

# Ust harvard case stady solution

Business



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Introduction Ocean Carrier Inc.

owned and operated cape-size dry bulk carriers worldwide. Major Cargo type is iron ore and coal. Vessel sizes are 80, 000 DWT to 210, 000 DWT. Cape-size carriers travel around Cape Horn rather than the Panama Canal due to size constraints. The cargo operations include maintenance, repairs, insurance, supplying of lubricants, maintaining supplies and on board stores.  
Fundamental Analysis Business ModelMostly chartered on “ time charter” basis for one, three, or five year periods.

Occasionally spot charter market was used too. Charterer paid a daily hire rate for entire duration. They controlled where the cargo was loaded and unloaded also determined the cargo. Ocean Carriers Inc. supplied a qualified crew along with a seaworthy carrier which complied with international norms. Operating Policies Ocean Carriers didn’t operate ships which were more than 15 years old.

As per international maritime regulations they underwent special surveys every 5 years for seaworthiness the carriers. To avoid these costs they sold the ships in scrap or second hand market before the third survey. Market and Competition To value the market and competitive environment, we imply the SWOT analysis. Strengths: Since the firm owns new and larger vessels compared to industry, premium is earned compared to market. Weaknesses: Since the firm depends on basic industries too much, it has not much

product differentiation and becomes less competitive. Opportunities: Over 85% of ships carry iron ore and coal throughout the world.

So the demand for iron ore and coal products is basically depends whether the economy is strong or not, which means a great deal of vessels are needed. Australian production and Indian Exports are creating long term demand. Threats: There is probability of defaulting of Charterer. And further estimates are not entirely reliable. Daily Hire Rate Depends on the market, shipping companies will decide whether increase the number of ships or rise scrapping.

What's more, the vessel's life of operation will also affect the daily spot hire rates. As we can see from the table 1-1, the spot charter rates tended to fluctuate more widely than time charter rates, which show the highs were higher and the lows were lower in the spot market. Table 1-1 worldwide iron ore vessel shipments, fleet size and average daily hire rates for capsized charters, 1994-2001 | 1994| 1995| 1996| 1997| 1998| 1999| 2000| 2001| Iron ore vessel shipments| 375| 397| 385| 424| 420| 410| 440| 436| Fleet size| NA| NA| 540| 523| 523| 552| 612| Avg. spot rate| \$16, 851| \$20, 149| \$11, 730| \$14, 794| \$10, 105| \$9, 427| \$22, 575| | Avg. 3-year charter rate| \$18, 250| \$18, 544| \$14, 079| \$16, 063| \$13, 076| \$12, 626| \$15, 344| | Table 1-2 current order book for dry bulk capsizes by delivery date | 2001| 2002| 2003| 2004| Number of vessels| 63| 33| 21| 9| Since Mary Linn was estimating in 2002, we can see from the table 1-2 given by the case, the number of vessels in 2001 and 2002 was 63 and 33 respectively.

And the supply had risen to 612 million tons. Under an assumption of the shipping demand in 2002 will be 445 million tons, we estimate the supply in 2002 will be 643 million tons ( $612 + (612 - 552) * 33 / 63$ ). Table 1-3 estimation of ship demand and ship supply (million tons)

	2000	2001	2002	2001 to 2002
Ship demand	440	436	445	2. 6%
Ship supply	552	612	643	5. 14%

As we can see from the table above, the ship supply rises only 5.

14% while the ship amount just rises 2. 06%. The ship supply is twice as more as the ship demand which will leads to a decrease in daily spot hire rates in the next year. Factors of Daily Hire Rate Factor 1: Supply and demand The market price of a good is determined by both the supply and demand for it, as well as the daily hire rates, were mainly determined by supply and demand. When the market demand for shipping capacity was high, owners would keep a vessel in operation as long as possible.

Conversely, when market demand was low, scrapping rose. There had been very few scrapping in recent years, one reason might be that most of the capacity of the worldwide fleet of capsizes was fairly young which we can see from Exhibit 5, another reason might be the market demand is strong recently. Market demand is affected by trading volumes, world economy and even trading patterns. For example, in 2003, the Australian and Indian ore exports would begin, the volume would increase, demand for capsizes would likely increase as well with the higher trading volumes. Exhibit 5 shows the evidence that demands (Iron ore vessel shipments) and supply (Fleet size) drive the average daily hire rate (Avg. spot rate).

Factor 2: World economy The average daily hire rate is also determined by the world economy, especially its basic industries. When the economy is strong, the production and demand for the shipped products increase thus will result a lower hire rate. Conversely, when the world economy is in a recession, the hire rate will be lower. Take an example, the average hire rate declined in 1998 and 1999 because of the effect of 1998 financial crisis.

Factor 3: Age of ships Average hire rate is influenced by the age of the ships. If a company's vessels are relatively new than the industry average, it earned a premium in daily hire rate to the market.

On the other hand, older ships earned a discount hire rate from the industry average. This adjustment is shown in the Exhibit 4. Prospect Analysis The long-term prospects of the capesize dry bulk industry From the passage, we know Linn take an optimistic view of the long-term market demand for capsizes. In 2003, she is aware that Australian and Indian ore exports would begin, and that these new supplies would significantly increase trading volumes Demand for capsizes would likely increase with these higher trading volumes, possibly boosting prices. Table 2.

1 Long-Term Growth Rate | 1994| 1995| 1996| 1997| 1998| 1999| 2000| Iron ore vessel shipments| 375| 397| 385| 424| 420| 410| 440| Growth rate| | 5.87%| -3.02%| 10.13%| -0.94%| -2.

38%| 7.32%| Avg. spot rate| 16,851| 20,149| 11,730| 14,794| 10,105| 9,427| 22,575| Growth rate| | 19.57%| -41.78%| 26.

12%| -31.7| 6.71%| 139.47%| Avg. -yr charter rate| 18,250| 18,544| 14,079| 16,063| 13,076| 12,626| 15,344| Growth rate| | 1.61%| -24.

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08%| 14.09%| -18.6%| -3.44%| 21.53%| From the table 2.

1 we find that, 1. The plus or minus signs of growth rate of Iron ore vessel shipments, Avg. spot rate and avg. 3-yr charter rate are the same. It means that worldwide iron vessel shipments and charter rates had been very strongly associated historically. But the growth rate of Avg.

spot rate and avg. 3-yr charter rate fluctuate more heavily than of Iron ore vessel shipments. 2. The long trend of the shipments of iron core is increasing. From 1994 to 2000, the number of core increased from 375 to 440, the geometric average growth rate is 3.

25% per year. 3. According to Figure 2. 1, from 1994 to 2000, we only can get a conclusion that the Avg. spot rate and avg.

3-yr charter rate fluctuated every year. But we can not found any rule of the fluctuation. The fluctuation doesn't have an upward trend as the shipment of iron core has. In conclusion, though there is a high relationship between the Iron ore vessel shipments and Avg. spot rate and avg.

3-yr charter rate. But it's the demand-supply equilibrium really affect the Avg. spot rate and avg. 3-yr charter rate. What's more, the condition of economy influences the demand-supply equilibrium.

In the long long run, we can suppose the economy is increasing, but in 20 years we can't expect the economy of the world will grow sharply. Figure 2.

1 In the Exhibit 6, the company supposes the growth rate of iron core shipments is 1.5% per year, but it's suspicious that the spot rate and charter rate will increase in the long run. However if the trade volume of iron core

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shipments from 2003 will truly significantly increase as Linn expected, then it's a good deal to buy the ship. But how can we be so aggressive without enough evidence about future increase.

At last, the prospect of capsizes is hard to forecast due to the heavy fluctuation of daily high rate. Financial Analysis Investment Analysis Based on the conditions provided by the article, we value the effect of investing the new ship to the company's value in this section. DCF Approach We add following assumptions before our valuation: 1. Our valuation conducted in the January 2001 and all of our data are ending figures; 2. Used the company's daily hire rate estimation and chartered days estimation; 3. Followed the company's estimation about operating cost, including initial operating cost (\$4, 000) and increasing rate ( $4\% = 3\% + 1\%$ ); 4.

Estimated that the operation of the ship will carry on after the termination of the three-year contract until 25 years; 5. Accordingly estimated the ship will be depreciated on a straight-line basis over 25 years; 6. Followed the company's operating policy, which only operating ships in 15 years. At the end of 15th year, the remaining depreciation of the new ship would be roughly recognized as gain or loss of fixed assets; 7. Assumed that there is \$500, 000 initial investment in net working capital that will grow with inflation; 8.

Assumed two circumstances of Ocean Carriers: the company is a U. S. firm subject to 35% taxation and Ocean Carriers is located in Hong Kong. As we are going to appraise the change value of the company's, we will go through

all related data into income statement. US DCF model was adopted for the evaluation methodology, i.

e. , FCFF of operation in each year is discounted back to 2001 to calculate the net present value. (Refer to Appendix 1) 1. Revenue. Since the operating of new ship would only begin two years after the purchase order was made in 2001, revenue would be recognized from 2003 onwards.

Daily hire rate in 2003 is 20, 000 with an annual escalation of 200 per day. Revenue = Daily hire rate\*(365-maintenance day). 2. Depreciation. The new ship would be depreciated on a straight-line basis over 25 years, which is 1, 560, 000 each year.

However, the counter part from capital expenditure would also be taken into the accumulated depreciation, which is shown in the later discussion. 3.

Operating cost. The operating cost for the first year (2003) is  $4,000 \times 365 = 1,460,000$ , with an annual escalation of  $3\% + 1\% = 4\%$ . 4. Gain on sales of PPE.

The terminal value of purchased ship at the end of year 15 is based on the assumption that it could be sold in the second-handed market, with a gain of  $39M \times (1 - 15/25) = 15. M$ . 5. EBIT. EBIT = Revenue - Depreciation - Operating Cost + gain on sales of PPE 6. Capital Expenditure.

Cap ex in preparation for special surveys would be depreciated on a straight-line basis over every 5 year period started from 2007, which is 300, 000.

Thus the adjustment is implemented for the depreciation, with a result of 1, 620, 000 by adding back 60, 000 to 1, 560, 000. According to the case assumption, the cap ex for 2001 and 2002 is 10% of the purchase price of



new ship (3.9M). And the remaining payment was made in 2003 on delivery date (31.2M).

After the special survey at the end of 15 year, the ship was sold. So the capital expenditure for the final year would be 1/5 of the expense at 2017, which is  $750,000 \times 20\% = 150,000$ . 7. Change of Working Capital. Initial working capital was anticipated at 0.5M, growing 3% as same as inflation rate annually.

8. Free Cash Flow to Firm.  $FCFF = EBIT \times (1-T) + \text{Depreciation} - \text{Cap ex} -$

Change of WC We calculate the following EBIT and EBIT (1-T) from 2001 to 2017: Table 3. 1 Even Year | Year | EBIT | EBIT (1-T) | 0(Before Delivery) | 2001 | - | - | 0(Before Delivery) | 2002 | - | - | 1(Begin Operation) | 2003 | 4,120,000.00 | 2,678,000.00 | 2004 | 4,133,000.

00 | 2,686,450.00 | 3 | 2005 | 4,143,664.00 | 2,693,381.60 | 4 | 2006 | 3,478,596.56 | 2,261,087.76 | 5 | 2007 | 2,842,037.

50 | 1,847,324.38 | 6 | 2008 | 2,774,479.76 | 1,803,411.85 | 7 | 2009 | 2,774,380.23 | 1,803,347.

15 | 8 | 2010 | 2,772,497.60 | 1,802,123.44 | 9 | 2011 | 2,768,365.19 | 1,799,437.37 | 10 | 2012 | 2,444,048.75 | 1,588,631.

69 | 11 | 2013 | 2,361,015.34 | 1,534,659.97 | 12 | 2014 | 2,345,416.08 | 1,524,520.45 | 13 | 2015 | 2,327,056.

96 | 1,512,587.02 | 14 | 2016 | 2,305,799.68 | 1,498,769.79 | 15 (Note 1) | 2017 | 16,513,690.39 | 10,733,898.5 | Note 1 As the scrap value \$5 million

is too low to accept, we assumed that the 180, 000 deadweight ton ship will be sold out with the gain of \$15, 600, 000 at the end of 15th operation year/event year, which equals to the remaining depreciation of the ship.

We roughly recognize this remaining depreciation as the gain or loss of fixed asset. Because we are doing valuation, we would like to use the reasonable market value instead of accounting value. Thus we use the FCFF approach to find out the NPV of the ship is -5, 351, 516. 21 in January 2001, which is discounted at 9%. Therefore, we find out that do not buy the ship if the company is a US company HK As we assumed Ocean Carriers is located at Hong Kong, where ships owners are not required to pay any tax on profits made overseas and are also exempted from any tax on profit made on cargo uplifted from Hong Kong, our valuation is also based on the tax free circumstance. EBIT/EBIT (1-T) from 2001 to 2017 summarized as follows:

Table 3.

Year	EBIT	EBIT (1-T)
2001	0 (Before Delivery)	0 (Before Delivery)
2002	0 (Begin Operation)	0 (Begin Operation)
2003	4, 120, 000. 00	4, 120, 000. 00
2004	4, 133, 000. 00	4, 133, 000. 00
2005	4, 143, 664. 00	4, 143, 664. 00
2006	3, 478, 596. 56	3, 478, 596. 56
2007	2, 842, 037. 50	2, 842, 037. 50
2008	2, 774, 479. 76	2, 774, 479. 76
2009	2, 774, 380. 23	2, 774, 380. 23
2010	2, 772, 497. 60	2, 772, 497. 60
2011	2, 768, 365. 19	2, 768, 365. 19

19| 10| 2012| 2, 444, 048. 75| 2, 444, 048. 75| 11| 2013| 2, 361, 015. 34| 2, 361, 015. 34| 12| 2014| 2, 345, 416. 08| 2, 345, 416.

08| 13| 2015| 2, 327, 056. 96| 2, 327, 056. 96| 14| 2016| 2, 305, 799. 68| 2, 305, 799. 68| 15 (Note 2)| 2017| 16, 513, 690.

39| 16, 513, 690. 39| Note 2 We make the same assumption to the US Ocean Carriers that the gain of the ship sales is \$15, 600, 000. Accordingly we get the NPV of the company is \$3, 162, 356. 89 (Appendix 2 for calculation tables). Thus we suggest conduct this project under Hong Kong Ocean Carriers.

Operating Policy Scenario One Group based in US with policy of not operating ships over 15 years DCF model was adopted for the evaluation methodology, i. e. , FCFF of operation in each year is discounted back to 2001 to calculate the net present value. NPV is the sum of each year present value of FCFF, which is -5, 351, 516. 21.

Refer to Appendix 1) Scenario Two Group based in US with policy of operating ships over 25 years The methodology was similar with scenario one except for the assumption of terminal value of ship. The vessel was demolished and sold after scarp for a price of 5M. In such situation, the NPV for the project would be -5, 251, 702. (Refer Appendix 3). Scenario Three Group based in HK with policy of not operating ships over 15 years As discussed in question 4, the core difference between based in US and HK for the group lies at the calculation valuation of EBIT (1-T). In such situation, the NPV for the project would be 3, 162, 357.

Refer Appendix 2). Scenario Four Group based in HK with policy of operating ships over 25 years In such situation, the NPV for the project would be 2, 532, 635. (Refer Appendix 4). Conclusion 1. Neither Scenario one nor Scenario two results in a positive NPV. 2.

NPV of Scenario one is bigger than Scenario two. 3. Both Scenario three and Scenario four result in a positive NPV. 4. NPV of Scenario three is bigger than Scenario four.

5. The group's operating policy is not applicable due to the NPV reason, no matter in a tax free business environment such as HK or tax intensive environment such as US.