

The Hong Kong Polytechnic University
Department of Logistics and Maritime Studies
Research Seminar

Capacity Allocation of Liner Ships when Considering Strategically Throwing away Cargoes

by

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(Conducted in English)

Abstract:

Nearly 90% of global trade is transported by ships. However, the increasing demand for high-quality shipping services and lower prices combined with the endless competition in the shipping market compel shipping companies to allocate the ship capacity more effectively. First, a benchmark capacity allocation model on a three-port (A, B and C) shipping line is established. In the model, the shipping company can observe the demand from the departure port A, but the demand from the intermediate port B is unobserved. When the shipping company allocates the capacity at the departure port A, the uncertainty from the intermediate port B must be considered. We find that the optimal capacity allocation strategy is related to a threshold parameter, which is decided by the shipping price of each shipping leg and the demand function of shipping leg B-C. When the threshold parameter is larger than the entire capacity of the ship, the shipping company should accept cargoes of shipping leg A-B as many as possible; When the threshold parameter is relatively small, the profit function reaches the peak point when the confirmed cargo delivery amount of shipping leg A-B is equal to the threshold parameter and the confirmed cargo delivery amount of shipping leg A-C is equal to the gap between the entire capacity of the ship and the threshold parameter. The second model considers when strategically throwing away cargoes is allowed, how the shipping company should allocate the capacity. The optimal results show that strategically throwing away cargoes will increase the optimal amount of cargoes that should be accepted to shipping leg A-C in some special cases. By comparing the expected revenues of the two models in the long run, the cases when throwing away cargoes should be allowed are shown. Lastly, a numerical example with exponential distribution demand is illustrated. The gap between the expected revenues of the two models shows that allowing the throwing away of cargoes can achieve a higher expected revenue in all five cases.

Bio:

Fu Jinjin received his BSc in Industrial Engineering from Nanjing University. He is currently pursuing his Master of Philosophy under the supervision of Dr Yulan WANG.

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All are welcome!