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SPECIAL INTEREST SESSION

PRODUCTIVITY OF GLOBAL LOGISTICS AND SUPPLY CHAINS: PORT-FOCAL VERSUS FIRM-FOCAL

Chairman: John Liu, Hong Kong Polytechnic University, Hong Kong

Session Presentations (8 Speakers):

1. Prof. John LIU (HK PolyU), Jianfeng (Jason) Mao and Jiguang (Laser) Yuan
“Idiosyncratic-Risk Characteristics of Port-Focal Logistics”

Abstract

The studies of logistics and supply chain management (SCM) have been based on a firm-focal framework; while in reality, the worldwide operations of logistics and SCM are carried out around ports and airports, of which the studies are basically void so far. Aggregate logistics as a necessary service sector of an economic system can no longer be fully characterized by firm-focal logistics. Just like a building cannot be characterized fully by its building blocks alone. The key contribution of this paper is to obtain value characteristics of a port-focal logistics system in terms of quasi-variational inequalities (QVI) of impulse theory, and show that value of risk-pooling exists in port-focal logistics, and can be measured by endogenous disturbance structure in response to exogenous variability of idiosyncratic demands. Algorithms are developed to compute the value of mutuality by solving the QVIs.

2. Prof. YAN Hong (HK PolyU), Arthur Kong
Analysis on Investor’s Behavior on Port Selection: A Risk-Minimization Model of Choice (Full paper submitted)

Abstract

The dominating role of public sector in the port industry has been increasingly questioned for the effectiveness of privatization on enhancing efficiencies and lowering costs. Under the trends of privatization, deregulation and decentralization, the public port authorities are eager to attract private capital into both port infrastructure and operations, aiming to high efficiency and competitive

advantages. Investment decisions of private investors are crucial to policy formulation in port authorities and operators. This study models the port choice behavior of port investors by utilizing a random choice model. We establish different a random risk-minimization model where each port investor faces a choice of several alternatives and makes their decision on the basis of various port and terminal characteristics. The findings indicate that the location of the port, the economic development level of the hinterland, the logistic network combined with government support play significant roles. This study suggest a reasonable framework to analysis the investors' behavior under the global economic crisis.

3. Dr T.L. YIP (HK PolyU), Xinyu Sun, John J. Liu

Group Competition of Global Ports (Revised full paper submitted)

Abstract (updated)

This paper focuses more on port group effects rather than individual variations. Port is a major component of maritime supply chain. Improving port efficiency can therefore have a significant impact on the whole maritime economy. Recognizing this fact, many governments have consistently prioritized the ports as a central element of infrastructure to promote regional economic growth. Our study is based on a stochastic production frontier model, which separates the technology heterogeneity with the inefficiency, and allows for both the technology and inefficiency to vary across time. We compile a panel data of container terminal operators from 1997 to 2004 to study the efficiency of container port production. The port groups involved in our study include HPH, PSA, Dubai Ports World, SSA and so on. We compared the effects of operator heterogeneity and port grouping. Our findings show port groups are important in promoting terminal efficiency at the global level. The global operators of stevedore background shows a higher efficiency than those of carriers.

4. Dr Adolf Ng (HK PolyU), Ismail B. Cetin (Dokuz Eylul), Girish C. Gujar

THE SPATIAL CHARACTERISTICS OF DRY PORTS IN DEVELOPING ECONOMIES: THE CASE OF INDIA (Full paper submitted as 2-50)

Abstract

In conjunction with containerization and the establishment of multimodal supply chains, the establishment and use of dry ports have has gained momentum globally. Given their pivotal roles in affecting supply chain's efficiency, and thus the competitiveness of manufactured products in the global market, establishing them at optimal locations is extremely important for policy-makers. Nevertheless, until now, studies on the locational characteristics of dry ports have been very scarce, especially in developing economies like India. Understanding such deficiency, using India as the case study, this paper investigates the spatial characteristics of dry ports in developing economies. By applying the centre of gravity model, the optimal dry ports locations in three major industrial regions within India have been assessed, with special attention paid on whether the simulated optimal locations are matching the realistic locations and, if not, investigating the major reasons for such anomaly. Conclusively speaking, this paper has provided some valuable insight on the forces in affecting the spatial characteristics of dry ports. This paper has added significant value in enhancing our understandings on the concepts of location, the interaction

between natural- and man-made forces in affecting the how transportation hubs should be located, as well as the policy implications of such forces. Also, by undertaking a scientific analysis on dry ports in developing economies, this paper has also enriched the geography literature highlighting the potential diversifications in transport and regional development due to geographical variations.

5. Dr Meifeng Luo (HK PolyU) , Lixian Fan, and Liming Liu

A Dynamic-economic Model for Container Freight Market (Edited full paper submitted)

Abstract

This paper presents a dynamic-economic model analyzing the fluctuation of container freight rate due to the interactions between the demand for container transportation services and the container fleet capacity. The demand for container transportation services is derived from international trade and is assumed exogenous. The container fleet capacity increases with new orders made two years ago, proportional to the industrial profit. Assume market clears each year, the shipping freight rate will change with relative magnitude of demand and supply shifts.

The dynamic model is estimated using the world container shipping market statistics from 1980 to 2008, applying the three-stage least square method. The estimated parameters of the model have high statistical significance, and the overall explanatory power of the model is above 90%. The short-term in-sample prediction of the model can largely replicate the container shipping market fluctuation in terms of the fleet size dynamics and the freight rate fluctuation in the past 20 years. The prediction of the future market trend reveals that the container freight rate would continue decreasing in the coming three years if the demand for container transportation services grows less than 8%.

Keyword: container freight, economic-dynamic model, Empirical analysis, market forecast

6. Dr. Jia Yan (Washington State), Xiaowen Fu (HK PolyU), Tae Oum (UBC, Canada)

Exploring Network Effects of Point-to-Point Networks: An Investigation of the Spatial Entry Patterns of Southwest Airlines (Full paper submitted)

Abstract

This paper explores network effects in Point-to-Point airline networks by examining the spatial entry patterns of Southwest airlines during the 1990-2006 period. Estimation results from a spatial probit model reveal clear spatial dependence in profitability across different routes served by the carrier. Detailed investigation suggests two main sources of network effects, namely: (1) airport and regional presence, and (2) substitutability of markets. Findings of the paper suggest also that the network effects embedded in Southwest's Point-to-Point network have many distinguishing features as compared to those identified in a typical Hub-and-Spoke network. This study

brings some fresh insights on airline network effects in general, as well as explains the pattern of aggressive network expansions of LCCs in particular.

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7. Prof Andrew Lim (HK CityU), Hu Qin (HK CityU), and Zhou Xu (HK PolyU)
Transportation Procurement with Cost Balancing Constraints

Abstract

In this paper, we studied a transportation procurement problem for a shipper that has financial independent divisions worldwide. In order to lessen the extent of unfair situation in which for some divisions the majority of their freight is transported by expensive carriers and for others by cheap ones, the transportation cost for each lane and for each division must satisfy a balancing constraint. In addition, the shipper is usually requested to commit a minimum quantity of freight volume to each of its carriers. We formulate this transportation procurement problem with cost balancing constraints into a mixed integer programming model, to which finding an exact optimum solution is shown to be computationally intractable. To achieve high-quality allocation plan practically, we devise a meta-heuristic solution approach based on the Tabu Search technique. Extensive experiments have been conducted to measure the performance of our proposed solution procedure and its related algorithms, and the results have shown that our work is a powerful and effective support tool for decision-makers. The practical usefulness of the model and the solution approach is substantiated by their applications in a multinational shipper, which source and transport products from China and other Asian countries to satisfy the demands of its sales divisions located in more than twenty European countries.

Keywords: freight procurement; minimum quantity commitment; balancing; carrier alliance; mathematical programming; meta-heuristics

8. Dr K.X. Li (HK PolyU) , Yulan Wang, Min Jie

**Remedy Against Duty of Disclosure: Weaknesses and Amendment
(Edited full paper submitted)**

Abstract

One hundred years ago, when signing the marine insurance contract, the underwriter was not well-informed and in a disadvantageous position. As a result, Marine Insurance Law of UK 1906 regulates a strict ex post remedy with respect to the duty of disclosure. Today it has become the most significant regulation in the jurisdiction of the marine insurance disputes, widely referred by many countries when drafting the marine or non-marine insurance laws. But with the development of the shipping industry and the insurance market, the underwriter has already understood most of the information of materiality (IoM) for the business. And Marine Insurance Law 1906 is believed outdated regarding the duty of disclosure.

The current remedy rule in the insurance law fails to classify the different types of the policyholders. In this paper, we consider two types of policyholders who will conceal or distort the information: (I) deceive the underwriter to cover the uninsurable loss; (II) deceive the underwriter to obtain a contract with low price. And we classify the IoM into three categories: (1) important for the underwriter only; (2) important for the policyholder only; (3) important for both parties. Here, the inducement of loss from (2) and (3) are our main focus. Then we develop the analysis for the various scenarios combining different types of policyholders and IoM.

First, based on the disclosed IoM, the premium rate is priced by minimizing the ruin probability controlled by a stochastic model. Second, through analyzing the inducement of the loss event and the utility of the policyholder after the ex post remedy, we reveal the weaknesses of the current remedy rules. It is consistent with the voice of amendment questioned by the academia, the legislators and the shipping industry. Finally, some amendment suggestions are provided in this study: the discriminative remedy rules are regulated corresponding to the four scenarios we discuss. The new rules succeed to prevent the underwriter from receiving money by the intentional default (refuse to pay for the claim). What's more, the amendment motivates the transfer of the asymmetric information from the policyholder to the underwriter via a learning process.

Key words: duty of disclosure, remedy, amendment, stochastic control, IoM