

Q1

(a)

1. The supply of dry bulkers is tight because the duration to build a ship takes 1 to 2 years. When there is growing demand for dry bulk shipping service, shipowners order for newbuilt ships from shipyards. However, ship can only be delivered after two years, and this creates a gap between current demand and supply. Since demand is greater than supply and cannot be met in the short run, freight rate surges.

2. Time lag in adjustment of supply exists. Shipowners in dry bulk market observes increase in freight rate first, and then order new ships if they expect the rate to continue growing. Similarly, shipowners will scrap ships only when they feel desperate about the market (because they usually sell ships before they decide to scrap ships). The action taken by shipowners often falls behind the turning point of market situation, and this makes the market even more volatile.

3. Capesize vessel takes up 40% in BDI calculation. Capesize vessel is less flexible in different types of cargo because it mainly carries major bulk cargoes (if it is switched to take minor bulk cargoes, the cargo hold cleaning cost is so high that shipowners are unwilling to do so). When the market is bad, the smaller dry bulker can carry various types of cargo in small amount, so the demand for small dry bulker is less impacted. However, capesize vessels cannot be filled, so shippers will not choose them and the freight rate drops. The weighting of capesize vessel in BDI makes the freight rate more fluctuating.

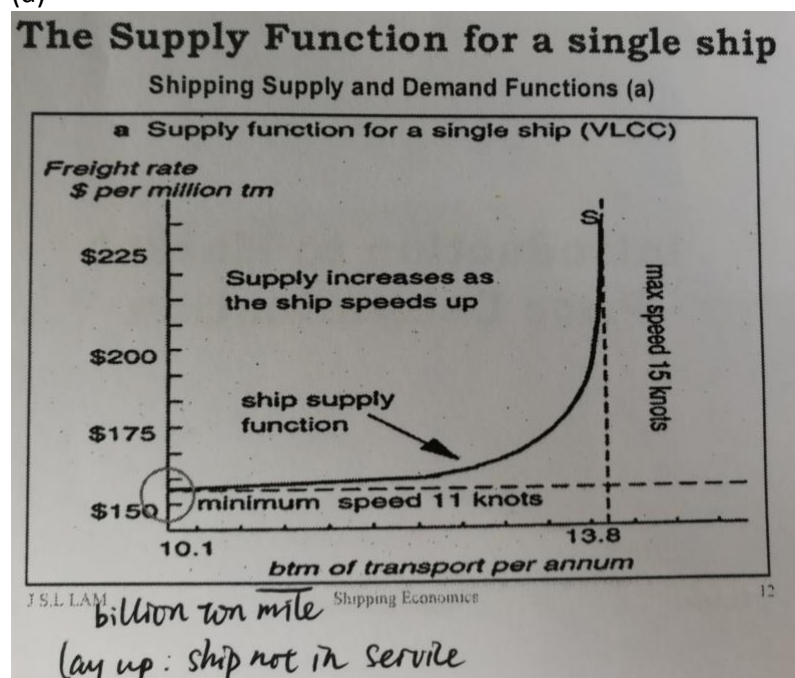
4. The freight market is subject to random shock such as extreme weather and political issues. Those factors could affect the demand for and supply of shipping in relatively short time, increasing the volatility of freight market. For example, extreme weather happening at a certain port will cause port congestion, so vessels concentrate at this port and the supply is low at other ports. This results in a sudden rise in freight rate.

(b)

Shipping pools can help owners lower the volatility risk.

1. A shipping consists of similar types of vessels that may have different configurations. For charterers, there is a wider range of vessel of choose from compared to dealing with single shipowner. When a ship is chartered, the earning is distributed to each shipowners in the shipping pool according their weighing. In the circumstance of bad economy, shipping pools can help shipowner keeping earning revenue even though their own ships are idle, as long as a few of the vessels in their shipping pool is operating. Hence, shipowners in shipping pools are subject to lower risk of operating loss.
2. Shipowners in a shipping pool enjoy economies of scale without buying many vessels. In shipping pools, the vessels are collectively managed by central administration, so shipowners can share the administration and marketing cost. This is helpful when the market is bad, where the shipowners have to cut cost.

Q2  
(a)



(b)

The intersection point of supply curve and y-axis (price) is the lay up point, which is the minimum price that shipowner is willing to offer shipping service (otherwise the ship will lay up). As the speed increases, the ship supply increases in terms of btm (billion ton mile), and ship incurs more bunker cost. Hence, freight rate is getting higher. When it is near maximum speed, the marginal cost increases significantly because it gets more and more expensive to improve the speed. Finally, the maximum amount of supply in btm is determined by the maximum speed of ship, at which freight rate reaches the highest value.

Q3

1. Capital cost is the expense of shipowner to build a new ship or buy second hand ship. It is a huge amount of investment due to the high monetary value of vessel. For a owner running a fleet of vessel (such as liner shipping company), they need to provide weekly services, so the fleet should consist of a number vessels to maintain such a frequency. Therefore, the capital cost is even larger than those who owns one ship.
2. If the shipowner does not have enough capital to make one-off payment to purchase the ships, he/she may borrow money from bank, and repay certain amount to bank each year. The repayment is continuous until tenor ends. If the market is bad, shipowners has to continue paying this amount, which is a burden for them if they purchase a fleet of vessels in this manner.
3. After ships are delivered and start operation, depreciation as a part of capital cost incurs every year. Even though ships may lay up in bad economic situation, depreciation will not stop, and it is still recorded on the financial statement of the shipowner. Thus, shipowner has to suffer more burden besides the poor revenue in this circumstance.

4. Capital cost is sunk cost that cannot be recovered once shipbuilding starts. However, there is time lag between the payment made and ship delivery, which is 1 to 2 years. Hence, shipowner cannot get immediate return from ship operation. If shipping market recedes during this period, shipowner may suffer a loss after the ship is put into service.

Q4

(a)

1. Supply and demand. Typically, freight rate of tramp shipping goes up when demand is higher than supply, and it declines when there is oversupply of vessels.
2. Seasonality. Tramp shipping carries bulk cargoes, some of which are energy cargo such as coal and LNG. The energy consumption has seasonality, which generally booms in winter. Therefore, the demand for tramp shipping is relatively high in winter and the freight rate increases accordingly.
3. Cargo value. Ships carrying cargoes with higher unit value are more likely to accept higher unit shipping cost because it takes up smaller portion of the price compared to those cheaper commodities. Moreover, cargo with higher value may require special equipment to handle and store. Hence, carriers can charge higher freight rate to the shipper.
4. Port congestion and choke point. Ships are congested at certain ports or choke points, so there might not be enough supply in other regions with many cargoes to be shipped. Therefore, carriers may increase freight rate in these regions.
5. Random shock. Geo-political issues such as taxation and sanction can affect the cargo flow or cargo volume in certain trade routes. Consequently, the demand for tramp shipping will decrease in the route that are affected, while it may also increase in alternative routes. For example, China put restriction on coal import in order to tackle air pollution, so the demand for shipping from Australia to China is impacted, and the freight rate in this route drops.
6. Bunker cost and crude oil price. Bunker price increases, freight rate will be higher.

(b)

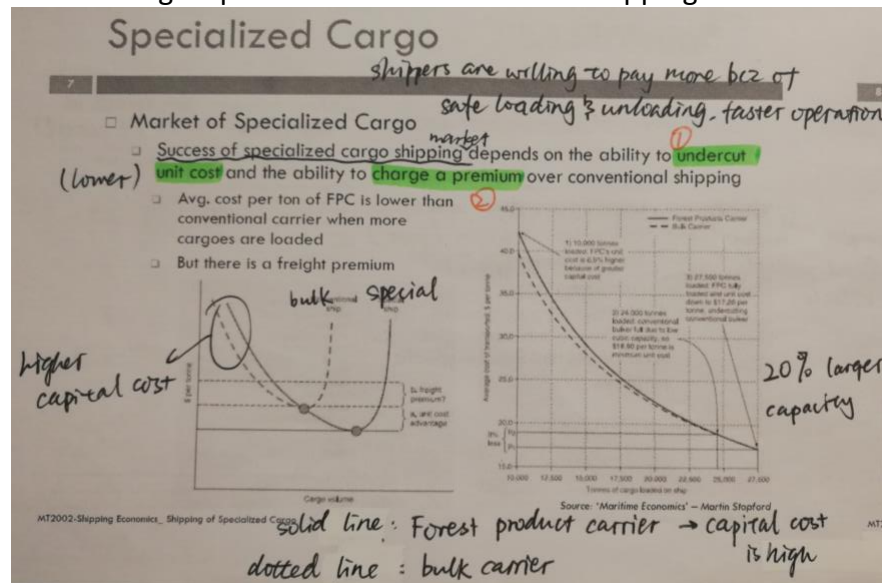
Competition in liner shipping market is oligopoly, where a few big shipping companies take up most of the market share and become the price maker, while small companies are merged or acquired. Due to the nature of liner shipping, companies have to operate a fleet of vessels to provide weekly service. Such a high capital investment becomes a barrier preventing new company from entering the market. Moreover, big shipping companies enjoy EOS, so they can reduce the price and hence crowd out those small companies.

Unlike liner shipping, tramp shipping is a nearly perfectly competitive market. There are no dominant players, and each firm sells identical product, so each individual firm has limited impact on the market. Besides, buyers have complete information about price offered by each firm. If one company tries to rise their price, shippers will rather choose other

companies. Therefore, all firms are price taker who set their price according to market price that is determined by supply and demand.

Q5

Success of specialized cargo shipping market depends on the ability to undercut unit cost and to charge a premium over conventional shipping.



### 1. Undercut unit cost

According to the diagram, initially when carrying small cargo volume, the unit cost of specialized cargo carrier is higher than conventional bulk carrier. It is because the capital cost (e.g. equipment onboard) is expensive, incurring high fixed cost. As cargo volume gets higher, the unit cost of specialized cargo carrier becomes even lower than that of convention bulker. This is because ships with specialized equipment are safer and more efficient in terms of cargo handling, which saves berthing time and manpower cost.

### 2. Charge premium

Specialized cargo carriers have larger capacity compared to traditional bulker with similar size. Moreover, it enables safe loading & unloading and faster operation. As a result, shippers are willing to pay higher freight rate for better service. By differentiating itself from traditional bulker, shipowners can charge premium on shippers who require delicate services.