A DUAL-CHANNEL SUPPLY CHAIN MODEL UNDER PRICE AND WARRANTY COMPETITION

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Abstract. Many industries use dual distribution channels to offer and distribute products, including electronics, appliances, and apparel. This research develops a dual-channel supply chain including a manufacturer direct channel and a retail channel. If customers incur higher price or lower warranty length, they will shift to another channel, i.e., the substitute effect. In the retail channel, the manufacturer determines the optimal wholesale price and the warranty length, whereas the retailer determines the optimal retail price. In the direct channel, the manufacturer determines the optimal price and warranty length to provide to end customers. The current study adopts a non-cooperative and cooperative equilibrium to solve the problem described above and discusses how to use profit sharing mechanisms to achieve a positive situation in the cooperative game. The study concludes with a computational analysis that leads to various managerial insights.

These results should be a useful reference for managerial decision-making.

Keywords: Dual-channel, Substitute effect, Pricing, Warranty length, Internet

1. Introduction. A supply chain encompasses all the facilities, functions, and activities involved in producing and delivering a product or service, from suppliers to customers. Supply chain management coordinates all activities to provide customers with prompt and reliable service of high-quality products at least cost. Research has investigated the issues of supply chain management for a long time. Recently, Su [1] and Chou [2] considered the topic of inventory control to reduce total cost or satisfy variable customer service levels. Tominaga et al. [3] discussed the effects of inventory control on bullwhip in the supply chain. Zhang et al. [4] investigated knowledge sharing in supply chain management. Grunder [5] dealt with lot sizing, delivery, and scheduling problems in a single-stage supply chain. Tsao [6] simultaneously determined pricing, inventory, and payment decisions.

Traditional selling systems have changed dramatically with customer use of the Internet. Manufacturers use both traditional retail stores and the Internet to sell their products. Such a system is called a two-echelon dual-channel distribution system, or more generally, a multi-channel distribution system. A review of the literature on distribution channels reveals several important economic reasons for serving various customer segments through different channels. Moriarty and Moran [7] pointed out that dual or multi-channel systems would become the dominant design for computer industries in the 1990s. However, not only computer industries, but also electronics, appliances, sporting goods, and apparel, have begun to sell directly to customers over the Internet. When commercial organizations