

The Impact of Valuation Heterogeneity on Equilibrium Prices in Supply Chain Networks

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Abstract

This paper studies bargaining in two-sided supply chain networks where manufacturers on the demand side purchase an input from suppliers on the supply side. The manufacturers may have heterogeneous valuations on the input sold by the suppliers. In such a supply chain network, a manufacturer and a supplier must have a business relationship or “link” to bargain and trade with each other. However, a firm on one side of the supply chain network might not have a business relationship with every firm on the other side of the supply chain network. We show that valuation heterogeneity, supply and demand balance, and network structure are the main factors that influence the equilibrium prices, trading pattern and surplus allocation in such a supply chain network. Valuation heterogeneity among manufacturers can mitigate unfavorable supply and demand balance to protect some surplus for the manufacturers and leads to higher price dispersion in the supply chain network. We demonstrate that bargaining effectively takes place in smaller subnetworks in a general supply chain network and develop an algorithm to decompose the general network into these smaller subnetworks, which simplifies the analysis of the general supply chain network significantly. We then identify what types of supply chain networks are competitive so that all trades happen at the same competitive price defined solely according to the aggregate supply and demand balance in the supply chain network and/or efficient so that only manufacturers with the highest valuations are able to trade. We also identify what types of links can be added into a supply chain network to improve its competitiveness and/or efficiency.

Keywords:

Supply Chain Network, Bargaining, Valuation Heterogeneity, Network Efficiency

Biographies

Alper Nakkas is an Assistant Professor in the Department of Information Systems and Operations Management in the College of Business at University of Texas, Arlington. He holds a PhD degree in Economics from Vanderbilt University. His research interests include supply chain management, retailing, and game theory. He is member of INFORMS and POMS.

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