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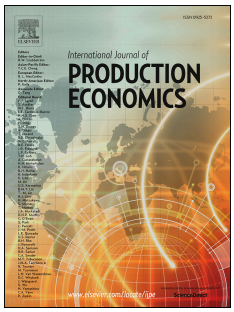

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Integrated pricing and supplier selection in a two-stage supply chain

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Abstract

This article presents an inventory replenishment model with supplier selection and pricing decisions in a two-stage supply chain consisting of a manufacturer stage followed by a retailer stage. A decision maker controls both stages. The manufacturer can procure the required raw material from a list of potential suppliers, each of whom has restrictions regarding capacity and quality. In this model, the manufacturer periodically replenishes the retailer's inventory, whose demand is sensitive to price changes. We propose a mixed integer nonlinear programming model designed to determine the number of orders placed to the selected suppliers per order cycle, the amount of inventory replenished at each stage, and the selling price that maximizes the profit per time unit. Additionally, we provide upper and lower bounds for the retailer's selling price and for the manufacturer's lot size multiplicative factor, which results in a tight feasible search space.

Key words: Two-stage supply chain; Price-sensitive demand; Supplier selection; Mixed integer nonlinear programming model; Optimal selling price bounds.

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