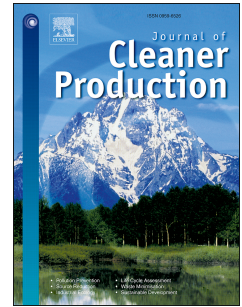


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Analyzing structure of two-echelon closed-loop supply chain for pricing, quality and recycling management

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Abstract

This paper analyzes the effects of recycling and product quality level on pricing decision in a two-echelon closed-loop supply chain (CLSC), where demand is sensitive with price and quality level of the product. Under Stackelberg game setting, this paper considers three possible collection activities of used product for recycling, viz, retailer led collection, manufacturer led collection and third party led collection. It is found that third party's involvement in used product collection activity is always disadvantageous. In this proposed model, cost parameters of the reverse channel play an important role in determining best channel structure. Quality level and price of the product directly vary with recycling. A threshold of collection effort determines which party between manufacturer and retailer can provide the best quality product at least price. To resolve channel conflict and to distribute surplus profit, the concepts of sub-game perfect equilibrium and alternative offer bargaining strategy are used. The analysis reveals that the subgame perfect equilibrium retail price cuts out channel conflict and depicts particular profit split irrespective of the offering party. The proposed model is also justified by illustrating numerical examples.

Key words: Closed-loop supply chain; product quality; Sub-game perfect equilibrium; Coordination; Strategic bargaining.

1 Introduction

In recent highly competitive business environment, the companies are engaged in improving economic and environmental performances for long term sustainability. A large number of companies are minimizing resources (fresh raw material) for economic viability. [In addition to selling new product through forward](#)

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