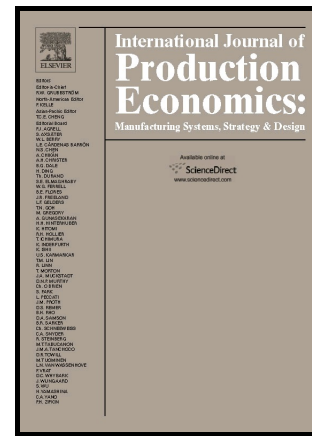


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Modeling Supplier Capacity Allocation Decisions

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Abstract

Understanding the cost effects of offering flexibility in any contractual setting is of considerable importance to suppliers. In this paper, we propose a Strategic Capacity Allocation (SCA) contract to deal with the problem of supplier-capacity allocation in a single-supplier, multiple-buyer system, when bilateral contractual agreements (between the supplier and each buyer) specify bounds of per-period purchase quantities, as well as penalties for deviating from these agreed-upon quantities. We formulate the problem as a stochastic dynamic program, and characterize the structural properties of the optimal allocation scheme in the current and future periods. In addition, we quantify the cost trade-offs of offering more flexibility to customers, which can serve as an input to aid the supplier in negotiating contracts. We also provide insights on the effect of setting contract parameters, i.e., shortage penalties, as a means to align short-term goals (i.e., profit maximization) versus long-term objectives (i.e., maximizing market positioning/growth) via improved customer service to strategically-valuable customers.

Keywords: inventory control; supply contracts; supply chain management; dynamic programming.

1 Introduction

It is generally accepted that the more “flexibility” a supplier offers his customers, the more he can charge for the goods being sold. Typically, flexibility is extended in terms of how far in advance customers must commit to making a purchase, the level of product customization available, and through price/quantity discount schedules or contracts. Examples of these types of flexibility can be found in the airline (advance ticket purchasing), automotive (options packages), and computer (minimum purchase commitments) industries. The extent to which flexibility is offered to customers

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