

# Trading System Design Based on Cooperative Game for a Two-Level Supply Chain

**Kotomichi Matsuno**

Department of Business Design and Management,  
Graduate School of Creative Science and Engineering,  
Waseda University  
3-4-1 Okubo, Shinjuku-ku, Tokyo, Japan  
sidiwu@aoni.waseda.jp

## Abstract

Supply chains of modular consumer electronics, such as LCD TVs, PCs, and smart phones have gradually changed from traditional vertical integration to horizontal division of labor. Almost all the manufacturers of consumer electronics in Japan have changed their sales channels from the affiliated electronics stores to large-scale retailers. Therefore, their attentions on sales planning have been moved to negotiation with such large-scale retailers on trading price and volume. Since the market power deviation, comparing with the retailers, manufacturers are getting difficult to achieve enough profits with the contract terms decided by negotiation. Information asymmetry, market power deviation and pursuing self-interest only are considered as the main reasons of Double Marginalization (DM) phenomenon.

In this study, after discussing the DM in a two-level supply chain which consists of a consumer electronics manufacturer and a retailer, a trading system based on cooperative game is proposed to eliminate the DM in order to help both players to build a win-win relationship. Effectiveness on total profit of whole supply chain and profit of each player with the proposed trading system are confirmed by numerical experiments. Products features as well as cost structures features of manufacturer and retailer are considered to discuss the applicability.

## Keywords

Double Marginalization, Negotiation, Trading System, Cooperative Game and Supply Chain.

## Biography

**Kotomichi Matsuno** is an Assistant Professor in Department of Business Design and Management in Graduate School of Creative Science and Engineering at Waseda University, Tokyo, Japan. He received his MD and PhD in Management Engineering from Waseda University, Japan, in 2012 and 2019, respectively. His research interests include operations management and strategy, such as supply chain management and coordination, risk management and performance evaluation, negotiation and supply chain contract. He is a member of the Japan Industrial Management Association, INFORMS and POMS.