

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

## **Tradable Permit Schemes for Controlling Traffic Congestion with Variable Capacity and Demand**

by

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(joint work with Prof. André de Palma)

**Date: 12 May 2017 (Friday)**  
**Time: 10:30am-11:30am**  
**Venue: M802, Li Ka Shing Tower**  
**The Hong Kong Polytechnic University**  
**(Conducted in English)**

### **Abstract:**

There is a substantial literature on the use of Tradable Permit Schemes (TPS) to control road traffic congestion. Most studies have assumed that a TPS can be optimized to prevailing travel demand and supply conditions. In practice, however, it may be difficult to adjust permit quantities if demand and road capacity are changing rapidly. We analyze the design of a TPS when agents learn the state before making their travel decisions, but the number of permits issued is inflexible. We compare the welfare performance of a TPS with congestion pricing when the level of the toll is similarly constrained to be the same across states. In general, a TPS performs well when first-best usage levels are similar across states. Analogously, a fixed toll does well if first-best toll levels are similar across states. The welfare ranking of a TPS and a toll depends on the curvature of the travel cost function, the nature of demand and cost shocks, the probabilities of good and bad states, and whether or not the permit constraint always binds. We also consider a modified version of the basic permit scheme in which the government issues an initial stock of permits, and then offers to sell further permits at a price  $s$ , or to buy permits at a price  $r$ , where  $r < s$ . Offers to buy and sell take advantage of current information available to agents, and impose a collar on the equilibrium price of permits. We show that for a linear version of the model the modified permit scheme outperforms a fixed toll, whereas a fixed toll outdoes the basic permit scheme.

### **Bio:**

Robin Lindsey holds the CN Chair in Transportation and International Logistics at the Sauder School of Business, University of British Columbia. His research interests include traffic congestion, road pricing, financing transportation infrastructure, urban public transportation and advanced traveler information systems. He has also worked on topics related to industrial organization including retail market competition, price discrimination and predatory pricing. Lindsey is a founding board member and Past President of the International Transportation Economics Association (<http://www.iteaweb.org>), and an Associate Editor of *Transportation Research Part B*.

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**All are welcome!**