

Commodity Derivatives and Risk Management
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Lecture 57
Freight Rate Derivatives

Welcome to the 57th lecture on Commodity Derivatives and Risk Management. And today we are going to discuss different aspects of Freight rate as well as Freight rate derivatives. Now, let us understand what is the Freight market. I am sure all of you must have seen this particular image which got discussed almost for 10 to 11 days during March 2021. As you can see in this image where a particular ship named Ever Given which is operated by Taiwanese shipping corporation Evergreen Marine. And it is a container ship and this particular ship got stuck in the Suez Canal for 6 days, that is during March 23 to 28, 2021. And this was a major discussion point all over the world because it led to a total estimated trade loss of about 54 billion over these 6 days. Because many other ships which were carrying goods in the Suez Canal could not go through and that led to a massive amount of loss resulting to the tune of 54 billion over a period of 6 days. So, from here you can make out what is the extent or size or the scope of the Freight market all over the world. In this context let us understand a little more about or interesting trivia about this particular ship. This ship Evergreen, which was launched in the year 2018, is about 400 meters long. So, I am sure all of you must have run the 100 meters race when you were young or in your in a childhood day. So, you can imagine the length of the ship is 400 meters and the total width of the ship is about 59 meters, and it was carrying a total tonnage of 2,24,000 tons. And basically, it had a carrying capacity of 24,124 TEU. So, TEU stands for 20-foot equivalent. So, this 20-foot equivalent is the standard unit of a container which gets loaded onto a ship. I am sure you must have taken note of the images or pictures of the ships where different containers are getting loaded into the ship and each of these containers can carry different types of goods. And this 20-foot equivalent is the dimension of 20-foot equivalent relates to 20 feet long, 8 feet wide and 8 feet tall. So, you can just from this dimension you will be able to understand what is the size of this particular ship. And in this context please note that the length of the sewage canal or the width of the sewage canal is about 656 feet. And this particular ship got stuck for 6 days. There was lot of discussion, lot of initiative, lot of things happened and finally, because of the high tide and lot of effort by the sewage canal authority this ship got dislodged. And rest of the normal trading activity, Freight activity continued after 28th March 2021. In this context let us understand some more details related to the Freight market. Please note that 90 percent of the world's total export import by volume happens by sea. And when we are talking about export imports, we talk about the word

bulk cargo and the bulk cargo can be two types, it can be dry bulk, or it could be liquid or wet bulk. And when we are talking about dry bulk, dry bulk relates to coal, iron ore, wheat, rice, soybeans, cement, steel etcetera forms the part of the dry bulk cargo. Similarly, wet bulk cargo is crude oil, petrol, diesel, LNG, cooking oil etcetera. And there are different categories or different types of ships that are made also for transporting livestock. So, basically cattle or sheep gets or pigs gets exported from one country to another country and the kind of ships in which the livestock are carried is different. And I have just taken the images of two different ships from the shipping corporation of India limited. As you can see the name of this particular ship is Vishva Ekta and this name is SCI Mumbai. And for every ship there is going to be an IMO number. In the context of IMO numbers please note that the international maritime organization requires every ship has to be given a particular identification number. It is basically our Aadhaar number, it is a permanent number to each ship for identification purposes. And as well as in addition to the number every ship will also have been given a name and the name of the ship has to be very prominently displayed on all sides of the ships. In this context of the freight market please note that a party will be known as a charterer. A charterer is the party who would like to rent or lease a ship for transport of cargo from one place to another. And who could be the charterer? Charterers are the producers, consumers, exporters, importers of bulk commodities. And a charterer can be also another party who could just arrange the goods to be shipped on behalf of a producer, consumer and exporter. So, the charterer can identify sorry a producer or consumer, or exporter of bulk goods can identify another party and that party on behalf of this producer, consumer, exporter can get into the leasing or renting agreement with another party. So, this is a little bit of an introduction to the freight market. Now let us come to what are the different types of contracts which are agreed in between the ship owners as well as charterers. So, charterers and ship owners can enter into voice contracts or contracts of affreightment as well as time charter contracts. Let me repeat there are three different types of contracts one is the voice charter contract, second is the contract of affreightment and third is the time charter contract. So, what exactly is a voice charter contract? In this type of a contract, the charterer, whoever is a producer or bulk exporter or importer that particular charter would like to hire a named ship and for a single voice to carry cargo between a load and discharge port. So, both the charterer as well as the ship owner knows the which origin port to which discharge port the goods will be carried when the journey will start all these will be very clearly negotiated between both parties and normally this voice charter contract is for single journey. So, that is how the word single voice or single voice charter relates to the single voice charter relates to the single journey or single time one the exporter will be, or importer will be exporting or importing the goods. And the payment is done per turn or a lump sum basis and the paid by charterer to the ship owner and please note that all other cost related to the running of the ship which is related to the staffing, the berthing, the loading, unloading and the fuel cost all these will be borne by

the ship owner. So, we can relate this voice charter is equivalent to like we are renting a car for a one day. So, that is example that will be an example of an equivalent of a voice charter contract and please note that the ship owners and the charterers enter into a contract, but normally the requirement of a particular charterer and a requirement of a particular ship owner may not be clearly available to everybody. So, normally charterers and ship owners do the business through an intermediary who are known as your ship brokers. So, these ship brokers are a link between the ship owner and charterers, and they aid in finalizing the different terms of agreement. So, this is an example of a voice charter. Now coming to the next type of a contract which is known as your contract of affreightment and in this type of contract the charterer enters into an agreement with the ship owner for transporting specific good or commodities and the specification such as weight, quantity, delivery destination, time frame for the delivery and the type of ship to be required for delivering the goods all these will be negotiated and it is normally for a medium period of time, but exact date is not mentioned, exact name of the ship is not mentioned, but rest of the information is agreed on between the ship owner and the charterer and please note that the ship owner bears the most cost and charterer pays the lump sum or the per turn basis. Almost a lot of parameters remain same as a voice charter contract while some parameters are different in case of a contract of affreightment. Now coming to the third type of arrangement which is known as your time charter. In this particular arrangement the charterer hires the ship for a specific period of time. So, what the charterer is going to do with the ship, that is decided by the charterer. The charterer basically hires the ship for a specific period of time and all cost basically the fuel cost which is also known as the bunker cost or bunker fuel cost with respect to ships. So, all costs that is bunker cost, crew cost, port cost, loading, unloading cost all these will be borne by the charterer. Please note that all these costs were borne by the ship owner in case of a voyage charter, but in case of a time charter this cost will be borne by the charterer. However, the maintenance of maintenance cost of the ship will still remain with the ship owner and the ship owner has to employ surveyors to check the sea worthiness of the ship and make the necessary maintenance related expenses. So, maintenance of the ship the cost associated with the maintenance of ship which could be significantly high that will be borne by the ship owner while the rest of the cost will be borne by the charterer. And in the case of a charter contract please note that the charterer may carry its own cargo or own goods, or it may relate the particular ship to another party, or it may also export or import the cargo for other companies. Need not necessarily that the charterer will always be carrying its own goods, it can carry somebody else's goods, or it can relate the ship to another party for making a profit. In this context I would also like to draw your attention to the fact that the bunker fuel cost is considered as the one of the most significant operating costs for cargo shipping operations. So, out of all running costs operational cost the cost associated with the bunker fuel is significantly high. In this context, please see that very recently on December 21, 2022, Gas authority

of India Limited signed a time charter contract for an LNG vessel that is liquefied natural gas vessel with MOL. So, the counter party is Mitsui O.S.K lines limited. So, Gail entered into a contract with the counter party for a time charter for a new liquefied gas carrier. So, the new LNG gas vessel is currently being constructed and once the construction will be over the reusing over for a long period of time will be done by the gas authority of India Limited. And then it is up to the gas authority of India Limited whether to ferry export or import the LNG for its own requirement or it can also use the same ship to transport LNG for any other customer or any other any other party. Now with the with the context of naming of the ships please note that the naming of ships is a mandatory requirement. It is not that the ships are named because we like the ships to be named. So, registration and naming of the ships this policy is governed by the United Nations Convention on Condition for Registration of the ships. So, every ship has to have a registration number every ship also has to have a name and in the context of ship registration in India we have four registry offices, five registry offices at five different places, five different ports in India that is Mumbai, Calcutta, Cochin, Chennai and Mar Magua. These five ports have the offices of the registry, and each port registry appoints a registrar of Indian ships and that particular unit or that particular body keeps record of every ship in terms of the name of the ship, the description of the registered owner, who is the owner of the ship, the builder's name, the certification related to sea worthiness. This is a very important component of marine seas that periodically the seas have to be audited and vetted and the certification of sea worthiness has to be received before the seas can embark any journey. And the director general of shipping in India maintains a central registry containing all records maintained by these five ports of registry. And in the context of naming ships for example, the shipping Corporation of India has some ships like Desh, Saman, Vishva Ekta, Desh Vishaal and so on so forth. Now coming to the cargo ship sizes, please note that the sizes of the cargo ship can be very different. So, the ship or sizes of these cargo ships are measured in a in a dead weight tonnage or DWT capacity and the DWT or dead weight tonnage is nothing, but the weight of the cargo alone and does not include the weight of the ship. So, a ship could be considered as a handy size if it is able to carry goods from 20000 to 40000 dead weight tons. As you can see the SHIPs can be handy size Supramax, Panamax, Cape size and China max. So, when we are talking about Panamax, Panamax are those ships which will have a dead weight capacity of 65000 to 80000 and who these ships can travel through the Panama Canal and because the canal has certain length and width etcetera. So, obviously, the Panamax ship will also have a size restriction. Similarly, Cape size ships will be those ships which normally sell via Cape of good hope hence the word Cape size and China max, China max will have the 380000 to 400000 dead weight tonnage capacity and these dimensions are also limited by the port infrastructure in China. So, this handy size Panamax, Cape size etcetera relates to the dry bulk cargo ships. Now when it comes to wet cargo, wet cargo is normally transported in tanker form and based on the again dead

weight capacity tankers can be categorized as a small handy size medium and large. And in the context of carrying crude oil and asphalt please note that there were special ships which carry this crude or asphalt and once a ship carries this crude oil or asphalt no other oil or no other liquid can be transported in those ships and those ships remain as a crude carrier as long as these ships fly, they will remain as a crude carrier. And in the context of crude carrier, we can have very large crude carrier or VLCC or we can also have a ULCC which is your ultra large crude carrier and specific tonnage dead weight tonnage is mentioned here. With respect to the freight rate, we have to understand the role of a Baltic exchange. So, this particular exchange is very old in fact, this is one of the oldest living exchanges in the world. It started its operation in the year 1744 and this particular exchange remains in business even today. And this Baltic exchange is a London based exchange. It started as I mentioned 1744 and it started at a coffee house where ship owners and merchants gathered to transact business. So, in the olden days I am sure that a lot of transactions and a lot of international export, imports, whatever was happening it was predominantly through the through the sea route. And during 1744 around that point in time ship owners and merchants used to come to a common place and negotiate the price at which they will be leasing the ships. And from there the Baltic exchange derives its history and this exchange right now provides maritime shipping information to its members, and it publishes many indexes. Please note one of the most important activities of the exchange is that it collates information related to the freight rate that how many ships which ship is being is being leased by which party at what rate. So, it collects that information, and it publishes many indexes. And please note that the indexes are estimates of cargo rates that are moving cargo of raw materials across seas by leading ship brokers. Please note that the rates which it collates from various parties that rate comes from the ship brokers it does not collect the rate from the ship owners or the charterers. And in the context of shipbroker please note that ship breaking is different than a ship broking. Ship breaking is literally physically dismantling or breaking a ship. But ship broking is a business in which a party will be bringing ship owners and charterers and negotiate the terms and terms and conditions and finalize a price at which the charterer will be leasing the ship. So, when we are talking about the Baltic index, Baltic index rates come from the ship brokers. And in the context of ship breaking please note that the India has the world's largest ship breaking industry. Very interesting aspect related to the ship breaking as an economic activity in India. There is a place called Alang in Gujarat. Lot of lot of activity is happening at that at any point in time related to breaking of the ships. If you are more interested to understand what is the economics associated with ship breaking, what are the costs associated with the ship breaking that you can read in from this particular website. Of course, there are many other interesting websites and web resources available for ship breaking. So, in the context of bolting exchange there is also another prominent exchange which is known as just Shanghai Shipping Exchange. So, that exchange also publishes a few indexes. And in the context

of word exchange I would like to draw your attention here that these exchanges are very different than the other exchanges we have discussed so far. Please note that these exchanges do not provide a platform where buyers and seller will be coming and giving their buy and sell order and the price matching will happen and then the exchange will publish the price. This exchange does not do that. This exchange merely collates the information from the ship brokers and that information it conveys to the whole world and from that information it calculates and reports many indexes, and these indexes are used for various purposes. So, even though we are using the word Baltic exchange or Shanghai Shipping Exchanges these are little different as compared to the other exchanges like multi commodity exchange or Chicago Mercantile Exchange or London Metal Exchange we have discussed in the past. In the context of Baltic indexes let us go ahead and understand how these indexes are calculated and reported. Please note that the Baltic exchange first published the Baltic Freight index from 4th January 1985 onwards. So, the Baltic Freight index started its journey from 4th January 1985 onwards and the right panel shows the Baltic Freight index composition on 2nd February 1996. I do not have the access to the composition of the index based on the 4th of January 1995, but the index composition on 2nd January 1996 exactly or from the 2nd of January 1996 index we will be able to make out how the index must have been calculated on 4th January 1985. So, on the 2nd of January 1996 the index comprised of 13 voyage routes covering cargos from 14,000 metric tons of fertilizers to 120,000 metric tons of coal. So, let me quickly take you through this particular right-side panel. As you can see these are the routes which are mentioned by the Baltic exchange and in each route suppose route 1 is relates to your gulf US gulf to ARA. ARA stands for Amsterdam, Rotterdam and Belgium. Similarly, you have 2, the route 2 relates to US gulf to south Japan and this is the route mentioned the vessel size is mentioned and what kind of a cargo those vessels will be carrying this is also mentioned and please note that this is a this is a dry index. So, that is why all dry cargo is part of this particular index and based on the actual export import volume the exchange has gone ahead and given different weights to different routes. So, on a given day from a ship broker the Baltic exchange will collect the actual freight rate for let us say route number 1. Similarly, it will collect the actual freight rate for route number 2. So, from these freight rates and the weights it will be able to calculate and report an index. And please note that this particular Baltic freight index has been renamed as Baltic exchange dry index and this particular index has gone through substantial amount of change and in addition to this Baltic exchange dry index the exchange now publishes about 15 to 20 different other indexes and Baltic exchange is known for its different types of indexes. We will go ahead and understand who uses this index and how. Please note that a Baltic exchange has a committee which is known as a freight indexes and futures committee or FIFC committee of the Baltic exchange which oversees the creation and maintenance of these indexes. So, as you can see Baltic exchange publishes handy size index, Panamax index, Supramax index, Capesize index, it also publishes dirty tanker

index, and it also publishes clean tanker index and many more indexes it calculates and publishes. I have only mentioned some of the well known or popular or well reported indexes as I mentioned there are many other indexes which the Baltic exchange is calculating and reporting. Now, coming to understanding little more on Baltic exchange index, let us understand the index composition of Baltic dirty tanker index. Now for the Baltic dirty tanker index, the first thing the exchange does is identifying a specific number of routes. Please note that this particular image which I have taken from the Baltic exchange website. So, it shows that Baltic dirty tanker index will have a TD1, TD2, TD3C and so on so forth, different Middle East Gulf to US Gulf, Middle Gulf to Singapore and all that because it is a dirty tanker index mostly the crude oil is getting exported from the Middle East countries to other countries and destinations. So, obviously, you will have the trade routes which are carrying the crude oil through tanker that will be the part of this particular index. Now, once the trade routes are identified the Baltic exchange will also collect the data from ship brokers who do not operate in a market they report. So, a particular ship broker if they are doing a ship broking business for companies in TD1 that is Middle East Gulf to US Gulf they will not be providing the data related to the freight rate which has been transacted between ship owners and the chatters for TD1. So, if somebody is doing if a ship broker is becoming a ship broker is doing a business in TD1 that is particular company will not be giving an information price information to the Baltic exchange for that route TD1. So, as you can see for the tanker index these are the names of the ship brokers who will be providing the quotation for calculation of the index. Similarly, the dry index which will be the parties who will be providing the quotation for the or price quotation for the dry index calculation. Again, these two image files are only the partial list this list can go into 70, 80 companies which are contributing towards the calculation of tanker index and dry index for that matter any other index which is calculated by calculated and reported by Baltic exchange index. With this we will come to our discussion on freight rate indexes and introduction to the freight market. In the next session we will discuss with the remaining part of the freight market and how freight rate derivatives are used to mitigate the risk associated with fluctuation in freight rates. Please note that the freight rate fluctuation can be very high over a period of 4 to 5 months there could be a significant up and down in the freight rate on a daily basis. So, that poses a significant amount of risk to the exporter, importers and consumers. So, if the freight rate increases then the buyers or the exporters will be receiving less money the buyers have to pay more money. So, this possesses a significant amount of bulk goods consumer, both consumers as well as exporters. So, how these indexes and derivative on these indexes are helping companies to mitigate the freight rate risk this aspect we will discuss in the next session.