Market driven ship investment decision using the real option approach

Abstract

This paper analyzes ship investment behavior where the main driving force is future freight earnings. The shipping market is cyclic and uncertain, and the decision is whether to invest ships now or later. Theoretically, we found the trigger rates—the necessary freight rates for profitable ship investment—for both the net present value (NPV) and real option approach (ROA), assuming that future freight earnings follow a mean reverting stochastic process. The combination of these trigger rates provides the necessary and sufficient conditions for immediate investment. Empirically, we estimated the trigger rates for the whole sample from January 1976 to July 2014, as well as sub-samples that take into account structural changes in the shipping market. Both theoretical and empirical results show that ship investment decisions can be made based on the relationships between the current freight rate and the trigger rates from NPV and ROA. If the freight rate cannot make NPV positive, no investment should be considered. Immediate investment is only recommended when the freight rate is higher than the trigger rate using ROA. Sensitivity analysis shows that the trigger rate is most sensitive to changes in the long-run mean of the freight rate. A simple regression analysis indicates that our model can explain market driven ship investment activities in the past. In addition, results that incorporate structural breaks in the shipping market are closer to actual investment behavior in the market.