

21/22 SEM 1

MT2002 Shipping Economics

1a) Describe the second-hand ship sale and purchase market as well as new shipbuilding market in shipping. (8M)

Second Hand Ship Sale and Purchase Market

- Ship Owners interact with other ship owners in this market.
- Ship Owners who want to sell second hand ships provide supply while ship owners who want to buy second hand ships provide demand.
- Prices are negotiated between buyer and seller with the help of a shipbroker

New Shipbuilding Market

- Ship Owners are the demand for new ships while Shipbuilders provide supply of new ships.
- Ship Owners and shipbuilders would negotiate on price, specification of vessel, terms and conditions of the contract.
- Shipbuilding prices are positively closely correlated with second hand prices (Higher price of second hand prices mean higher FR and more demand for transport of goods -> price of new ships would also be high)
- Shipbuilding prices are affected by steel prices (Higher steel price -> higher prices for new ships as cost to build ships increase)
- Shipbuilding prices are also volatile and affected by demand and supply and freight rates.
- Require shipbuilding contract and letter of intent for developing details of the design and construction contract which are generally not legally binding.

1b) Describe and explain the major factors affecting second hand ship prices by using concepts in shipping economics. (17M)

- Freight rate (FR) is the primary influence on ship prices (Higher FR -> higher demand for second hand ships in order to capitalise on profits now as new ships take too long to build and second hand ships can be used immediately -> higher price for second hand ships set as ship owners would want more ships to maximise shipping cargo and earn from higher FR , vice versa for low freight rate)

- Second influence on ship prices is age (Older ship has lower value while newer ship has higher value due to reasons like easier repairability and lesser maintenance for newer ships, easier to learn controls of newer ships as they are more similar to new ships etc)
- Inflation affecting ship prices in the long term (due to inflation, price of ship may increase in the long term eg buying a ship for \$2 million 10 years ago does not mean price of ship is still \$2 million today, will increase due to inflation and thus be sold for higher than \$2 million)
- Shipowners' expectations for the future (expect higher FR in the future, would set higher price for second hand ships, if expect lower FR , set lower prices to sell more second hand ships)

2) Based on the analysis of factors affecting shipping demand, identify five uncertainties leading to changes in shipping demand, discuss and illustrate your points with practical examples from the shipping industry. (30M)

Factors affecting shipping demand:

1. World economy
2. Seaborne commodity trades
3. Average haul
4. Random Shocks
5. Transport costs

World Economy

Affected by **Business Cycle** and **Trade Elasticity**.

Business Cycle is affected by Investment multiplier and income accelerator, time lags, stockbuilding and mass psychology.

Investment multiplier and income accelerator is affected by consumption and investment. Investment generates consumption which further creates more investment. Thus an increase in investment of shipping demand would increase consumption of shipping demand, leading to increase in shipping demand. Likewise, fall in investment of shipping demand may lead to fall in consumption of shipping demand, causing fall in shipping demand. An example is increasing investment and research for shipping demand through improving fuel efficiency and engines of ships, making them travel faster and longer distances with less bunker fuel. This would increase consumption for shipping and lead to increase in shipping demand.

Time lags are the delays between economic decisions and the delay in implementing decisions make fluctuations more extreme. An example is if a shipowner chooses to buy a new ship during a market boom, if the freight rate falls after shipbuilding is complete after 1.5-2 years, the lower shipping demand would cause shipowners to suffer greater losses as they still must pay for the ship tax etc but are unable to utilise the ship to deliver cargo. The arrival of new ships when there is already surplus of ships unused in recession period discourages new ordering of ships at the time when jobs like shipbuilders are running out of work. This would further worsen the

recessions for jobs like shipbuilders as shipyards earn less money. The time lags make booms and recessions more extreme and cyclical. Thus, during periods of recession, time lag decisions may cause shipping demand to fall more due to it affecting many jobs and weakening the world economy further.

Stockbuilding is a short run effect which produces sudden bursts of demand as industries adjust their stocks/inventory during the business cycle. This happens when shippers are not able to predict how much cargo to ship as they do not know the demand and may ship less goods than demanded, thus they would increase shipping demand and ship more cargo in the future, especially when the economy is recovering.

Mass psychology is when there are periods of optimism or pessimism that become self fulfilling through the medium of stock exchanges, financial booms and the behaviour of investors. An example is if there is low confidence in the shipping industry, less shippers would use ships to transport cargoes and shipping demand falls, leading to lower freight rate, creating lower confidence in the shipping industry.

Trade elasticity is the long term relationship between seaborne trade and world economy. It is affected by countries' economic structure changes over time ie mature, and the balance of demand to available local resources of food and raw materials that change over time. As countries' economic structure matures and becomes more developed, they may do lesser manual jobs thus decreasing shipping demand for goods like raw materials. If local resources have lower availability, they will import more raw materials from other countries, increasing shipping demand.

Seaborne commodity trade

Affected by:

Seasonality (short term fluctuation eg in winter, demand for coal increases as more people use electricity and fires to warm up their houses using heaters or fires etc)

Changes in demand (eg crude oil demand change due to price volatility-> if price increase, FR increase and may lead to lower shipping demand)

Changes in supply sources (eg Chinese iron ore imports from Australia and they might change to import iron ore from Brazil or Argentina as well, increasing shipping demand from Brazil and Argentina)

Relocation of processing (eg factories move to lower cost countries like Vietnam from China -> increase in seaborne commodity trades from Vietnam instead)

Shipper's transport policy (if shipper only wants to use a specific mode of transport like ships, shipping demand increases)

Average haul

Average haul is the distance over which the cargo is shipped. The further the distance, the higher the shipping demand as the countries further away may lack the resource like oil or are unable to grow certain types of plants like tea in their climate, thus causing increase in shipping demand.

Random Shocks

Refers to unexpected shocks such as economic shocks like recession, natural disasters like earthquakes and floods, disease like covid 19 outbreak, terrorism and political events like US-China trade tensions from 2018, Gulf war in 1990s etc. The random shocks would lead to decrease in shipping demand from the affected countries especially for terrorism, recession and natural disasters. However, in the aftermath of unexpected shocks like natural disasters, more raw materials would be imported like steel to rebuild homes etc.

Transport costs

Lower transport costs would encourage more shipping of high value items like raw materials as if the transport costs are too high, shippers may not want to ship to that country as profits are low. Buying bigger ships would increase economies of scale and lower cost of transport, increasing shipping demand. Having more cost-effective organisation of the shipping operation and higher quality of service would lead to lower transport costs and increase in demand of shipping transport which would increase shipping demand.

3a) Distinguish between operating costs and voyage costs in running a fleet of vessels. Explain how capital cost of a vessel is different from the above two costs from the financial cashflow perspective. (15M)

Operating costs (for day to day running of vessel)

- **Manning costs** (costs incurred by crew ,up to ~40% of overall operating costs)
- **Stores and consumables** (~15% of overall operating costs, includes cabin stores and various domestic items and lubricants to reduce friction in diesel engine)
- **Repair and maintenance** (~15% of overall operating costs, routine maintenance of main engine and auxiliary equipment, steel renewable in holds and cargo tanks)
- **Insurance** (~15% of overall operating costs , 2/3 to insure Hull and Machinery, 1/3 is third party insurance like Protection and Indemnity for injury/death of crew, third parties or damage to cargo , pollution etc)
- **Administration** (Accounts for ~15% of overall shipping costs, registration fee paid to flag state, others include shore based administrative and management charges, communication etc)

Voyage costs

- **Fuel costs** (can be up to 76% of overall voyage costs, most influential cost element in overall shipping costs, can be reduced by slow steaming through reducing ship operating speed, improving energy efficiency or improving hull design and smoothness etc)
- **Port charge** (~24% of overall voyage costs, charges levied on vessels/cargoes for use of facilities or services provided by the port)
- **Towage and pilotage cost** (minor cost element and normally absorbed by port charge)
- **Canal dues** (normally a flat rate charge per net ton, mainly payable to Suez canal and Panama canal)

Voyage costs are incurred only when cargoes are being delivered from port to port while operating costs are incurred whenever the ship is being operated even at berth.

Capital costs accounts ~42% of the overall shipping costs and can be paid to buy a ship through one off payment by reserves or cashflow or borrowing full purchase price from the bank. Taxation is also incurred as part of the capital costs and can be avoided by registering at one of the many open registry flag of conveniences like Panama.

From financial cashflow perspective, capital cost is different from operating and voyage costs as capital costs are much higher than operating and voyage costs. Capital cost can also be raised through selling company stocks or offering bonds to raise capital. This would allow the shipowner to purchase more ships. Capital costs also take a long time to repay due to it being very high in costs and is a fixed cost paid by the shipowner. Payment for capital cost must be done even if the ship is not in use while voyage and operating costs are mainly paid when the ship is in use.

3b) Describe the FIVE typical types of specialised cargoes and explain why the capital cost of these specialised cargo vessels is so intensive. (10M)

5 typical types of specialised cargoes**1. Chemicals**

- Organic (derived from crude oil, natural gas, coal or oil products, are raw materials for plastics, artificial fibres, artificial rubber, solvents, paints etc)
- Inorganic (Made by combining chemical elements, can be gasses e.g ammonia and liquids, e.g sulphuric acid, phosphoric acid etc for use in fertiliser industry, also have high density, are corrosive, hazardous and poisonous)
- Others (like vegetable oils, palm oil, alcohols, molasses, lubricating oil etc)

2. Liquefied gas

- Examples are propane and butane which are gases that are produced as by-product of oil refinery with boiling temperatures ranging from -88.6°C to -0.5°C . They are transported via pipelines on land and liquefied gas state by sea to reduce volume up to 99.8% via LNG tankers. Liquefied gas can be fully-pressurised, semi-refrigerated or fully refrigerated.

3. Refrigerated cargo

- Cargoes like meat, fish, butter, eggs that must be transported under specific temperature-controlled environment and can be carried by ISO reefer containers.

4. Unit load cargo

- Include paper rolls, steel coils, bagged cement, timber, vehicles, heavy units etc. Unit Load cargo are usually large and uneven, stowage is more complicated and demanding, have higher risk of pilferage and must be handled separately.
- There are 5 main categories of specialised vessels for unit load cargo: 1. Pure car carrier (PCC) or pure car and truck carrier (PCTC), 2. Deep sea ro-ro, 3. Open hatch bulk carrier, 4. Multipurpose (MPP) and 5. Heavy lift

5. Passenger

- Specialised vessels for passengers include cruise ships and are more for vacation than transportation. Some examples are Oasis, Allure, Harmony and Symphony of The Seas by Royal Caribbean International.

Capital costs of specialised vessels are intensive as each specialised trade has its own distinctive features arising from the character of the cargo and the way transport operators have adapted to improve their performance in carrying it.

Cargo handling

- Chemical tankers allow small chemical parcels to be handled separately without the risk of contamination or corrosive damage to the vessels
- For chemicals, tanks and pipes are protected by stainless steel, rubber or acid-proof paints and extensive heating needed for acidic and corrosive liquids etc, special coating or segregated tanks and dedicated transfer systems are needed for some organic chemicals, specialised chemical tankers also must satisfy IMO regulations for the carriage of hazardous chemicals thus all these make chemical tankers capital intensive.
- For LNGs, they must be refrigerated or pressurised thus LNG tankers are more capital intensive they must be able to carry and supply electricity to reefer containers that can control temperatures and hold pressurised LNG.
- For vessels carrying reefer containers they are more capital intensive as they need to be able to carry and supply electricity to reefer containers as well.
- For unit load cargo vessels, an example is Forest products carrier (FPC) which has ~20% higher capacity than conventional bulk carriers of the same DWT. Since deadweight is minimised, unit load cargo vessels are more capital intensive as they need to be built more efficiency to store higher volume of high value cargo.
- Ro-Ro access for wheeled cargoes can be handled more efficiently

- Cruise ships have high capital cost due to high cost of recreational facilities such as swimming pools, bars, cinemas, restaurants, and hotel rooms built on the ship for people to enjoy during vacation.

4) Current year 2021 has seen decade-high freight rate in both container shipping and dry-bulk shipping. Describe the major factors in freight rate pricing of these 2 shipping trades and list out the main reasons contributing to these 2 freight rate booms. (20M)

Container shipping – type of general cargo, liner shipping

Dry bulk shipping – type of bulk cargo, tramp shipping

Factors affecting Freight Rate pricing

Container Shipping

1. Distance via different trade routes
2. Cargo related factors eg cargo weight, dimensions, value, Less than Container Load (LCL) – cargo fill up less than a container -> will be charged more due to higher administration and documentation fees in total etc, Full Container Load (FCL)- cargo fill up full container -> charge less, etc
3. Additional charges eg loading and unloading expenses at ports, ie. Terminal handling charge (THC), carriage of goods by other transportation modes along the supply chain, storage of goods, customs clearance, etc.
4. Currency Adjustment Factor (CAF) – charge CAF to adjust for fluctuations in currency exchange rate (eg instead of USD use SGD)
5. Bunker Adjustment Factor (BAF) – higher bunker fuel price, higher BAF -> higher FR

Dry bulk shipping

1. Demand of commodities (determined by industrial productions, energy demand, economic activities etc)
2. Supply of vessel fleets (Number of available vessels, capacity, Utilisation)
3. Disruption at choke points, port congestion etc (slower and ship stuck at ports)
4. Bunker price (bunker price increase, FR increase)

Reasons for freight rate pricing booms

1. Covid-19 restrictions easing worldwide

- More economies opening up after vaccines were produced, eg China first few to open up their economy -> import more steel for construction of houses factories etc

With the opening of global economies, more construction jobs are also created and this generates demand for steel, iron, cement etc due to increased construction worldwide. This would lead to higher freight rates for tramp shipping as there is higher demand of dry bulk cargo in large economies like China.

There would also be increased demand for grains like soybeans needed for animal feed as with the opening of economies and global diet being increasingly meat-based, products like meat from chicken and cows are demanded more -> more grain feed needed to fulfil meat demand. Population growth in countries like India and China's also lead to more grains like rice being demanded for meals. The high demand for tramp shipping for steel, iron, cement and grains lead to tramp shipping having higher freight rates in 2021.

With economies opening up, there is also an increase in exported goods globally. Shippers are more willing to pay higher prices to export their cargoes as freight rate is high due to higher demand for goods. Liner shipping companies and alliances like 2M, Ocean alliance and THE alliance might also set higher General Rate Increase(GRI), Freight All Kinds(FAK) in areas where they control most of the trade routes or have the most ships. Due to higher demand of liner shipping due to many economies opening up and buying more goods, shippers are willing to pay the higher proposed freight rates to earn more profits. This leads to higher freight rates for liner shipping in 2021.

2. Suez canal blockage caused by evergiven vessel

- Lead to large supply shortage of ships as many ships were stuck at Suez canal and were unable to deliver cargo or return to ports. Low supply of ships and high demand of cargo shipping would push up the freight rates as higher freight rates are willing to be paid by shippers in order to deliver more cargo and earn higher profits. This led to increased freight rates for liner and tramp shipping in 2021.

3. Covid 19 outbreak at ports

- Capacity at ports declined as more people get covid, including crew at large ports like port of Shanghai and port of Los Angeles. This leads to lower efficiency at ports for maintenance, administration etc leading to lower ship supply as less ships can deliver cargo due to being stuck at port longer. The low supply of ships with high demand causes freight rates to spike for both liner and tramp shipping.

4. Covid 19 effect on general population

- Caused people to stay in home, unable to enjoy recreational activities like drinking at bars, going out to shopping malls, exercising outside or at gyms etc -> led to increase in people spending money on their home through online shopping for furniture and exercise equipment like treadmills, dumbbells etc for home use. Demand of these items outweigh supply of goods, lead to FR increase as shipping demand spiked but supply is unable to keep up as suppliers of such goods did not expect the sudden large rise in demand.

5. Financial aid for most countries

- With governments worldwide providing financial aid for their people like Singapore providing GST vouchers and USA providing their trillion-stimulus budget, people worldwide are still able to spend on buying goods even if the economy is not booming thus the high demand of goods lead to higher freight rates in liner and tramp shipping for all types of goods from general cargo including recreational items like game consoles and exercise equipment to more dry bulk cargo such as daily necessities like grains.

6. Bunker price increase

- With bunker prices increasing in 2021 due to higher demand for shipping and more global economies opening up due to optimism and availability of vaccines, freight rate for liner and tramp shipping would boom.

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Note: For shipping econs, the profs like real world examples so do read up more on maritime news or at least know some big events that impact the shipping industry, you can elaborate on your answers and quote real world examples to potentially get higher marks. My examples here are just some of what I can think of but I'm sure there will be more case studies to use in 2022 or examples you all can think of to value add to your answers.

When doing the paper, please focus on time management and those you are more confident in especially the higher mark questions first as it is very hard to write full length answers for everything. Be careful not to spend too much time on the lower mark questions and save more time for higher weightage questions.

If possible, do not leave any blanks as well! Hope this helps and good luck for your MT2002 finals, see you all around in school 😊