

Chapter 11

The Value of Information Sharing: Impact of Inventory Policy, Pricing Decision, and Product Substitution

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ABSTRACT

This chapter proposes a model to study the effects of inventory policy, pricing decision, and product substitution on the value of information sharing. The value of information sharing has been studied widely in the literature. To simplify models, prior research usually studies a supply chain with one product. However, modern supply chain models often produce and distribute ranges of products. Moreover, manufacturers and retailers define prices for products based on demand forecast and inventory levels or they even compete by using pricing decisions. Carefully reading the extant literature, the authors found that no existing articles considers the inter-relationship of inventory policy, pricing decision, and product substitution when studying the value of information sharing. The proposed model in this chapter will help to provide insights on the value of information sharing and fill the gap in the literature.

INTRODUCTION

Information sharing has been viewed as a crucial factor for the success of supply chain management. Information sharing can help companies to respond quickly by having appropriately production and replenishment plans (Taleizadeh, Noori-

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daryan, & Cárdenas-Barrón, 2015). It also improves the demand forecast accuracy (Wan & Sanders, 2017) which enables a better price structure, better management of consumer demand, and inventory management.

The value of information sharing has been studied widely in the literature. Chen (2003) and Bian, Shang, and Zhang (2016) provide a significant review of the value of information sharing. Lee, Padmanabhan, and Whang (1997) indicate that information sharing can eliminate the bullwhip effects. Gaur, Giloni, and Seshadri (2005) state that information sharing reduces the safety stock level at the manufacturer side by 16%. Ketzenberg, Geismar, Metters, and van der Laan (2013) believe that information sharing can increase the profit for the supply chain up to 30%.

However, there are strategic barriers to implement information sharing in a competitive setting. Specially, in addition to the competitiveness between retailers, modern supply chains often provide multiple varieties of a product. That is a customer may buy another product when the desired product is unavailable. This chapter studies information sharing in a competitive supply chain model and define mechanisms to overcome such barriers. The studied model consists a manufacturer and two competitive retailers in an uncertain market. Two retailers have demand information and buy products from a common manufacturer. The model is common in practice when retailers have one opportunity to buy products and compete with others. The goal of this chapter is to study the effects of inventory policy, pricing decision, and product substitution on the value of information sharing.

Existing literature of information sharing can be classified into two categories. The first category focuses on the strategic aspect of the supply chain. For example, Jain, Seshadri, and Sohoni, (2011) consider a two-echelon supply chain in differentiated Cournot competition. The second category focuses on the operational benefits of information sharing. This chapter presupposes the benefits of the strategic aspect and explores the operational aspect. In this respect, this chapter extends the works of Panda et al. (2015), Ganesh et al. (2014), and Jain et al. (2011). Panda et al. (2015) study the effects of information sharing on the inventory policy and pricing decisions. Ganesh et al. (2014) realise the importance of product substitution and study the effect of information sharing on the product substitution. Jain et al. (2011) mainly focus on the strategic aspect and study the effects of information sharing on pricing decisions and product substitution. In contrast to these three works, this chapter studies the effects of information sharing on three factors inventory policy, pricing decisions, and product substitution.

The contributions of this chapter are two-fold. First, this chapter defines a gap in the current literature of information sharing. Second, we propose a research model to fulfil this gap in the literature. We observe that no existing article related to information sharing considers inventory policy, pricing decisions, and product substitution simultaneously. To simplify models, prior studies usually assume a supply

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