

Lecture Series of the Research Institute for Supply Chain Management

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Summer semester 2017

**“Optimizing an emission allowance trading scheme for local governments: A Stackelberg game model and hybrid algorithm”**

May 22, 2017, 5:00 pm – 6:30 pm

Building D2 ,Ground Floor, Room 0.38, Welthandelsplatz 1, 1020 Vienna



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**Abstract:** We investigate a policy-making problem for a local government to implement a market driven emission allowance trading scheme by considering the interactive production decisions of firms in its administrative region. The government sets the emission reduction target of the region and allocates tradable initial allowances to firms, and firms plan their production according to their allowances on hand. In accordance with the characteristics of the problem, we formulate a Stackelberg game model to analyze the decisions of the government and firms aiming to maximize the social welfare of the region and minimize the overall cost of each firm. In view of the non-concavity and discreteness of the decision model for the government, we develop a hybrid algorithm to solve the game model efficiently. This algorithm consists of a polynomial time dynamic programming, binary search, and genetic algorithm. Results reveal that i) the Stackelberg game model greatly supports local governments' policy-making on the market-driven emission allowance trading scheme, and that ii) the social welfare is a great metric for policy-making decisions on environmental regulations.

**Biography:** Dr. Zhang is a Professor of Operations Management in Department of Management at IESEG School of Management, Lille-Paris, France. She obtained her BEng and Ph.D. degrees in Industrial Engineering from China in 1998 and Singapore in 2007, respectively and Habilitation in Management Sciences from France in 2012. Her research interests include operations and supply chain management. In these areas, she has published many articles in international refereed journals, such as *Decision Support Systems*, *IIE Transactions*, *IEEE Transactions on Engineering Management*, *European Journal of Operational Research*, *International Journal of Production Economics*, etc. Dr. Zhang has extensive teaching experiences in a number of countries, including the Netherlands, France, Singapore, and China. She has taught courses at undergraduate, graduate and postgraduate levels.