

**NANYANG TECHNOLOGICAL UNIVERSITY**

**SEMESTER 1 EXAMINATION 2016-2017**

**MT2002 – SHIPPING ECONOMICS**

**NOVEMBER/DECEMBER 2016**

**Question 1(a)**

Shipping risk is a measurable liability for any financial loss arising from unforeseen imbalances between the supply and demand for sea transport. The fluctuation of shipping freight rates (freight rate risk) is an important source of market risk for all participants in the freight markets including hedge funds, commodity and energy producers. Shipowners are vulnerable to inflation, fluctuating exchange rates, mechanical performance of the ship and the ability of shipper to pay his hire.

**Question 1(b)**

There are three ways in which shipping risk can be shared between the ship owner and cargo owner.

Shippers will take the shipping risk when they are very confident about the volume of cargoes to be transported in the future and want to control the shipping or see transport as too important to be left by chance. Shippers take all the shipping risk by buying and operating their own ships themselves. If all cargo owners do this, spot market disappear and role of independent shipowners shrinks.

When shippers are reasonably certain about future cargo volumes but feel independent shipowner can do the jobs cheaper, shipper will consider taking long term charters from independent owners. The longer the charter the more risk is taken by the cargo owner and less by the shipowner.

Shipowners are vulnerable to inflation, exchange rates, mechanical performance and ability of shipper to pay his hire. Raw materials such as iron ore and coal are often shipped in this way.

Cargo owners can also pass all the shipping risk to the shipowners by using spot market. Hire ships they need on a cargo by cargo basis. If there is no cargo, shipowners carries all the cost of the ships which are unemployed. When there is a shortage of supply of ships, cargo owners must be prepared to pay a premium freight rates.

These three options do not change the amount of shipping risk but redistribute it between cargo owners and ship owners.

**Question 2**

- The relationship between speed and freight rate can be defined as:

$$s = \sqrt{\frac{R}{3pkd}}$$

Where

- $s$  = optimum speed in miles per day
- $R$  = voyage freight rate
- $p$  = price of fuel
- $k$  = the ship's fuel constant
- $d$  = distance

Shipowner maximizes his profit by operating his ship at the speed at which marginal cost equals the freight rate. In addition, optimum speed depends on the price of fuel, efficiency of the ship and length of voyage. If optimum speed have a marginal cost higher than freight rates, ship will not be deployed.

Slow steaming is no longer a new concept to the shipping industry. The practice of deliberately slowing down the speed of a ship is in fact a common operating feature of today's shipping market as a way to lower costs by reducing fuel consumption. And with shipping lines trying to stay profitable in the present weak freight market, slow steaming had proven a good way to trim operating expenditures so as to boost the bottomline.

Slow steaming offers cost savings and reduced emissions and it seems that even most shippers have more or less accepted the practice. There are already talks in the market that slow steaming would be a normal way of ship operation for the future.

### **Question 3(a)**

There is a trend of increasing cost of running a vessel with increasing vessel's age. Operating cost will increase with increasing vessel's age, which includes ongoing expenses involved in day to day running of the ship except fuel cost which is included in voyage cost, day to day repair and maintenance except major dry dock. Older vessels are less fuel efficient and hence consume bunker than newer ships. Fuel cost is the single most important item in voyage cost today.

Crew manning cost will be higher in older ships as older ships will require higher level of manning. Older ships will also see a lower degree of automation as compared to newer ships. These will require a larger crew size to maintain the vessel operational needs. Expenditure on stores will be larger as compared to newer ships as older ships are less technological advance. These include general stores including cabin stores and various domestic items used on board and Lubricating oil.

Routine repair and maintenance cost will increase with increasing age. Routine maintenance is the maintenance of the main engine and auxiliary equipment and ship physical structure. Cost tend to increase with age. Also, older ships especially those with poor maintenance will experience higher breakdowns and mechanical failure which may result in additional costs outside those covered by routine maintenance. Loss of revenue due to loss of trading time. Insurance cost will also be higher with older vessels as they are less technology advanced and hence a higher risk than newer vessel.

### **Question 3(b)**

Fuel cost is the single most important cost element in running a vessel. Fuel cost can be reduced by improving hull design and hull smoothness, improve efficiency of engine and machinery and operating at the optimal speed. During high freight rate, vessel move at full speed to earn more revenue. During low freight rates, reduced speed maybe more economic because the fuel cost savings maybe greater than loss of revenue

In recent years, we have been seeing consolidation of shipping companies to gain economy of scale. For example, the acquisition of NOL helped CMA CGM to gain market share and improve economy of scale. Japan's K Line, MOL and NYK have announced an integration of their container shipping business with the establishment of joint venture by 1 July 2017 and the commencement of joint service from 1 April 2018. Another out of the norm approach is Maersk, in which the chief executive

officer of the world's largest container line says he is willing to lose money in the short term in exchange for longer-term market dominance.

Shipowners can explore the different policy available for assist shipowners to reduce cost. In Singapore, the Green Ship Programme encourages Singapore-flagged ships to reduce carbon dioxide and sulphur oxides (SOx) emissions. Qualifying Singapore-flagged ships can enjoy a reduction of Initial Registration Fees and a rebate on Annual Tonnage Tax. To qualify for incentives relating to the adopt of energy efficient ship designs, shipowners can submit a copy of the International Energy Efficiency (IEE) Certificate or pre-verification report as proof that the attained EEDI of the ship exceeds IMO's requirements on EEDI for that particular ship type and size (at the time when the incentives are to be applied) to Singapore MPA. Such incentive can help shipowners to reduce cost and at the same time reduce pollution.

Shipowners can also lesson the cost burden by taking advantage of the government policy. Shipyard credit scheme are provided by government to help shipowners finance new ship. Shipyard require customers to make payment in stages to pay for the material and labour required to build the ship. A down payment is involved for the builder to purchase materials on signing the contract. Drawn on the delivery of the vessel, government offers credit scheme to assist its shipyards in obtaining orders in the form of government guarantee, interest rates subsidy and moratorium.

#### **Question 4**

General Rate Increase(GRI) are used in liner shipping to earn more and improve profits which are not usually applicable to the tramp shipping business. GRI is the average amount by which carriers tariff rates increase applied to base rates. GRI occurs when carriers announce an increase in base ocean freight rates within a given trade route. There are four factors that will affect the successfulness and sustainability of GRI.

The seasons, peak seasons are more likely to be successful as there is a higher demand of ships. Shipping company with greater market share are also more likely to see a success in applying GRI as they have a greater control over price. In a case where shipper have bigger bargaining power, the implementation of GRI are less likely to be successful. When shipping capacity are reduced, it is more likely to be successful in applying GRI.

Liner companies can do cargo differentiation and pricing to earn more. Shippers of high value commodities are likely to be willing to pay more while for lower value commodities where transport cost is a significant post of the delivered price, pricing is crucial (Price sensitive cargo). For example, increase in freight rate will affect scrap material more than designer clothing. Hence liner companies usually charge a premium for cargo of higher value.

**Note: MT2002 questions are not direct. Do additional readings and try to quote real examples in the shipping industry to gain more points. Good Luck!**