A Study of Coordination Mechanisms for Three-echelon Supply Chain System

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ABSTRACT

Supply chain management has drawn increasing recognition by academicians as well as practitioners. The members of the supply chain system are keener on building collaborative relationship to achieve mutual benefits for all firms. Therefore, the issue of establishing coordination mechanisms to maximize profits for the entire system is important. In this study, we consider a three-echelon supply chain system consisting of one retailer, one distributor, and one manufacturer. The objective of this study is to design coordination mechanisms that can facilitate to determine the price and order quantity for achieving profits maximization at each member. Stackelberg game is used to model the scenario under investigation. The manufacturer plays the leader role; it announces its wholesale price to its downstream distributor by taking account of the order quantity of distributor. The distributor acts as a follower by considering the upstream wholesale price specified by its upstream manufacturer as well as its downstream retailer ’ s order quantity to decide its retailer price. Each member tries to achieve seeks to its own benefit. However, the proposed coordination mechanisms could help to achieve the maximum profit for the entire channel, meanwhile maintaining an equilibrium status. We assume the demand linearly proportioned to its sale price only occurs at the retailer. We compare the three coordination mechanisms volume discount, franchisee fees, and profit sharing incorporating with quantity discount. The results of numerical study provide some managerial insights for designing channel coordination.

Keywords : Three-echelon supply chain ; Stackelberg game ; coordination mechanism

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