Cooperative Pricing Under Forecasting Sharing in the Manufacturer-E-Retailer Supply Chain

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ABSTRACT

With the rapid development of the Internet, many retailers and individuals nowadays use this technology to engage in direct e-retailing sales. In this article, we investigate the value of demand-forecast information sharing in a manufacturer-e-retailer supply chain. The value of market information depends not only on its accuracy, but also on the e-retailer’s market power and the product’s Web compatibility. We develop a theoretical approach to examine the value of information sharing for the manufacturer and the e-retailer first, and then we further check to see how information sharing is moderated by the e-retailer’s market share and the product’s e-market-base demand. Our results suggest that under some conditions, both the manufacturer and the e-retailer can be better off from information sharing. Especially when the e-retailer’s market share is larger and the product’s e-market-base demand is higher, information sharing is more valuable for the supply chain players. Using our analysis findings, we indicate marketing strategies that the manufacturer and the e-retailer may want to adopt.

Keywords: e-retailing; information sharing; market power; product strategies; supply chain management

INTRODUCTION

The surge in the growth of information systems over the past two decades has significantly reshaped supply chain management and given businesses an unprecedented marketing opportunity. In the United States, business-to-consumer (B2C) sales over the Internet are increasing at an unprecedented
rate. The Census Bureau of the Department of Commerce estimated that retail e-commerce sales for the first quarter of 2006 were $25.2 billion, a 7% increase from the first quarter of 2005. In the same period, the total retail sales increased by only 3.2% and retail sales over the Internet for the whole year of 2005 totaled $87.7 billion. The growth rate is going to increase even further in the near future. As a result, the growth of the Internet has made it attractive for many retailers or individuals to engage in e-commerce sales, especially for those products that are more suitable for selling through the e-market (W. Y. Chiang, Chhajed, & Hess, 2003).

The significant benefit of information systems is to let firms share information (i.e., demand-forecast information, sales trends and data, etc.) quickly and conveniently so that market information can be more accurate and efficient in a supply chain. Information sharing can effectively improve the efficiency of supply chain management. The manufacturer and the retailer can use the information systems to respond to customer demand more quickly and improve the accuracy of demand forecasts by information sharing. There is obviously no doubt that a good information base helps decision making. But can information sharing within a supply chain increase the profits of both the manufacturer and the retailer?

In our research, we focus on the value of demand-forecast information sharing in a supply chain consisting of a manufacturer and an e-retailer (e-commerce retailer). We use a game theoretical model to specifically study the following questions. Under what conditions can both the manufacturer and the e-retailer benefit from information sharing? Under what condition is only one player better off and the other worse off from information sharing? When the market share of the e-retailer or the e-market-base demand of the product category is larger, what is the value of information sharing? Based on our results, we suggest marketing strategies for the supply chain players (the manufacturer and the e-retailer) to adopt. Findings from our research should be of value when the manufacturer and the e-retailer make plans on how to improve market information accuracy, which can then be transmitted to their profits.

The rest of our article is organized as follows. The second section provides a summary of the relevant literature. Then, the third section presents our modeling framework, while the section after that analyzes the cases of no information sharing and information sharing for the manufacturer and the e-retailer under the Stackelberg game. The fifth section studies the value of information sharing for the manufacturer and the e-retailer and how the value of information sharing is further moderated by the market share of the online retailer and the e-market-demand base of the product category. We present our numerical analysis next, and conclusions and managerial implications are presented in the final section. All relevant proofs are given in the appendices for clarity of exposition.

LITERATURE REVIEW

Given the increasing importance of information, researchers have looked at the subject of information from a variety of perspectives. Raju and Roy (2000) provide a good summary of this by discussing the studies done by, among others, Hilton (1981), Vives (1984), Morrison and Schmittlein (1991), Blattberg and Hoch (1990), Padmanabhan and Rao (1993), Day (1990), Glazer (1991), Sarvary and Parker (1997). Raju
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