Optimal pricing and replenishment policy for a deteriorating item in a two-echelon supply chain

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Abstract

This paper deals with an emerging problem that jointly determines the optimal retail price and inventory replenishment policy in a manufacturer-retailer channel. We formulate both the centralized and the decentralized decision-making policies in the two-echeloned supply chain with an aim to maximizing the total profits. The demand in the retail end is assumed to be price-dependent and the item is subject to continuously exponential decay. We derive the optimal solutions, prove their optimality, and carry out numerical study. In addition, a profit-sharing mechanism, through a quantity discount scheme, is proposed so that Pareto improvement, i.e., one party is better-off and the other is not worse-off, can be achieved among channel participants.

Keywords: Inventory, pricing, replenishment, channel coordination, deterioration.

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