

Inventory Management and Pricing Decisions for a Supply Chain with Demand Leakage and a Return- Policy Contract

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Abstract

We address a supply chain wherein a manufacturer supplies two newsvendor-type items to a retailer who sells the two items with two distinct retail prices in a stochastic demand market, allowing demand leakage from the higher-priced item to the lower-priced one. The objective of this study is to determine the two items' order quantities, retail prices, wholesale prices and buyback prices to coordinate the chain and create a win-win situation, from which we learn that the buyback commitment is Pareto-efficient and can enhance the chain's profit proficiency when facing high demand uncertain markets. Many significant managerial insights regarding demand leakage and demand uncertainty are observed hereafter.

Keywords: Newsvendor, supply chain, demand leakage, return policy, demand uncertainty.

1. Introduction

It is well-known that if a manufacturer and a retailer, two independent entities in a supply chain, are each seeking to optimize their own profits, "double-marginalization" will occur (Spengler [20]). This phenomenon, in turn, will lead to poor chain profit performance as a result of a less optimal order quantity relative to a coordinated supply chain. Therefore, contractual terms enhancing a chain's profitability have become imperative when managing inventory and pricing decisions in a decentralized supply chain, two purposes of which are supply chain coordination and Pareto-efficiency. A contract is defined as chain coordination if it maximizes the chain's profit and Pareto-efficient if each member's profit is no worse off when the contract is in place than under other default contracts (Bosed and Anand [2]).

A traditional price-only contract is widely considered a basic, simple trade-off in the extant literature, as a manufacturer does not provide any incentive to retailers and the downstream partners take all responsibility for excess inventory at the end of the selling season. However, plenty of existing articles, such as Larivieue and Porteus [11], Cachon