Contract design in a supply chain considering price and quality dependent demand with customer segmentation

Mehdi Seifbarghy[1], Khashayar Nouhi[2] and Amin Mahmoudi[3]

[1] Department of Industrial Engineering, Alzahra University, Tehran,
[2] Iran Faculty of Industrial and Mechanical Engineering, Qazvin Branch, Islamic Azad University, Qazvin, Iran
[3] Department of Industrial Engineering, Buein Zahra Technical University, Buein Zahra, Qazvin, 3451745346, Iran

Abstract

We consider a two-level supply chain consisting of a manufacturer and a retailer. The retailer gives a final product to a competitive market with customer sensitive to price. The customer demand is assumed to be constant depending on the price and quality degree of the final product. The manufacturer decides on the quality degree of the product. The optimal values of the major decision variables of the chain are determined for different conditions. The supply chain in centralized condition is considered and the optimal values of the price and the quality degree are found. Chain profit in decentralized condition is optimized and the optimal values of wholesale price and quality degree are determined. Retailers revenue sharing contract is designed and the optimal values of wholesale price and quality degree are found. Finally, a market segmentation condition in which customers are divided into two categories of quality oriented and price oriented is considered; then, the threshold of the percentage of potential quality oriented customers is determined. A set of numerical examples are designed in order to analyze the optimal values of the decision variables.