).



Graph 1 Supply function

Source: Stopford, M.: Maritime economics, Rutledge, Tavlor&Francis group, 2009, pg. 140.

The initial graph delineates the supply function associated with a singular vessel. The circular curvature serves as a symbolic representation of the extent of transportation services provided by the proprietor across multiple levels of freight. In the contemporary context, the aforementioned maritime vessel can be categorized as a very large crude carrier (VLCC) boasting a deadweight tonnage

(dwt) of 280,000. In circumstances wherein the pecuniary worth of cargo descends beneath the designated benchmark of 155 dollars for each metric ton-mile (mtm), or more precisely, when the freight magnitude is adjudged to be diminutive, the proprietor of the vessel proceeds with the act of decommissioning said vessel and abstains from providing transportation services. Once the expenditure associated with transporting goods exceeds the specified limit of 155 dollars per metric tonne-mile, the ship initiates a reactivation procedure and commences its voyage at the lowest achievable speed of 11 nautical miles per hour, primarily aiming to preserve fuel reserves. The ship will proceed to traverse at its maximum speed of 15 knots, thereby enabling an annual maritime transportation capability of 13.8 billion ton-miles, a substantial magnitude for a single vessel. At higher magnitudes of cargo, the associated expenses will exhibit an upward trajectory, reaching an estimated value of $220 per metric tonne.

The application of economic theory enables the identification and analysis of the supply curve. The current market conditions manifest a landscape characterized by intense competition in the realm of supply. To enhance their financial gains, the ship proprietor astutely assesses the most economically advantageous velocity for conveyance, considering the equilibrium between cargo fees and the additional cost per unit of distance traveled. The present discourse endeavors to explicate the intricate nexus between velocity and cargo, drawing inspiration from the scholarly contributions of Stopford (2009).$S = \sqrt{[R/(3 \cdot p \cdot k \cdot d)]}$

whereas:

R – freight amount

S – optimal speed in miles/day

p – freight level at journey

k – constant of ship fuel

d – distance

The geometric properties of the supply curve are delineated by the following mathematical expression. The determination of the optimal speed is contingent upon two key factors: the prevailing cost of petroleum and the inherent suitability of the ship for long-distance voyages.

In actuality, the supply function exhibits a level of intricacy that surpasses simplistic associations between velocity and cargo. The pace encompasses a broader scope than solely the temporal aspect of the supply chain's responsiveness to shipments. By leveraging the advantageous low freight rates, the ship owner has the option to either decommission their vessel or enter into a temporary storage agreement.

The descending trajectory of the short-term supply curve is contingent upon three key factors that impact the reduction in costs associated with marginal vessels. Firstly, it is observed that older ships generally incur higher operational expenses, thereby necessitating a higher freight level to achieve a point of cost savings. Secondly, larger ships exhibit lower transportation costs per unit of cargo in comparison to their smaller counterparts. The aforementioned factor, pertaining to the correlation between velocity and freight, has been previously expounded upon.

The demand function elucidates the manner in which charterers respond to fluctuations in price. The supply curve exhibits a near-perpendicular orientation. This proposition primarily constitutes a hypothesis, albeit one that is supported by various rationales elucidating the consistent configuration observed in all bulk cargoes. One of the most persuasive rationales lies in the dearth of available transportation alternatives. Shippers necessitate the acquisition of cargo, even in instances where they possess the temporal capacity to engage in negotiations for alternative contractual arrangements. The procurement of a vessel remains imperative for shippers, irrespective of prevailing market prices. Nevertheless, it is imperative to acknowledge that the mere existence of low prices does not inherently serve as a catalyst for shippers to engage in the acquisition of an additional vessel.

The significance of leisure and balance in contemporary society cannot be overstated. These two elements play a pivotal role in promoting overall well-being and enhancing the quality of life. Leisure, often regarded as discretionary time, encompasses activities that individuals engage in voluntarily The confluence of the supply and demand curves transpires at the point of equilibrium price. At the given price point, prospective buyers exhibit a willingness to acquire a specific quantity of ships, while vendors demonstrate a willingness to supply a specific quantity of

ships. The culmination of the investigation has been duly ascertained. The determination of transaction prices in the real world is contingent upon the temporal allowance granted to buyers and sellers for the purpose of adjusting their respective market positions. Accordingly, it is imperative to take into account three distinct temporal intervals as delineated by Stopford (2009): the extant or contemporary state of equilibrium, the transient state of equilibrium in the near future, and the enduring state of equilibrium in the distant future.

The existing state of equilibrium delineates the contracted freight levels for vessels and cargoes classified as "urgent," thereby giving rise to transient oscillations. In this particular market, the proprietor is persistently engaged in the endeavor of prognosticating the subsequent selection of cargo or deliberating upon the feasibility of undertaking a voyage in ballast to a more favorable loading location. The process of price determination involves the engagement of two parties in a negotiation wherein they seek to establish a mutually agreeable price point that achieves equilibrium between the forces of supply and demand.

The concept of short-term equilibrium affords owners and charterers an extended duration within which they can effectively adapt to fluctuations in freight demands. This adaptability is achieved through the strategic deployment or withdrawal of vessels on a temporary basis. The present state of the market, as observed through the lens of short-term supply dynamics, is hereby explicated. Upon the decommissioning of ships that exhibit diminished effectiveness, the available supply experiences a notable decline. However, over time, this supply undergoes a gradual augmentation as ships are reinstated into active service. In the scenario where the fleet is fully engaged in maritime operations and navigating at its utmost velocity, the cargo volumes experience a notable augmentation, thereby potentially alluring the remaining vessels to join the convoy. In the absence of forthcoming vessels, the provision of maritime transportation shall remain unattainable. The comprehension of freight determinants is facilitated by the examination of short-term demand dynamics. The market effectively sustains a state of equilibrium by ensuring a harmonious balance between the forces of supply and demand. In instances where demand is at a minimal level, the transportation of goods experiences a state of equilibrium, commonly referred to as a plateau. As the process of recommissioning ships ensues to accommodate the heightened demand,

it is anticipated that a consequential surge in freight will ensue. The present state of the market price is contingent upon the presence of antiquated and suboptimal vessels, which necessitate elevated freight rates in order to incentivize their reintegration into active service. Consequently, a mere incremental rise in demand is capable of yielding a threefold augmentation in the upper threshold of freight quantities. In the event of a dearth of vessels, charterers engage in a competitive endeavor to secure capacities that are currently accessible, predicated upon the quantum of conveyance that is necessitated. Subsequently, it is plausible for prices to exhibit an incessant escalation. Nevertheless, it is imperative to acknowledge that the current scenario under scrutiny is deemed unsuitable due to the fact that transporters are actively pursuing alternative supply sources that offer lower costs. It is worth noting that exorbitant freight charges tend to incite unconventional and often irrational investments from both ship owners and shippers alike.

Once the ship fleet has attained a state of long-term equilibrium, modifications can be implemented through the acquisition of novel vessels and the decommissioning of existing ones. Long-term equilibrium in the realm of supply and demand is achieved through the implementation of three distinct market categories: namely, sale and purchase, new construction, and demolition.

2.5. Conclusion

Inquiries pertaining to the determinants of freight on shipping markets, the allocation of average profits, and the adequacy of said profits in financing the acquisition of a new vessel hold paramount significance for investors seeking insights into long-term expectations, persisting through successive cycles. It is imperative to possess a comprehensive understanding of the global economy and the current state of the maritime shipping market. It demands a profound comprehension of the intricate interplay between the global economy and political dynamics, coupled with a discerning ability to identify and secure advantageous contractual agreements.

3. Historical overview of main geopolitical effects in shipping freight

This chapter's objective is to provide a historical overview of the most significant geopolitical effects on shipping freight, concentrating on World War I, the two closures of the Suez Canal, and the outbreak of Covid-19. The selection of these major geopolitical factors was motivated by a desire to provide a comprehensive picture of freight formation under three distinct challenges and over three distinct time periods.

3.1. World War I

During the course of World War I, it was observed that ocean freight rates experienced an unprecedented escalation, reaching levels that had not been witnessed before. In the initial biennium of the conflict, governmental authorities exercised direct jurisdiction over a segment of the British commercial fleet, while maritime traffic under neutral auspices enjoyed a substantial degree of unimpeded operation in accordance with customary norms. During the aforementioned period, it is noteworthy to highlight that the proportion of British imports attributed to neutral shipping was estimated to be approximately one-third. During the concluding biennium of the war, a notably more stringent system of freight control was implemented, thereby compelling a substantial portion of shipowners with neutral status to withdraw from engaging in British and Allied commerce. The confluence of these factors, in conjunction with the escalating tonnage depletions stemming from the German submarine offensive, engendered a pronounced dearth of transportation capability and diminished inbound shipments. The contention posits that the freight control policy was predicated upon a misapprehension regarding the function of freight rates in contributing to the exacerbation of inflationary pressures during times of armed conflict.

3.1.1. Overview of freight rates 1912-1920

Commencing in the month of January in the year 1912 and concluding in the month of December in the year 1920, a series of novel monthly indices pertaining to freight rates were introduced. These indices specifically pertained to the transportation of coal and encompassed a total of thirteen distinct routes for outgoing shipments from Britain, as well as an

additional seven routes for incoming trade. The aforementioned data is θpresented in a tabulated format within the appendix, wherein a more extensive elucidation of trade routes and the methodologies employed for weighting is also provided. The aforementioned calculations are predominantly grounded upon the prevailing freight rates pertaining to the transportation of coal for both inbound and outbound shipments in the United Kingdom. The extant scholarly literature on freight rates during the aforementioned time period posits that the United Kingdom, in its capacity as a maritime powerhouse, held sway as the preeminent hub of global shipping activities throughout this temporal span. The phrase "inward trade routes" necessitates a comprehensive interpretation within the confines of this particular context. Our examination encompasses a diverse array of international trade activities, including but not limited to the transportation of grain from North America and the River Plate to various European nations such as France and Italy, the conveyance of coal from Virginia to South America and Italy, the movement of rice and seeds from Asia to the Mediterranean region, and the transfer of salt from the Red Sea to India. By integrating these cross-trades, the indices will effectively capture the comprehensive dynamics of global freight rate fluctuations. The computation of freight rate indices involved the utilization of a repeat sailings index, which is a widely employed index methodology commonly found in housing price indices.

During the period spanning from 1912 to 1920, our sample encompasses a total of 65,236 observations pertaining to freight rates. It is worth noting that the overwhelming majority of these observations originate from documented fixtures, wherein the charter parties involved were engaged in contractual agreements for singular voyages. The aforementioned figure of 35,171 pertains to the aggregate number of consignments comprising coal originating from Britain, with a limited number of shipments encompassing iron and clay materials. With the exception of freights originating from Australia and the Pacific coast of the United States, the aforementioned sample is predominantly comprised of steam ship freights. Nevertheless, during the latter stages of World War I and the subsequent

period directly following it, sailing vessels commenced assuming a relatively insignificant position in the transportation of coal. This was primarily observed in the commerce between North America and the River Plate, albeit sporadically observed in the coal trade between Britain and France. The observed phenomenon can be attributed to the notable insufficiency in carrying capacity experienced during this period. However, it is also conceivable that the limitations imposed on freight rates were comparatively less stringent for these particular vessels.

Figure 3 illustrates the amalgamated indices for both inbound and outbound freight rates, alongside the yearly values of the Isserlis (1938) index that have been recalibrated to reflect a base value of 100 in the year 1913. The conspicuous magnitude of the escalation in freight rates during the conflict is discernible in this instance. During the latter part of 1917 or the early months of 1918, it is observed that the inbound freight rate level exhibited a notable tenfold increase, while the outbound freight rate level experienced a significant twelvefold increase, when compared to the average rates recorded in the year 1913. Following the culmination of World War I, it was observed that freight rates experienced a significant decline, approximately reaching half of their zenith during the peak of wartime. Nevertheless, it is important to highlight that there was a slight rise in freight rates observed during the period of global restocking surge that occurred between 1919 and 1920.

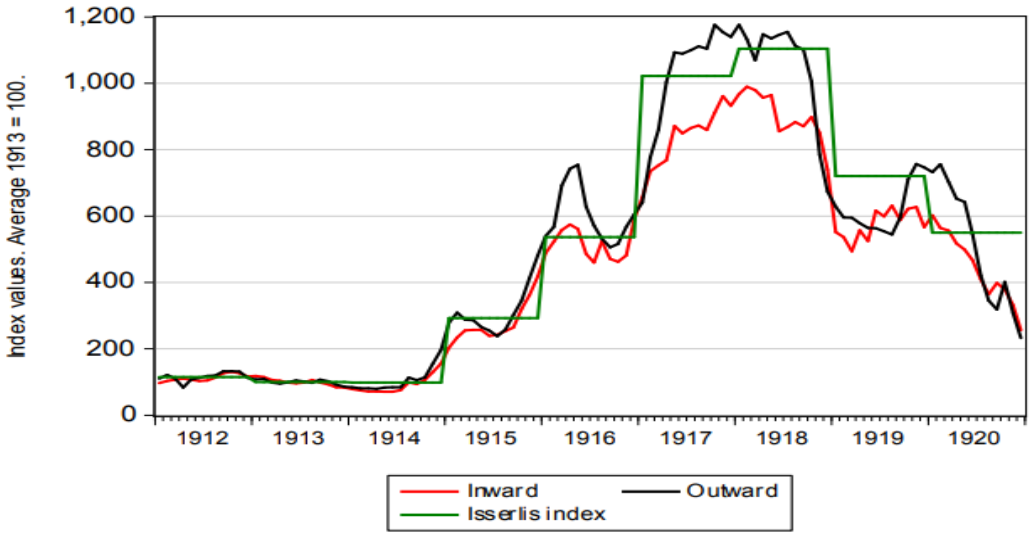


Figure 3.1: Indexes of aggregate nominal freight rates from January 1912 to December 1920.

The observed increase in freight volumes presented in this context, which occurred during the period of armed conflict, aligns closely with the comprehensive annual freight rate index developed by Isserlis in 1938, encompassing both inbound and outbound freight movements. The apex of the Isserlis index in the year 1918 exhibits a magnitude roughly elevenfold greater than that observed in 1913. This value lies within the spectrum delineated by the novel inward and outward indices, as visually represented in Figure 1. Nevertheless, the recently introduced monthly indices offer a significantly more comprehensive depiction of the substantial fluctuations in freight rates compared to the annual Isserlis index, particularly during the final two years of the war and the immediate post-war period. The present study has successfully derived a set of 20 novel subindices, which facilitate a comprehensive analysis of the variances among trade routes. These variances have been found to possess considerable statistical significance. The most egregious instances transpired during the latter stages of the war; during a specific juncture in November 1917, the transportation of coal to Scandinavian regions had escalated by a magnitude of 78, whereas the transportation of coal to French Mediterranean and Italian ports, which were subjected to stringent direct and indirect regulatory measures, had merely increased sixfold in comparison to the levels observed in 1913.

Following the year 1916, a period during which a significant number of trades were subjected to comprehensive freight rate controls, it is pertinent to note that the quotations presented herein pertain solely to neutral ships in the context of British trade. Amidst the conflict, it became imperative for British and Allied naval vessels to acquiesce to considerably reduced rates in comparison to those imposed upon neutral ships. This matter shall be expounded upon in subsequent elaboration. In order to attain a comprehensive comprehension of the fluctuations in ocean freight rates during the war, it becomes imperative to transcend the realm of aggregate figures and delve into a meticulous examination of the discrete trajectories of inbound and outbound trade routes.

To comprehensively examine the fundamental factors influencing fluctuations in freight rates, it is imperative to employ a more refined temporal framework beyond the scope of annual observations. The monthly indices presented in Figure 1 reveal that the progression of freight rate escalation during the war was characterized by fluctuations, in stark contrast to the perception conveyed by the annual indices. The historical record reveals the existence of distinct periods characterized by a notable upward trajectory in rates, interspersed with briefer intervals wherein rates exhibited a nominal decline. Notably, the middle of 1915 and 1916 stands out as one such period marked by a temporary decrease in rates. The aforementioned attributes possess potential utility in discerning the primary determinants responsible for the notable escalation in wartime freight rates. Prior to embarking on a more comprehensive exploration of the distinct phases within the wartime freight rate narrative, it is imperative to examine the most probable contenders responsible for propelling these freight rate determinants.

3.2. The Closure of Suez Canal

Two times, the Suez Canal has been closed. In 1956, the United Kingdom, Israel, and France invaded Egypt to reclaim control of the Suez Canal and oust Egyptian President Gamal Abdel Nasser. In 1967, Israel attacked Egypt and its neighbors.

Despite the fact that the initial closure of the Suez Canal in 1956, from November 1956 to just before May 1957, was considerably shorter, the impact was significantly greater. The British still controlled the supply of oil from Iran (after the coup of 1953), Iraq (prior to the uprising of 1958), Aden, and of course the Trucial States. Their regional base had only recently (1954) moved from the banks of the Suez Canal to Cyprus, and their domestic economy was still recovering from the effects of World War II (food, petroleum, and other necessities were still rationed). The French had recently dealt with the independence of Morocco and Tunisia, were involved in quelling the Algerian uprising (which they blamed on Nasser), and had been an active ally of Israel, supplying it with the nuclear expertise and materials that would form the basis of Israel's nuclear weapons capability.

The unexpected and abrupt cessation resulted in the confinement of a fleet of fifteen cargo vessels, colloquially known as "The Yellow Fleet." Following the cessation of hostilities, the Egyptian and Israeli military forces found themselves strategically positioned on opposing sides of the canal. Regrettably, the outlook for the resumption of canal operations appeared unpromising. The canal's closure endured until the culmination of the Yom Kippur War and the subsequent peace negotiations, a span of eight years.

The Suez Canal, renowned for its strategic significance, serves as the most expeditious maritime pathway connecting the continents of Asia and Europe. This vital waterway, responsible for facilitating an estimated 7.5% of worldwide trade, holds immense economic importance on a global scale. The international trade industry was caught off guard by the unexpected cessation of the canal's operations, which, at that particular juncture, seemed to be of a permanent nature. The spatial separation among certain nations has experienced a significant expansion. The provided visual depiction in Figure 1 portrays the additional distance that has been imposed due to the closure of the Suez Canal. The estimated geographical distance between the urban hubs of Mumbai and London is approximately 6,200 nautical miles when traveling through the Suez Canal, whereas a longer route of approximately 10,800 nautical miles is observed when circumnavigating the Cape of Good Hope.

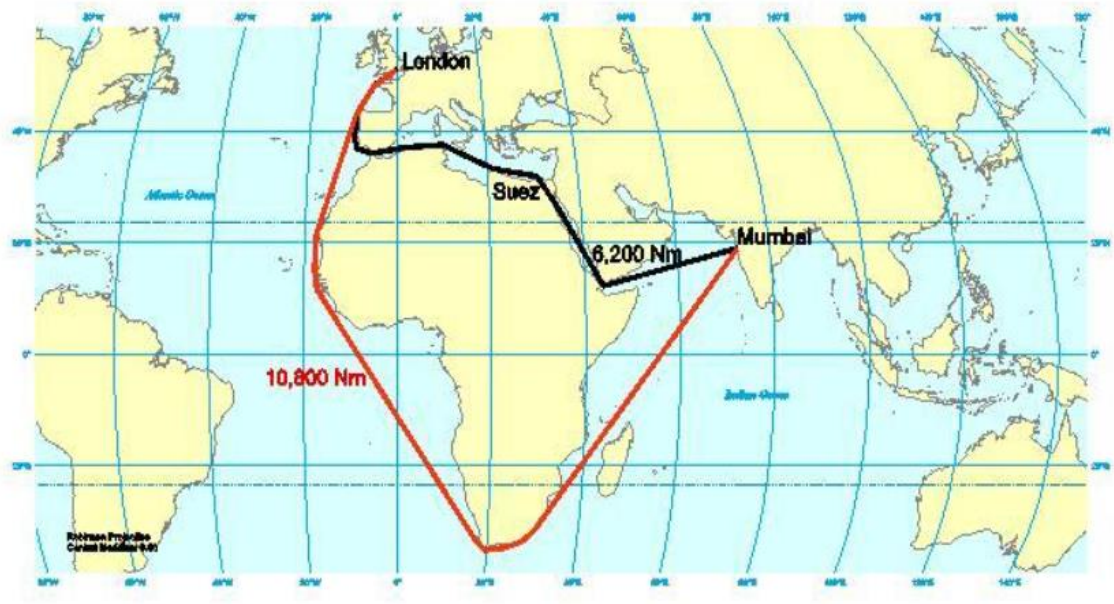


Figure 3.2: The Suez Canal against the Cape of Good Hope from Mumbai to London
Source: James Feyrer, "The 1967-75 Suez Canal Closure: Trade Lessons and the Trade-Income Link," 2009.

The temporal span of 1959 to 1984 is represented by Figure 3.3, which visually portrays the course of bilateral trade among 79 pairs of countries characterized by a distance increment exceeding 50%. The cessation of operations led to a reduction in trade exceeding 20% for the aforementioned pairings, necessitating a period of adaptation spanning three to four years. Following a comparable period of adaptation, commerce between these two nations recommenced in its entirety a mere eight years subsequent to the reopening of the canal. A reduction of 10% in the expanse of the ocean leads to a corresponding augmentation of 5% in the realm of commercial activities. The empirical evidence regarding the responsiveness of trade to fluctuations in trade costs implies that a reduction in trade barriers leads to a corresponding augmentation in trade volumes.

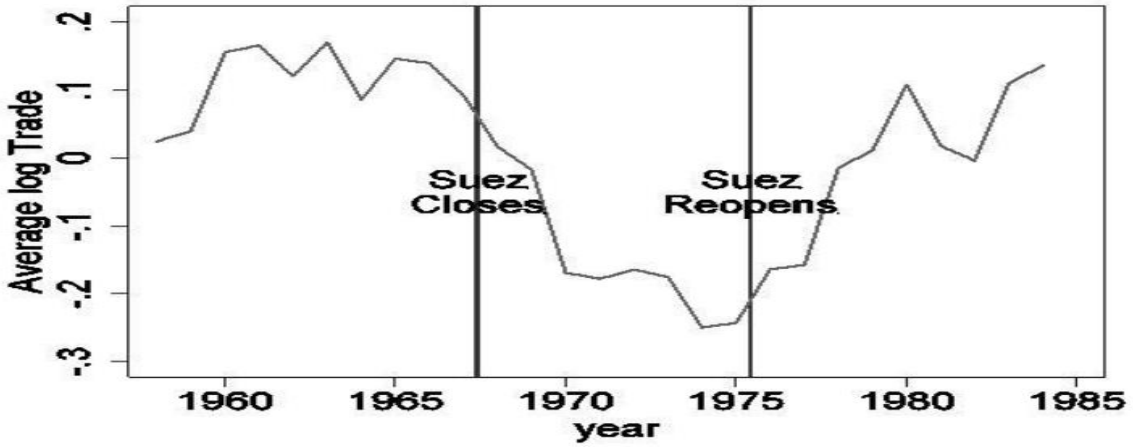


Figure 3.3: The decrease in trade induced by the closure of Suez

The ramifications of the Suez Canal's disruption were of considerable magnitude for nations heavily dependent on this vital waterway as a primary conduit for their commercial activities. The nations situated in the regions of South Asia and East Africa experienced a disproportionately severe impact. Throughout the period of closure, it is noteworthy that both Pakistan and India encountered a trade-weighted average surge in the distance across the sea, amounting to approximately 30%. Table 1 presents a compilation of countries exhibiting average distance increments of 5% or higher.

Table 1: Trade Weighted Increase in Sea Distance from Suez Closure

Country	Increase		Country	Increase
Pakistan	31.4		Singapore	10.6
India	30.6		Thailand	10.0
Kenya	23.6		China	9.4
Sri Lanka	20.4		Bulgaria	7.2
Malaysia	13.7		Indonesia	6.2
Madagascar	13.4		Cyprus	6.0
Mauritius	11.2		Greece	5.9
Romania	10.6		Philippines	5.0
Vietnam	10.6			

Source: IMF Direction of trade database, author's calculations.

Table 1: Trade weighted increase in sea distance as a result of Suez closure
Source: James Feyrer 2009, "The 1967-75 Suez Canal closure: Lessons for trade and the trade-income link".

Based on the empirical evidence, it can be deduced that the augmentation of trade by one unit of currency results in a corresponding increment of income by an

estimated value of 25 cents. The observed income increments exhibit a relatively expeditious trajectory, attaining their zenith within the temporal span of four to five years subsequent to the initial perturbation. The cessation of canal operations engendered trade dynamics that exhibited no discernible correlation with the income levels of the majority of nations. Consequently, the directionality of causality is such that trade influences income, rather than the reverse.

It is evident that augmentations in the magnitude of commercial activity yield a corresponding escalation in financial earnings. The outcomes presented in this study are exclusively applicable to maritime trade, as they are contingent upon the fluctuations in sea distance. The shocks serve the purpose of isolating the impact of commodities trade, effectively disregarding numerous country interactions that are influenced by geographical distance, such as international migration and trade in services. Hence, alterations in trade costs resulting from the cessation of operations at the Suez Canal can be more aptly likened to modifications in policies, such as tariffs, which impact the expenses associated with global trade. The findings presented herein unequivocally establish that the reduction of trade barriers leads to a discernible augmentation in both trade volumes and income levels.

3.3. Covid-19

The current global landscape is characterized by a profound socioeconomic crisis stemming from the ongoing pandemic. In response to this unprecedented situation, measures have been put in place to regulate and curtail mobility with the primary objective of mitigating the transmission of the virus. Moreover, this occurrence has engendered an economic crisis of considerable magnitude, thereby engendering profound ramifications for the domain of maritime transportation, ports, and cargo. Furthermore, it is imperative to acknowledge that the ongoing pandemic has engendered notable repercussions, one of which pertains to the considerable volatility observed in freight expenses. This can be attributed to the sluggish trajectory of economic growth, coupled with a surge in the demand for essential raw materials. The COVID-19 pandemic has engendered a discernible correlation between shipping demand and the economy, thereby precipitating deleterious ramifications on the latter. This is evinced by the oscillating nature of freight rates, which have been subject to fluctuations as a direct consequence of the

aforementioned pandemic. The global economy has been subject to a significant disruption in demand as a result of the COVID-19 pandemic, thereby precipitating a notable decline in the need for transportation services. Furthermore, it is worth noting that there exists compelling evidence indicating that the industry has experienced a significant downturn as a direct consequence of the ongoing pandemic. Specifically, the maritime trade sector has been particularly affected, enduring substantial setbacks attributable to disruptions in the supply chain resulting from scarcities in materials, closures of ports, and a dearth of available labor. In the interim, it is noteworthy to observe that freight expenditures have attained unprecedented levels, thereby engendering substantial ramifications on the phenomena of inflation and the pricing of commodities. Commencing in the initial months of 2020, the COVID-19 pandemic instigated a significant disruption within the realm of maritime shipping, thereby leading to the unfortunate occurrence of sailings being cancelled, delays experienced at terminals, and an insufficiency of containers. The aforementioned disruptions exhibited a heightened degree of severity, specifically in relation to the imports originating from Northeast Asia and destined for the United States. In conjunction with the alterations in demand brought about by the COVID-19 pandemic, the aforementioned disruptions have contributed to a heightened level of instability in maritime freight rates across various geographical areas. Furthermore, they have resulted in noteworthy setbacks in the timely transportation of merchandise imports to the United States. The present chapter is structured into two distinct sections. The initial section delves into an analysis of the inherent characteristics of shipping disruptions that have been instigated by the ongoing pandemic. Conversely, the subsequent section scrutinizes the repercussions that have ensued in relation to freight rates, shipping modes, and the temporal intervals associated with the arrival of merchandise imports within the United States.

Maritime Shipping

The COVID-19 pandemic has had profound implications for the maritime shipping industry, resulting in a discernible influence on the importation of goods. The aforementioned effects can be categorized into two discrete components. During the initial six months of 2020, there was a notable decrease of 7.0 percent in the volume of maritime container imports in the United States, as compared to the corresponding period in the preceding year. Nevertheless, it is worth noting that there was a noteworthy resurgence in the influx of imported goods during the latter portion of the year 2020. The volumetric analysis indicates a significant increase of 9.5% in the importation of containerized goods during the latter half of the calendar year 2020, when compared to the corresponding time period in the preceding year of 2019. Moreover, it is worth noting that a significant increase of 16.4% was observed in a year-on-year comparison, specifically within the confines of the fourth quarter.

The discernible escalation in the magnitude of merchandise imports into the United States during the latter portion of 2020 has given rise to a commensurate increase in the importation of maritime shipping and port services that are intricately connected to these imports. Based on the extant data pertaining to merchandise trade in the United States, it is discernible that the notable escalation in the influx of maritime freight services during the third and fourth quarters of the year 2020 can predominantly be ascribed to a significant surge in trade endeavors with the Asian region, with a particular emphasis on the nation of China. The data elucidates a conspicuous upsurge of 16.5 percent in the valuation of maritime freight transport services imported by the United States during the latter portion of 2020, when juxtaposed with the corresponding temporal interval in the antecedent year. In a comparable manner, within the latter portion of the calendar year 2020, there was an observable increase of 3.5 percent in the United States' outbound shipment of port-related services. The aforementioned services are concerned with the procurement of goods and services by international maritime vessels upon their arrival at ports within the United States.

Decreased Container Shipping Capacity

In reaction to a fall in US merchandise trade and a slowdown in Chinese manufacturing, container shipping companies cancelled scheduled sailings, sometimes known as "blank sailings," and consolidated shipping routes to focus service on major ports in the first half of 2020. Consequently, transportation companies successfully reduced expenses and alleviated the negative impact of excessive capacity on the pricing of freight. According to the plans formulated in June 2020 by the three largest container shipping alliances, namely THE Alliance, 2M Alliance, and Ocean Alliance, a total of 126 planned voyages between Asia and North America, as well as an additional 94 voyages between Asia and Europe, are expected to experience delays until the end of August 2020. Container shipping companies canceled more than one thousand voyages during the initial six months of 2020. The spot rates for maritime freight demonstrated stability following the outbreak of the COVID-19 pandemic, reaching a level slightly higher than that of 2019 by the middle of 2020. This trend was anticipated by businesses due to expectations of diminished global trade and a prolonged economic recuperation. The latter part of 2020 witnessed a significant increase in maritime freight costs attributed to the resurgence of global trade, surpassing the existing shipping capacity. This phenomenon will be elaborated further in subsequent sections.

During the latter half of 2020, the maritime freight industry is anticipated to encounter capacity constraints due to a surge in merchandise trade resulting from heightened economic activity and consumer demand. During this period, the container transportation industry made efforts to restore its capacity to levels observed prior to the crisis. The increase in online sales has resulted in a significant rise in Asian imports into the United States during the month of December 2020, exhibiting a nearly 30% growth compared to the corresponding period in December 2019. The quantity of transportation containers utilized during the latter part of 2020 proved inadequate in meeting consumer storage requirements, while the demand for imports exceeded initial projections. The surge in demand unexpectedly posed a significant challenge for businesses in terms of effectively delivering their products to customers. Maersk, a prominent multinational shipping

corporation, has made a forecast indicating an extended duration of reduced demand commencing in the year 2020. Towards the conclusion of the fourth quarter, container transportation companies had reached a state of near-maximum capacity. The proportion of blank sailings experienced a notable decrease, decreasing from 21% in May 2020 to a mere 1% by October 2020. The heightened global demand for maritime freight transportation necessitated container ships to operate at near-maximum capacity, thereby resulting in a decrease in container availability at significant port locations.

The unequal distribution of containers throughout the distribution network worsened the shortage of these containers. During the initial stages of the COVID-19 pandemic, there was a noticeable decrease in the number of orders placed for the production of new containers, which was accompanied by a corresponding decline in the demand for containers. Consequently, certain containers were repurposed for the purpose of long-term storage. The growth in containerized imports within the United States during the latter half of 2020 surpassed initial projections, outpacing both the demand for eastbound exports and the production of shipping containers. Consequently, it was observed that shippers accorded utmost importance to the allocation of transportation containers for the purpose of facilitating the movement of imported goods, primarily originating from the Asian continent, with a particular emphasis on China. The temporal duration required for a receptacle to complete a voyage and undergo the necessary preparations for subsequent loading has witnessed a notable augmentation, particularly in trade routes characterized by substantial transactional volume linking the northern regions of Asia with the western coastal areas of the United States.

COVID-19's Influence on Transportation Personnel

The elevated rates of COVID-19 infection among port personnel have posed significant obstacles to the smooth functioning of port operations, consequently impeding the efficient transfer of cargo between maritime vessels and terrestrial facilities. As a result, the ports underwent a transformation into critical junctures, wherein the accumulation of containers impeded the efficient process of cargo handling and transfer. It is plausible to posit that the efficacy of port operations may have experienced a diminution in light of the implementation of revised health

regulations and alterations in labor circumstances. Furthermore, it is worth noting that the presence of labor shortages has had a significant impact on the intricate web of global supply chains. The onshore transportation systems, namely rail and trucking, encountered a dearth of labor, thereby impeding the timely delivery of commodities and augmenting expenses.

The COVID-19 pandemic has had a detrimental impact on international travel for maritime personnel, resulting in a deceleration of movement and an escalation in labor expenses within the maritime industry. Consequently, this has exacerbated the hindrance of the global trade of goods. In light of the global dissemination of the COVID-19 pandemic, numerous governmental bodies have implemented measures such as travel limitations and quarantine protocols, thereby impeding the free movement of labor within the maritime industry. According to estimations provided by the International Labour Organization, it is anticipated that a substantial number of 800,000 seafarers will encounter significant challenges in terms of embarking or disembarking their respective vessels in the year 2020. Commencing in the month of May in the year 2020, several nations shall authorize the operation of charter flights within pre-established "safe transit corridors." This shall facilitate the movement of seafarers, enabling them to journey from their respective countries of origin to designated ports, thereby mitigating the hardships faced by their fellow seafaring brethren. The aforementioned factors contributed to the escalation of labor expenditures, particularly in relation to the provision of hardship remuneration to offset the predicament faced by workers marooned on vessels, augmented travel outlays for the purpose of relocating personnel, and the financial burden incurred due to COVID-19 testing and quarantine protocols. Based on the findings of a singular source, it has been posited that augmented labor expenditures shall yield a notable upsurge of 6.2% in the domain of maritime personnel costs during the forthcoming year of 2020.

The effect of Shipping Disruptions on Freight Transportation Prices

The emergence of the COVID-19 pandemic in the latter part of 2020 resulted in a notable increase in maritime freight expenses originating from Northeast Asia. Due to a decline in global demand, shipping companies opted to cancel pre-arranged shipments, leading to instances of blank sailings during the initial half of 2020.

Therefore, it is crucial to recognize that the current prices in the shipping industry exhibited a noticeable level of resilience in the face of the unprecedented challenges brought about by the COVID-19 pandemic. Nevertheless, it is imperative to recognize that the escalation in shipping expenses commenced in June 2020. The aforementioned phenomenon can be attributed to the resurgence of consumer demand for a wide range of goods, the scarcity of containers, and other factors that have been previously explained. The study conducted by Freightos indicates a notable upward trajectory in the weekly index price for container transportation from China to the North American West Coast. The observed phenomenon exhibits a notable surge of 178 percent, leading to a significant rise in monetary value amounting to $2,676 per container. The temporal analysis pertains to the time frame spanning from January to December of the year 2020. The discernible influence of escalated transportation expenses on enterprises has resulted in certain entities withdrawing from the market, while also inciting modifications in inventory management strategies.

When examining the financial value per unit of weight, it is important to highlight the three sectors that have experienced notable increases in insurance and freight costs originating from Northeast Asia. The industries mentioned above include apparel and textiles, which experienced a significant increase of 25 percent compared to the previous year. Following this, there was a significant growth of 16 percent in the minerals and metals sector, whereas the chemicals and allied products industry observed a noticeable increase of 13 percent. The increase in shipping costs related to textile and apparel can primarily be attributed to the increased demand for Personal Protective Equipment (PPE) in response to the ongoing COVID-19 pandemic. The United States started buying significant amounts of personal protective equipment (PPE) in the spring of 2020. The rapid and significant increase in demand for air freight services specifically created for the transportation of personal protective equipment (PPE), along with an observable drop in the accessibility of passenger flights, served as the impetus for this endeavour. Consequently, the aforementioned circumstances led to a substantial escalation in the expenses related to transportation. The rise in transportation expenses associated with textiles and apparel was primarily observed during the initial six months of the year, but remained prevalent during the subsequent half as well (refer to figure 3.4).

In contrast, it is important to note that the increase in transportation costs for various goods was predominantly observed in the latter part of the year. During the aforementioned time frame, there was a significant rise of 23 percent in the demand for chemicals and their corresponding products. In a similar vein, there was a notable increase of 22 percent in the expenses associated with minerals and metals.

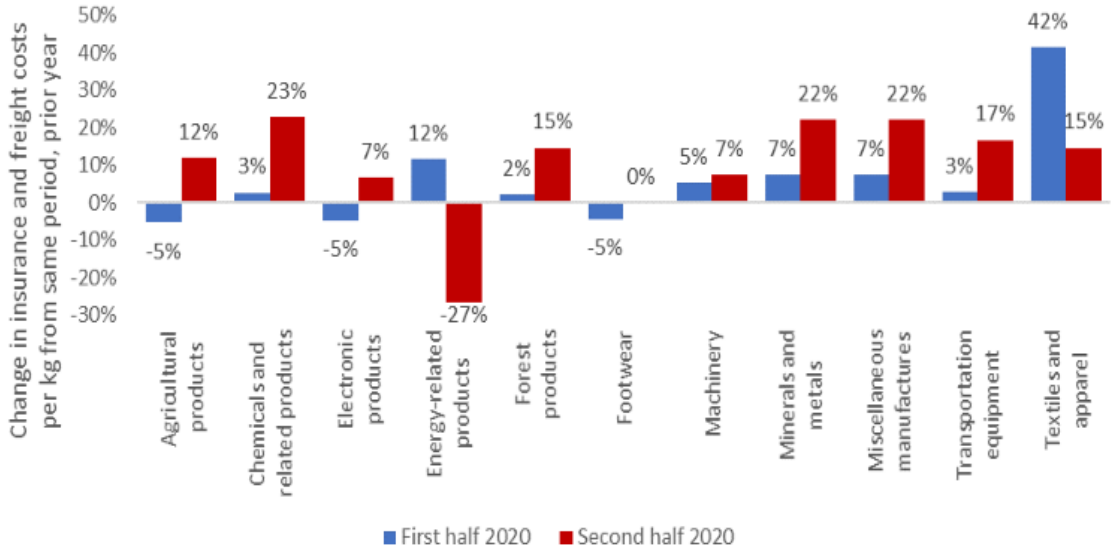


Figure 3.4: Change in insurance and freight expenses per kilogram compared to the same period the previous year, U.S. imports from Northeast Asia, 2020.

Sources 1: IHS Markit, "Global Trade Atlas Database," accessed May 20, 2021; DataWeb/Census, accessed August 19, 2021.

Source 2: The Impact of the COVID-19 Pandemic on Freight Transportation Services and U.S. Merchandise Imports | United States International Trade Commission.

Notes: The data in this graphic are based on DataWeb import costs for all means of transportation from Northeast Asia and official statistics from Global Trade Atlas on the volume of imports in kg by air and vessel. These figures may slightly overestimate import costs because import charges are not accessible per transport mode for these data, reflecting import charges for means of transport other than air and vessel. However, only 6% of yearly imports (by value) did not arrive by air or sea between 2016 and 2020.

The Effects of Higher Shipping Costs on the Value of Imported Goods

The implications of heightened shipping costs on the assessment of imported goods.

The allocation of financial resources towards the costs related to shipping constitutes a relatively insignificant portion of the overall value of imports. Furthermore, there was a moderate nature observed in the rise of the proportion of

the import value that was allocated towards shipping expenditures. When taking into account the inclusion of duties and taxes, the energy-related products category exhibited a significant rise in insurance and freight expenses compared to the total value of imports. The expenses related to insurance and freight for energy-related goods originating from Northeast Asia demonstrated a rising pattern, with an increase from 4.4 percent to 5.7 percent in relation to the total import value. However, it is imperative to recognize that this increase can primarily be attributed to substantial reductions in the prices of energy commodities, rather than an increase in freight expenses. A significant rise was observed in the forest products sector, specifically in the expenses associated with insurance and freight. This increase resulted in the proportion of these expenses to the total import value increasing from 6.9 percent to 7.8 percent. Nevertheless, it is crucial to emphasize that these expenditures demonstrated a favorable trajectory over the course of the year, particularly in the final quarter of 2020 when compared to the corresponding period in 2019. It is noteworthy to highlight that there was a significant rise in costs across various sectors for imports originating from Northeast Asia. The forest products sector demonstrated a significant increase, experiencing a rise from 7.0% to 8.5%. In a similar vein, there was a notable upward trajectory observed in the domain of minerals and metals, as indicated by a rise from 5.4% to 6.6%. Within the domain of apparel and textiles, a discernible upward trend was observed, characterized by an increase from 4.3% to 5.3%. In addition, there was also an observed increase in the utilization of machinery, which rose from 3.5% to 4.5%.

The effect on Ports

The observed disturbances in the flow of goods can be ascribed to the influence of the COVID-19 pandemic on ports within the United States. The total volume of goods processed at seaports in 2020 demonstrated a degree of resemblance to that of the previous year, 2019. Nevertheless, the analysis of consecutive changes within a year-to-year framework made it difficult to perceive a V-shaped pattern, which consisted of a sharp decrease followed by a significant recovery in monthly fluctuations over the duration of 2020. The monthly volumes experienced a decrease during the first half of the six-month period, followed by a subsequent increase in the latter half. The data that has been observed indicates a significant

decrease in the monthly volume of 20-foot equivalent units (TEUs) from January to March in the year 2020. More precisely, a significant decline of 17.5% was observed in the metric mentioned earlier, as the volume decreased from 3.7 million TEUs in January to 3.1 million TEUs in March. The monthly volume remained relatively stable until June, when it began to show a noticeable increase. There was a significant increase of 34% in the number of containers managed over the following four-month timeframe. This increase resulted in a rise from 3.3 million twenty-foot equivalent units (TEUs) in June to 4.4 million TEUs in October. The elevated level of container handling remained consistently present until the end of the year. The three ports that have demonstrated the most significant monthly increases in volume are Los Angeles, Long Beach, and New York and New Jersey.

The occurrence of delayed delivery of merchandise was a direct consequence of disruptions that occurred within the maritime shipping sector. Moreover, it is important to acknowledge that the frequency of delayed freight deliveries demonstrated a greater prevalence and a longer-lasting persistence during the calendar year 2020 in comparison to the previous year of 2019. The occurrence of extensive delays was noted, which had implications not only for the international supply chains of well-known American retailers and small businesses involved in importing finished products and intermediate parts, but also for maritime shipping, cargo handling facilities, and land-based transportation systems. The prolonged and more frequent occurrences of delays led to a decrease in corporate inventories and a slowdown in the delivery of goods to customers.

4. The War in Ukraine and its effects on Maritime Market

The ongoing conflict in Ukraine has significantly impeded trade and logistics operations within Ukraine itself, as well as in the broader Black Sea region. The pursuit of alternative trade routes for Ukrainian products has precipitated an intensification in the requisition for land and maritime transportation infrastructure and services.

The commercial partners of Ukraine are currently compelled to procure numerous commodities from more distant locations. The global demand for vessels has experienced a notable surge, consequently leading to a commensurate rise in the cost of international transportation. In light of the prevailing influence exerted by the Russian Federation and Ukraine within the agrifood sectors, coupled with the consequential significance of grains in ensuring food security and alleviating poverty, it is imperative to underscore the pertinence of grains in this context. Since the onset of the year 2020, there has been a discernible escalation in both grain prices and transportation expenses. However, it is imperative to note that the ongoing conflict in Ukraine has significantly intensified this prevailing pattern, thereby negating a transitory downturn in shipping expenditures. During the temporal span encompassing the months of February to May in the year 2022, a substantial escalation of approximately 60 percent was observed in the expenditure associated with the conveyance of dry bulk commodities, notably including but not limited to grains. The simultaneous escalation of grain and shipping expenses would result in a substantial rise of approximately 4% in global consumer food prices. Approximately 50% of this phenomenon can be attributed to the escalation in transportation expenses.

The Russian Federation holds a prominent position on the global stage as a formidable force in the fuel and fertilizer sectors, both of which play a vital role as indispensable inputs for agricultural practitioners worldwide. Supply disruptions can have detrimental effects on grain yields, leading to a decrease in production and subsequently causing an increase in prices. This situation poses a significant threat to global food security, especially for economies that are vulnerable and heavily reliant on food imports.

Moreover, it is worth noting that the Russian Federation holds a prominent position as a notable exporter of hydrocarbons and natural gas. In light of trade limitations and logistical impediments, there has been a discernible escalation in the expenditure associated with oil and gas. This can be attributed to the pursuit of alternative supply sources, often situated in geographically distant areas. The escalation in energy

expenditures has precipitated a concomitant surge in the valuation of maritime bunkers, thereby engendering a commensurate augmentation in shipping expenses across the entirety of the industry. From the onset of the current year, it has been observed that the global mean value pertaining to very low sulfur fuel oil (VLSFO) has undergone a notable escalation, amounting to a substantial 64 percent surge as of the conclusion of May in the year 2022. Upon amalgamation, the cumulative effect of these expenditures culminates in elevated price points for consumers, thereby posing a potential risk of intensifying the existing socioeconomic inequality.

The intricate web of global trade is heavily dependent upon an intricate network of maritime ports and vessels that traverse the vast expanse of our planet. In order to facilitate the smooth progression of global trade, it is imperative that Ukrainian ports maintain their accessibility to international shipping. Furthermore, it is crucial for transportation stakeholders to sustain their collaborative efforts in order to ensure the provision of requisite services. Furthermore, it is imperative to conduct a thorough examination of alternative modes of transportation. Furthermore, it is imperative to promote support for economies that are particularly susceptible to vulnerability, while also advocating for investments in the enhancement of transportation systems and the facilitation of commerce.

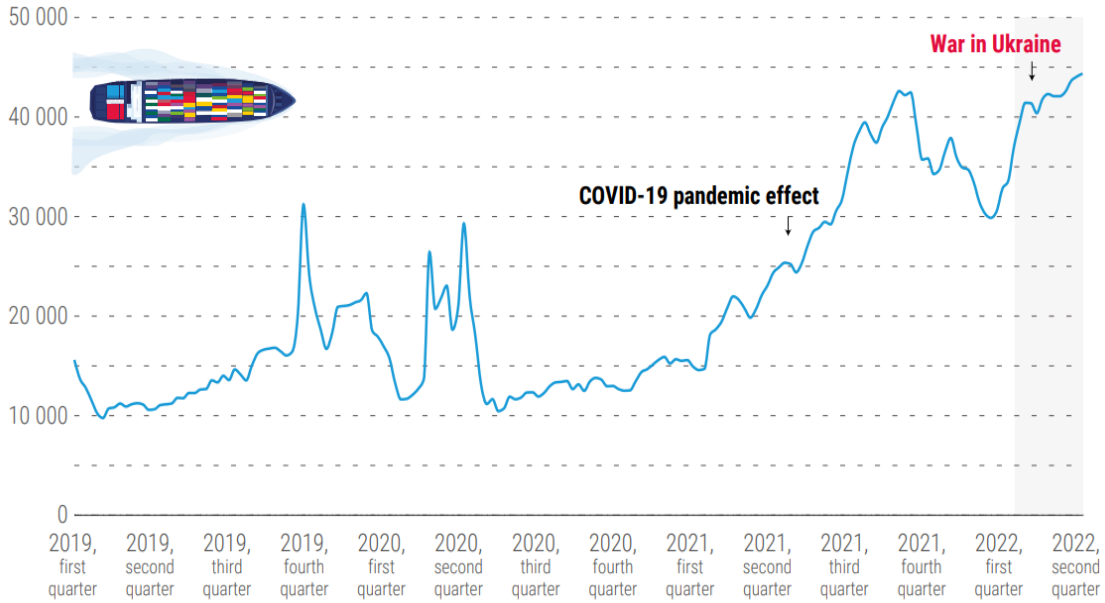
4.1. Shipping costs are rising.

The logistical challenges in the Black Sea region have been exacerbated by a multitude of factors, including regional disruptions in logistics, the suspension of port operations in Ukraine, the severe impairment of critical infrastructure, the imposition of trade restrictions, the escalation of insurance premiums, and the escalation of fuel costs. Furthermore, their contributions have resulted in an escalated financial burden and a precarious state of affairs in the realm of global trade and transportation. Numerous nations have been compelled to explore more distant territories in order to fulfill their requirements for hydrocarbon, gas, and grain resources. Consequently, there was an observable escalation in shipping distances, transit durations, and associated expenditures.

The attribution of all advancements in the realm of global shipping to a singular causative factor is deemed implausible. In conjunction with the ongoing COVID-19 pandemic, the phenomenon of port congestion, and the imperative to shift

towards low-carbon fuels, among other pertinent matters, it is noteworthy to acknowledge the Ukrainian conflict as a significant factor exerting influence on the realm of global maritime transportation. However, it is apparent that the disruptions caused by the Ukraine war and the subsequent surge in demand for ton-miles significantly contribute to the escalation of shipping costs (figure 1).

Figure 1. The price of shipping is rising again
Clarksea index in dollars/day, all shipping markets



Source: 1) UNCTAD, based on data provided by Clarksons Research Shipping Intelligence Network, 2) Maritime Trade Disrupted: The war in Ukraine and its effects on maritime trade logistics (unctad.org)
Note: The series measures average vessel profits across various shipping sectors, such as tankers, bulkers, containerships, and LNG carriers, weighted by the number of vessels in each segment.

The escalating expenses associated with energy serve to compound the challenges faced by individuals involved in the transportation industry. The Russian Federation holds a prominent position as a notable exporter of oil and gas commodities. Nevertheless, the imposition of trade limitations and alterations in trading dynamics stemming from the conflict have engendered a surge in the requisition for ton-miles. The current market conditions have witnessed a significant surge in the daily rates pertaining to smaller tankers, which play a crucial role in facilitating regional oil trade within the Black Sea, Baltic Sea, and Mediterranean Sea.

Moreover, the escalation of energy expenditures has precipitated a concomitant surge in the prices of marine petroleum, thereby engendering a commensurate elevation in the overall expenses associated with shipping. By the conclusion of May 2022, the mean global cost for very low sulfur fuel oil (VLSFO) had escalated to surpass $1,000 per metric ton, exhibiting a surge of 64 percent from the onset of the year. Simultaneously, the average fuel surcharges imposed by container shipping enterprises had undergone an approximate augmentation of 50 percent subsequent to the commencement of the conflict.

4.2. Fewer grain shipments over longer distances lead to higher food prices

Russia and Ukraine are prominent stakeholders in the agrifood market, encompassing the domain of animal fodder. The entity in question bears the onus of overseeing a significant portion, specifically 53%, of the global trade pertaining to sunflower oil and seeds. Additionally, it assumes responsibility for approximately 27% of the worldwide trade associated with wheat.

The Russian Federation and Ukraine collectively account for the importation of over 50% of the total wheat imported by 36 countries. In the year 2021, Ukraine's export volume of cereals amounted to approximately 50 million metric tons. Antecedent to the commencement of the conflict, a prevailing expectation had been established, positing a projected augmentation of 3% in the realm of international maritime grain exports. It is projected that there will be a decrease of 3.8% in the year 2022. It is projected that there will be a decrease of 7% in worldwide shipments of fertilizer and its constituent elements, including potassium, in the year 2022.

The partial mitigation of the decline in Ukrainian grain exports was achieved through the augmentation of shipments from diverse suppliers. According to projections, there is an expectation that Brazil's export volume of wheat and coarse grains will witness a substantial growth of 37% in the year 2022. It is anticipated that in the upcoming year, there will be a rise in export volumes for both the United Kingdom of Great Britain and Northern Ireland, as well as the European Union. The projected increase for each entity is estimated to be 8%. It is anticipated that the countries of Argentina, Brazil, and the United States of America will witness an

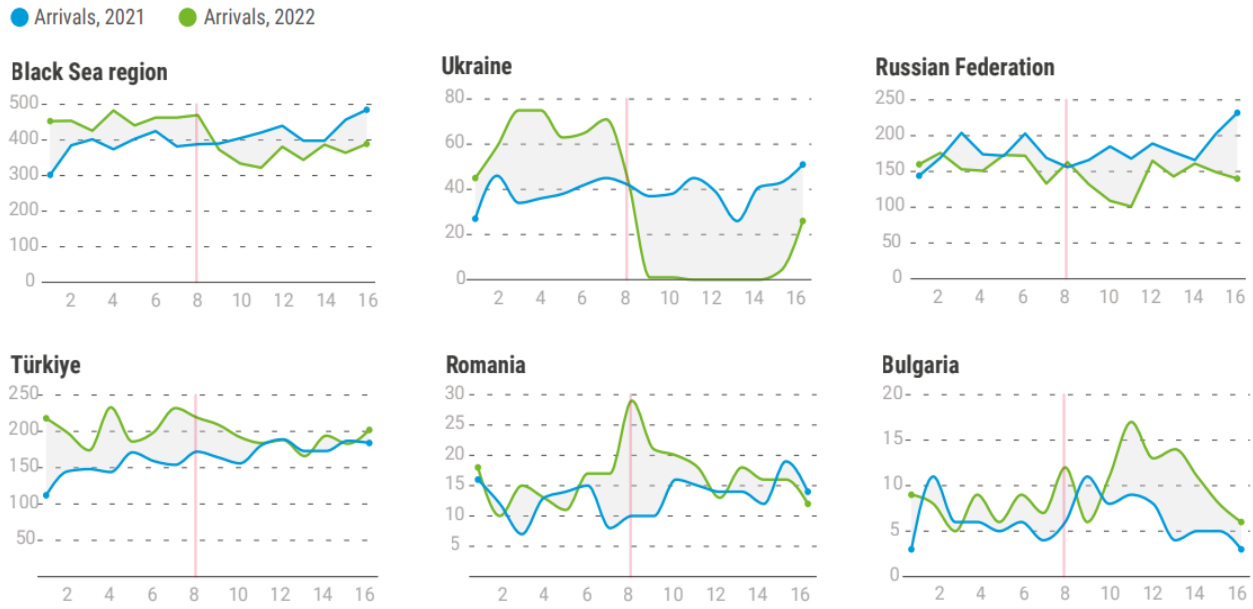
increase in their individual volumes of soybean exports. It is anticipated that Australia, Brazil, and the United States will function as compensatory suppliers to offset the decrease in grain exports to North Africa and the Middle East in the foreseeable future. As the sourcing of alternative cargos from more distant locations becomes prevalent, it is expected that the demand for transportation services, specifically in terms of ton-miles for countries reliant on food imports, will rise, even in the face of a decrease in overall shipping volumes.

Changing ports of call and logistical difficulties

The port calls of dry bulk vessels in the Black Sea serve as a manifestation of the alterations observed in grain trading patterns. Throughout history, it has been observed that the ports situated along the Black Sea have played a pivotal role in facilitating the transportation and exportation of Ukrainian grain, accounting for a significant proportion of over ninety percent. As a consequence of the discontinuation of port activities, the transportation of grain on an international scale has been limited exclusively to the western borders, railways, and the relatively smaller ports along the Danube River, namely Reni and Izmail. The aforementioned alternatives fail to adequately substitute the operational capabilities typically offered by the ports situated in the Ukrainian Black Sea region.

Since the commencement of hostilities, the frequency of maritime visits to Ukrainian ports has experienced a significant decline, plummeting from a weekly average of sixty to an almost negligible figure. Conversely, there has been a slight upward trend in the number of port calls observed in the Russian Federation and Turkey. During the intervening period, there has been a slight uptick in dry bulk vessel visits to ports in Bulgaria and Romania, suggesting a potential diversion of Ukrainian maritime traffic (figure 2).

Figure 2: The changing pattern of port calls of dry bulk in the Black Sea region
Number of port calls of dry bulk in the Black Sea region, by week, 2021 and 2022



Source: 1) UNCTAD, based on data provided by Marine Traffic, 2) Maritime Trade Disrupted: The war in Ukraine and its effects on maritime trade logistics (unctad.org).
Note: The Russian Federation and Turkey encompass ports that extend beyond the confines of the Black Sea region. The Black Sea region encompasses a multitude of countries, including Georgia and the Republic of Moldova, which stand as notable representatives within this geographical area. The vertical lines observed in Week 8 serve as a symbolic representation denoting the initiation of hostilities in the year 2022. A portion of grain is transported via railway infrastructure originating in Ukraine and subsequently redirected to ports located in Bulgaria and Romania for further handling and transfer. Nevertheless, it is imperative to acknowledge that the current grain storage capacity has already been allocated to accommodate the harvest of the previous year. This predicament gives rise to apprehensions regarding the potential inability to store the forthcoming harvest, consequently leading to its potential deterioration.

4.2.1. Logistical difficulties for the Ukrainian harvest

Numerous grain elevators situated within the geographical confines of Ukraine are regrettably confronted with an inherent inability to execute essential pest control measures, effectively safeguard the grain from the detrimental effects of precipitation, or engage in the necessary agitation processes to avert the perilous occurrence of self-heating. Consequently, this lamentable state of affairs significantly augments the susceptibility of the grain to undergo a deterioration in its overall quality. In the event that the capacity for export transportation continues to be limited, there arises an element of uncertainty surrounding the forthcoming harvest, thereby amplifying the potentiality of a food scarcity. The expeditious resumption of Ukrainian seaports, even if prompted, may prove tardy for a segment of the forthcoming agricultural season in 2022, given the potential dearth of logistical infrastructure and human capital.

The vast majority of Ukraine's grain exports undergo processing at seaports situated along the Black Sea and the Sea of Azov. The departure of commercial vessels, particularly those engaged in the transportation of grains and other agricultural commodities, is currently impeded at port facilities. The ongoing military operation in Ukraine, apart from its detrimental effects on logistics and infrastructure, carries both immediate and potentially enduring ramifications for the worldwide trade of grains and oilseeds, as well as the provision of these essential commodities to susceptible regions such as Africa, Asia, and the Middle East.

The restoration of secure access to infrastructure for grain production and transportation holds paramount importance in ensuring the welfare of Ukrainian farmers and producers. The imminent reaping of winter wheat and the subsequent cultivation of spring grains and oilseeds shall render the forthcoming months of utmost significance for the agricultural practitioners in Ukraine. The provision of secure access to fields, along with an ample availability of seeds, fuel, and fertilizers, constitutes a paramount set of prerequisites for Ukraine to effectively ensure domestic food security and make a meaningful contribution to the global food equilibrium.

The imperative to augment mobile storage capabilities necessitates a concomitant integration with the existing railway, road, and waterway infrastructures in Ukraine and its surrounding countries. The presence of diverse rail dimensions and transit procedures persistently impede the unimpeded movement of commercial activities, thereby impeding the smooth flow of commerce due to logistical hindrances. The exacerbation of the logistical crisis can be attributed to various factors, including the presence of competing demands from producers and traders in neighboring countries, the substantial costs associated with insurance, congestion issues, and a notable scarcity of waterway pilots.

Increased freight rates and higher food costs

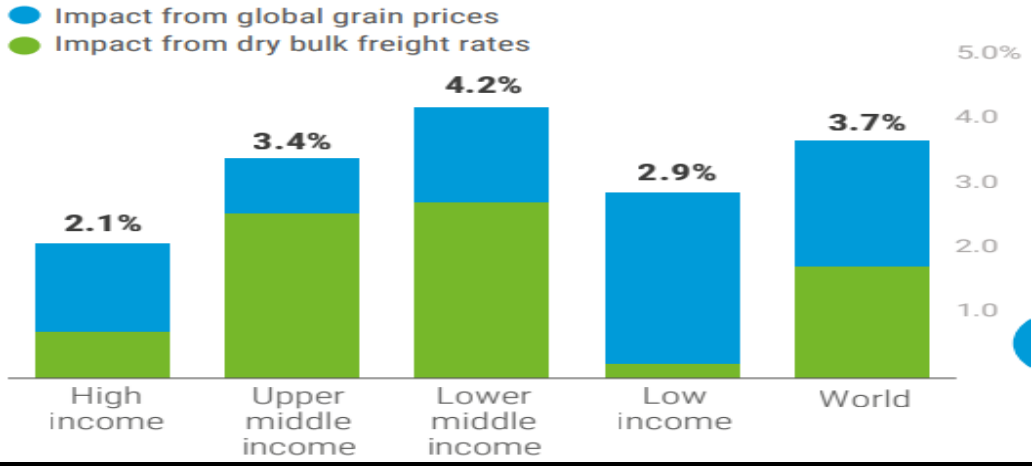
During the temporal span encompassing February to May in the year 2022, it is noteworthy to observe that the Baltic Dry Index, a widely recognized and utilized metric serving as a global standard for evaluating dry bulk freight rates, experienced a notable surge, exhibiting an impressive growth of 59%. The potential outcome of this scenario may result in a notable augmentation of approximately 3.7% in the overall global food prices, thereby impacting consumers. Approximately 50% of the observed surge can be ascribed to escalated transportation expenses resulting from augmented freight rates and extended distances (see figure 3).

Due to their greater dependence on dry bulk transportation for food imports, middle-income economies are projected to encounter marginally elevated escalations in food prices, as compared to the global mean (refer to figure 4). The potential impact of the rise in dry bulk freight rates is expected to be relatively mitigated in economies characterized by lower income levels. Owing to their constrained processing capabilities, the predominant proportion of their food imports predominantly comprises

processed rather than unprocessed food items.

Figure 3: Higher freight rates and grain prices mean higher food prices

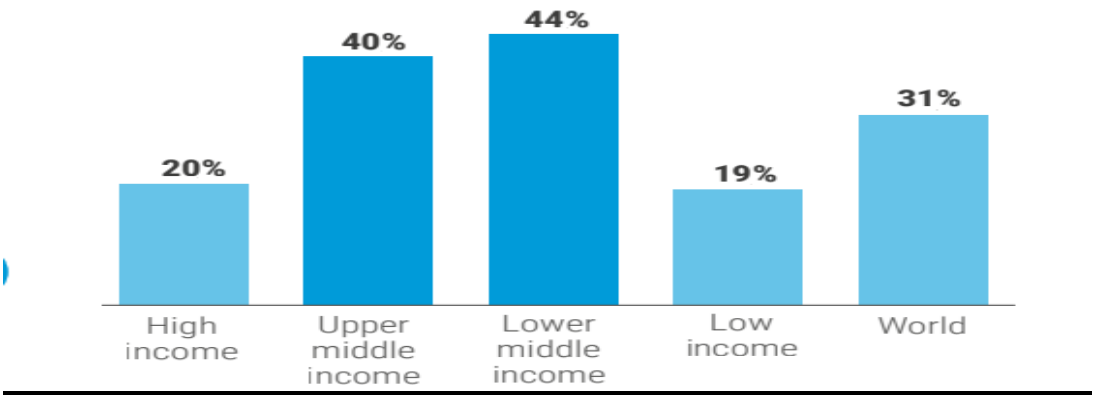
Impact of higher dry bulk freight rates and global grain prices on consumer food prices, selected country groupings



Source: UNCTAD, Maritime Trade Disrupted: The War in Ukraine and its Effects on Maritime Trade Logistics (unctad.org), based on information provided by Clarksons Research Shipping Intelligence Network, IMF, International Financial Statistics, Direction of Trade Statistics and Consumer Price Index, UNCTAD Statistics and the World Bank, World Integrated Trade Solutions, Commodity Price Data and A Global Database of Inflation.

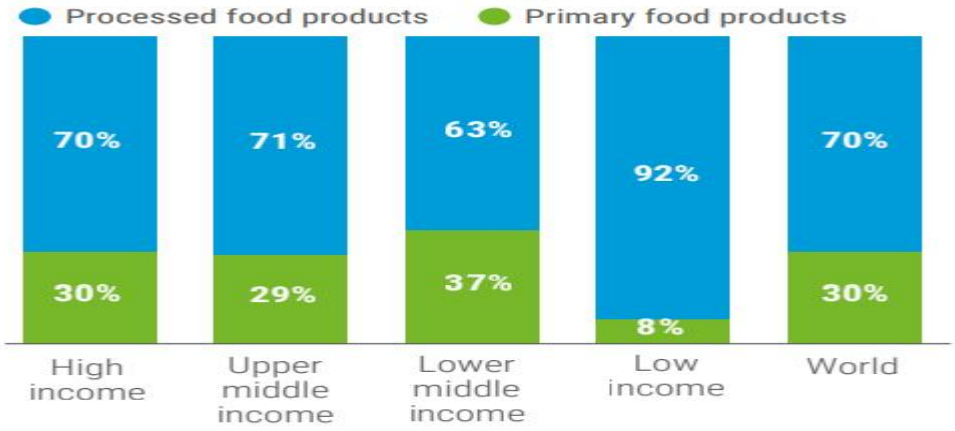
Figure 4: Middle-income economies are more dependent on ships to import grains

Share of grains imported by dry bulk ships in total food imports, selected country groupings, 2019



Source: 1) UNCTAD, based on data provided by Sea/Live (https://www.sea.live/) and the Food and Agriculture Organization of the United Nations, food balances, 2) Maritime Trade Disrupted: The war in Ukraine and its effects on maritime trade logistics (unctad.org)

Figure 5: Low-income countries depend more on processed than primary food products in food imports.
Share of primary and processed food products in food imports mainly for household consumption, selected country groupings, 2020



Source: 1) UNCTAD, based on data provided by Sea/Net and FAO and World Bank Integrated Trade Solutions, 2) Maritime Trade Disrupted: The war in Ukraine and its effects on maritime trade logistics (unctad.org).

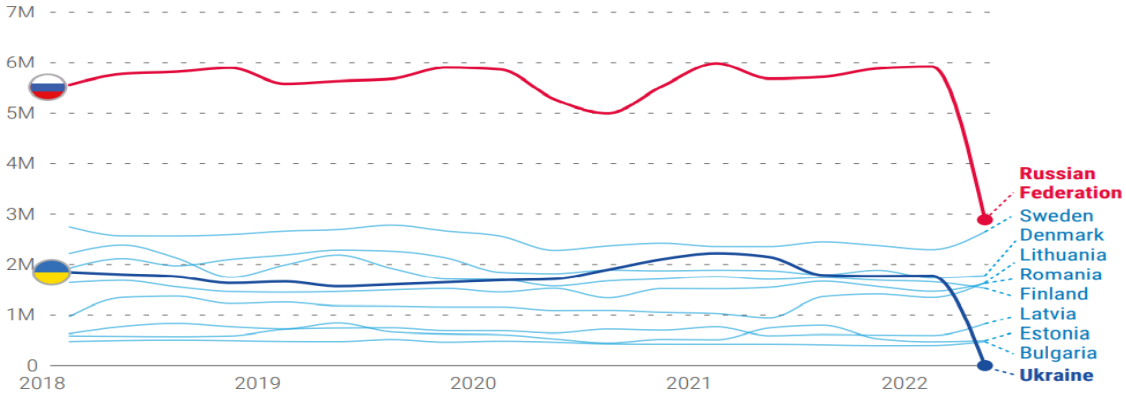
4.3. Container shipping and global value chains are also being affected.

Despite the limited integration of Russia and Ukraine into global container shipping and value chain networks, it is evident that the ongoing conflict and trade restrictions have exerted a discernible impact on this particular sector of the shipping industry. In Figure 6, we observe a graphical representation illustrating the phenomenon of container carriers diminishing the assigned ship capacity within the Russian Federation and ceasing their operations at seaports located in Ukraine. Several contiguous countries experienced a marginal augmentation in the quantity of vessels moored within their respective harbors.

Due to the closure of ports and the suspension of cargo transportation to the Russian Federation and Ukraine, vessels and containers underwent rerouting measures. Cargo destined for Russia and Ukraine is accumulating at various ports, namely Hamburg in Germany, Rotterdam in the Netherlands, Constanța in Romania, and Istanbul in Turkey. The current situation of delays is exerting a significant impact on shippers, thereby leading to an anticipated escalation in the imposition of detention and demurrage fees at various terminals. The cargo originating from the Russian Federation is currently experiencing a state of

immobilization in various ports across the world, including those situated in Europe. The aforementioned phenomenon engenders a heightened level of strain on the infrastructure of warehouses and storage facilities, consequently leading to an escalation in expenses. In light of the ongoing pandemic, it has been observed that there has been a notable surge in freight rates. This can be attributed to the necessity of repositioning ships and containers amidst the prevailing conflict, thereby exerting additional upward force on the rates.

Figure 6: Going down: container shipping deployment for the Russian Federation and Ukraine
Container shipping fleet deployment, selected countries, in TEU capacity.



Source: 1) UNCTAD, based on data provided by MDST Transmodal, 2) Maritime Trade Disrupted: The war in Ukraine and its effects on maritime trade logistics (unctad.org).
Note: TEU capacity is the annualized vessel carrying capacity in twenty-foot equivalent units.

According to the United Nations Conference on Trade and Development (UNCTAD), it is anticipated that the elevated expenses associated with container freight during the period of 2021-2022 will be transferred to consumers, thereby leading to a discernible augmentation of approximately 1.6% in global consumer prices. Furthermore, it can be inferred that the persistence of elevated freight rates will lead to a notable escalation in the average import price on a global scale, amounting to an approximate surge of 11.9%.

Small Island Developing States (SIDS) exhibit a notable fragility in their trade volumes, characterized by substantial trade imbalances. A prominent illustration of this phenomenon is the prevalent occurrence of empty return trips for ships operating in these regions. Furthermore, the dearth of maritime companies catering to the needs of SIDS exacerbates this situation. Consequently, these states heavily depend on imports of energy and consumer goods to sustain their economies. The

transportation expenditures incurred for the importation of goods are found to be approximately two to three times higher than the prevailing global mean. Sudden Infant Death Syndrome (SIDS) not only engenders augmented transportation expenditures, but also manifests a more pronounced economic repercussion in the face of escalating transportation costs.

4.3.1. Inflationary pressures caused by rising freight rates

The COVID-19 pandemic had a profound impact on the global maritime industry, leading to a substantial decrease in international trade activities. Nevertheless, as the year 2020 drew to a close, a notable resurgence was observed, predominantly within the realms of container and dry bulk transportation sectors. The recovery of maritime trade, characterized by its asymmetry and concentration on containerized trade lanes in the East-West direction, has imposed significant strain on supply chains, ports, shipping operations, and overall trade dynamics. The surge in electronic commerce, limitations in capacity, scarcities in equipment, and the emergence of novel viral infections in specific regions across the globe are anticipated to exert considerable pressure on supply chains throughout the year 2021.

In the year 2022, the persistence of elevated port congestion alongside limited logistics and transportation networks has continued to exert significant pressure. During the temporal juncture spanning from the onset of the global pandemic to the culmination of the calendar year 2021, a discernible escalation of approximately 20% was observed in the median duration of temporal lags experienced by container vessels within port facilities. Modifications were implemented with regards to the augmentation of freight rates, surcharges, service reliability, as well as the mitigation of delays and dwell times. By the conclusion of the calendar year 2020, the rates pertaining to containers had escalated to a magnitude exceeding fivefold in comparison to the corresponding figures observed in the preceding year of 2019. Although there has been a subsequent decline in these rates, it is noteworthy that they continue to persist at an extraordinary level of elevation. The advent of novel disruptions, exemplified by the cessation of manufacturing operations and port activities

in China in the initial half of 2022 owing to the emergence of fresh COVID-19 infections, has compounded the strain on the prevailing system. The issue of cost escalation presents a formidable challenge for merchants and supply chains across the board, with smaller shippers particularly susceptible to the adverse effects. These entities, lacking the necessary resources to absorb the supplementary financial burdens, find themselves in a disadvantaged position when engaging in rate negotiations and securing ship capacity.

4.4. Is there everything that can be done?

In order to facilitate the future facilitation of global trade and ensure the resilience of ports and maritime transport amidst the unprecedented disruptions caused by the pandemic, it is imperative that policy measures be implemented. In consideration of the concerns explicated within this concise memorandum, the United Nations Conference on Trade and Development (UNCTAD) proffers the ensuing sextet of suggestions for effectively mitigating the predicaments encountered in the realm of maritime transportation:

1. The attainment of a viable resolution to the prevailing food crisis remains contingent upon the reintegration of the Ukraine and the Russian Federation's food and fertilizer production into the global markets, notwithstanding the existing conflict.
2. Facilitate the liberalization of Ukrainian port access for international shipping, thereby enabling the efficient exportation of Ukrainian grain to global markets, thereby resulting in a notable reduction in transportation expenses.

The present discourse concerns the notable reduction in transaction costs pertaining to the exportation of food and fertilizer from the Russian Federation.

3. It is imperative to maintain a seamless and uninterrupted collaboration among the flag States of vessels, port States, and the industry at large. This collaborative effort must persist in order to ensure the provision of essential services such as bunkering supplies, sailor health services, and certification of regulatory conformance. This will aid in mitigating the adverse effects on expenditures, insurance premiums, and organizational functions.

4. In order to mitigate the strain on global trade and transit, it is suggested that measures be implemented to provide temporary relief for transportation personnel, thereby facilitating their mobility and transit.

5. It is recommended to allocate additional resources towards the enhancement of trade and transit facilitation, as well as the improvement of transportation services, surpassing the pre-war levels of investment. 6. It is imperative for trading partners and transit countries to accord primacy to pivotal factors that influence the costs associated with international transportation. These factors encompass trade facilitation and digitization, infrastructure development, economies of scale, imbalances, and competition.

7. The imperative at hand is to provide support to the developing nations, encompassing the group of Most Indebted and Heavily Indebted Poor Countries (MICS). Particular attention must be directed towards those nations that possess economies that are highly susceptible to vulnerability, notably the Small Island Developing States (SIDS), the Least Developed Countries (LDCs), and those nations reliant on food imports. The exacerbation of the COVID-19 pandemic and the climate crisis is observed as a consequence of the escalating Ukraine conflict. The provision of financial and technical assistance for trade and transportation facilitation necessitates the involvement of the international community.

5. Conclusion

The primary objective of this study was to discern the geopolitical ramifications on freight rates, with a specific focus on the Ukrainian context. The discourse commences with a comprehensive exposition of the four shipping Markets and the determinants that influence the establishment of freight rates, as well as the dynamics of demand and supply. Subsequently, a retrospective analysis is undertaken to elucidate the principal geopolitical influences on shipping freight rates, thereby furnishing a holistic depiction and establishing a solid foundation upon which the case of Ukraine shall be predicated.

The primary objective of the initial chapter, titled "The four shipping Markets," is to foster the reader's comprehension of the shipping industry through a comprehensive examination of the four interconnected markets. These markets, namely a) the Freight Market, b) The sales and purchase Market, c) the Shipbuilding Market, and d) the Demolition Market, will be thoroughly analyzed to elucidate their interdependencies and intricate associations. The reader is introduced to the notion of a charter party within the realm of the Freight market, which elucidates the three primary contractual arrangements currently prevalent in the shipping industry, namely the time charter, the voyage charter, and the bareboat charter. The domains of sales and purchases in the market, as well as the newbuilding market, necessitate distinct approaches to negotiation and a comprehensive understanding of the subject matter, given the substantial financial implications involved. The demolition market serves as a means for the recycling treatment of vessels that are deemed unsellable in the sales and purchase market.

The second chapter, entitled "Freight rates on maritime shipping markets," assumes a pivotal role in comprehending the intricate mechanisms underlying the formation of freight rates. The chapter presents a comprehensive examination of the various factors that influence the establishment of freight rates in maritime shipping markets. It delves into an in-depth analysis of the demand for maritime transport as well as the supply within the maritime industry. Geopolitical factors constitute a prominent causative element behind the fluctuations and uncertainties observed in the realm of freight transportation. The chapter was brought to a close by elucidating the various tiers of cargo utilizing economic theories, mathematical formulas, and graphical representations.

The third chapter, entitled "A Historical Overview of the Primary Geopolitical Impacts on Shipping Freight," provides readers with the opportunity to comprehend the

ramifications of geopolitical factors on freight rates by means of a retrospective examination of three significant occurrences. Commencing with the onset of World War I, progressing through the subsequent Closure of Suez, and culminating in the contemporary Covid-19 era, this chapter offers a comprehensive retrospective, traversing a temporal spectrum from a bygone occurrence to the most recent phenomenon.

The preceding three chapters serve to orient the reader in anticipation of the ultimate chapter, titled "The War in Ukraine and its Effects on the Maritime Market," wherein an analysis is conducted to assess the ramifications of the ongoing conflict on the shipping industry. The commencement of this discourse is predicated upon the veracity that the expenditure associated with maritime transportation is experiencing an upward trajectory, as substantiated by the empirical evidence proffered by Clarkson's Research Shipping Intelligence Network and the United Nations Conference on Trade and Development (UNCTAD). The subsequent discourse shall delve into the primary alterations observed in the realm of shipping as a direct consequence of warfare. These modifications encompass a reduction in the frequency of grain shipments traversing extended distances, thereby instigating an escalation in the cost of sustenance. Furthermore, the selection of ports of call has undergone a discernible transformation, while logistical challenges have emerged as a prominent concern. Additionally, the domain of container shipping and global value chains has not remained unscathed, as it too has been subject to the ramifications of warfare. Furthermore, within the concluding section of the chapter, the discerning reader shall encounter a compilation of six pivotal suggestions aimed at effectively tackling the multifaceted obstacles encountered within the realm of maritime transportation.

The primary challenge encountered during the course of this research endeavor pertained to the arduous task of ascertaining a contemporaneous standpoint, wherein a conspicuous dearth of pertinent data was readily apparent. Additionally, the onerous endeavor of procuring all requisite documentation necessary for the composition of the final chapter proved to be a formidable undertaking. In order to obtain a comprehensive understanding of the influence of warfare on the volatility of shipping freight rates, it is imperative to undertake a more extensive analysis and conduct future research subsequent to the cessation of hostilities.

In summary, the objective of the thesis has been successfully attained, thereby yielding significant discoveries, given the ongoing nature of the conflict. However, it is imperative to emphasize the significance of conducting thorough research to ascertain the most current and accurate information for the benefit of readers perusing my written composition.

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