

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

## **Game Theoretical Analysis on Shipping Freight Markets under Uncertainty**

by

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**Date: 28 April 2017 (Friday)**  
**Time: 10:30am-11:30am**  
**Venue: R503, Shirley Chan Building**  
**The Hong Kong Polytechnic University**  
**(Conducted in English)**

**Abstract:**

We analyse the behaviour of market participants in shipping freight markets under uncertainty. To address this, we construct a model in which we use the framework of a non-cooperative game and take the following points into consideration. First, freight shipping as a commodity has non-storable property. Therefore, shipowners have to meet the total demand of charterers in the market. Second, at the stage of spot trading, each shipowner faces uncertain demand and capacity constraint, which makes spot prices volatile. Third, to consider the decision-making under uncertainty, we use an  $\alpha$ -quantile utility function as the objective function of each firm. Finally, to express risk-premiums, we apply the framework of non-cooperative games to the market and construct an equilibrium spot price model, where each shipowner can strategically offer a supply curve that is greater than the marginal cost curve. By considering them, we presented the Nash equilibrium spot price and to observe the mark-up and risk premiums in the equilibrium. We also apply the model to shipping freight market, and calculate the degree of risk attitude of market participants.

*Keywords: shipping freight market, Non-Cooperative game, Nash equilibrium,  $\alpha$ -quantile utility function, capacity constraint, uncertainty*

**Bio:**

Koichiro Tezuka, presentator, obtained the B.Sc. degree in 1995, M.A. in 1997, and Ph.D. in Commerce in 2005, all from the Hitotsubashi University, Japan. He is Professor in College of Economics, Nihon University since 2012, and teaches industrial organization. He is an executive director of JSLSE (Japan Society of Shipping and Logistics), and JSTE (Japan Society of Transportation Economics). His research interests are in Maritime- and Transport Economics.

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**All are welcome!**