

Allocation of Supply Contracts
with Service Guarantees



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Abstract

We address the problem of allocating a set of firms among several suppliers. Each firm wants to establish a contract with a single supplier. In particular, each firm needs to process a certain volume of work at a given price, and each supplier's ability to process the customers' requests is constrained by a production capacity. The suppliers compete for the customers by offering them a set of guarantees that their products will be available when needed. These can be specified as backorder penalties, minimum fill-rate agreements, etc. Each firm chooses the supplier with the highest level of guarantee. On the other hand, the suppliers make their offers in order to earn contracts with the set of firms that maximize their profits. The assignment of firms induced by the levels of guarantee may not coincide with the allocation preferred by the suppliers. The main objective of this paper is to determine which set of contracts is allocated to each supplier and how to determine the guarantee levels in order to achieve such allocation. We model this problem as a game among the suppliers. We first characterize the Nash equilibria in a fairly general setting. We then investigate the equilibria that arise under a cooperative agreement among the suppliers and characterize those that are Pareto preferred. Based on this, we study in detail a situation where two make-to-stock suppliers compete for two contracts with backorder penalties.

Biography

Francis de Véricourt is Assistant Professor of Business Administration at the Fuqua School of Business. Prior to joining the faculty of Duke University, he was a visiting researcher at MIT. His main research interest is in the optimization of supply chains and service delivery systems. His recent work has focused on optimal stock allocation, supplier contract design, call center management and operations management for non-profit organizations. He has published articles in leading academic and professional journals such as Management Science and Operations Research. Francis is a native of Paris, France, where he graduated.

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