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Channel selection in a supply chain with a multi-channel retailer: The role of channel operating costs

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ABSTRACT

In this paper we establish a linear demand model to explore the channel selection and pricing strategy in a supply chain that comprises a dominant multi-channel retailer, and a manufacturer that sells two horizontally differentiated products through its own direct channel and the retail channel, respectively. We find that the gap between the online and offline channels' operating costs is critical to the retailer's choice of its channel selection strategy. Multi-channel selling is the best choice for the retailer only when the cost-gap is narrow enough. Conversely, the retailer should only select the low-cost channel if the cost-gap is too large. In addition, we find that small product differentiation is more favorable to the manufacturer in a retailer-led supply chain as the retailer is forced to reduce its margin and retail price. Meanwhile, the manufacturer can benefit from a rise in the wholesale price and increasing demand in the retail channel. Finally, we consider the case where the manufacturer, instead of the retailer, acts as the decision maker for channel selection. We find that in theory the manufacturer will adopt the same channel selection strategy as the retailer in this case.

1. Introduction

E-commerce has been developing rapidly in recent years. B2C e-commerce sales worldwide reached US$1.471 trillion in 2014, a jump of almost 20% over 2013 (eMarketer, 2014). In China, the growth in e-commerce sales is phenomenal, up to 103.7% and 94.1% in 2011 and 2012, respectively (eMarketer, 2013). Against this backdrop, many traditional retailers have built their online arms, evolving into large multi-channel retailers. For instance, most of the top global retailers like War-Mart, Tesco, Metro, Costco Wholesale etc. have built online channels (NRF, 2014). Besides the traditional retailers, some large electronic retailers such as Bonobos, Warby Parker, Fab.com, Gilt.com, JD.com etc. have also transformed themselves into multi-channel retailers by building their own physical stores or cooperating with other bricks-and-mortar retailers. The rise of large multi-channel retailers has a profound impact on supply chains. They dominate the market with a big share and wield increasingly strong pricing power in the supply chain. To counter the increasing power of retailers in supply chains, many manufacturers such as Apple, Haier, Nike, Coca Cola etc. open their direct online channels in droves with a view to improving the performance of the whole supply chain (Chiang et al., 2003). The competition between a manufacturer's direct channel and a retailer's multi-channels has become an important issue to address in supply chain management.

Although it has become a general trend for a single-channel retailer to transform itself into a multi-channel retailer, many fundamental questions remain to be answered. Addressing such questions will help firms to adopt the most fitting channel selection strategies. Some giant retailers still focus exclusively on single-channel selling. For instance, 7-eleven does not provide online purchase options for consumers; Amazon.com has not opened a physical store yet. Some retailers have failed in their efforts of building multi-channels. For instance, Suning.com suffered a great drop in net profit when it adopted a new multi-channel strategy in 2013, largely due to a sharp increase in the online marketing cost. Likewise, Carrefour was forced to exit the e-market of Tsingdao in 2010, due to the unaffordable online delivery cost. In a nutshell, one of the main reasons for such failures is that retailers underestimate or fail to recognize the impacts of their channel operating costs, i.e., the total cost of marketing, delivering, warehousing, and other costs incurred to sell a product through a specific channel. In view of the great importance of channel operating costs to channel decisions (Park and Keh, 2003;

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Khouja et al., 2010), we carry out this study to explore the role of channel operating costs in retailers' choice of channel selection strategies.

To the best of our knowledge, there is a lack of research to address the issues discussed above in the literature. There are studies on the competition between a direct channel and a retail channel, e.g., Chiang et al. (2003), Tsay and Agrawal (2004), which focus on the channel entry decision of a manufacturer, rather than the channel selection of a retailer. There is research that analyzes the channel decisions of multi-channel retailers from a horizontal competition perspective, e.g., King et al. (2004), and Liu et al. (2006), which does not consider vertical competition in a supply chain. Choi (1991) and Pan et al. (2010) considered a retailer-led supply chain, but they only analyzed their problems from a pure vertical competition perspective without involving the manufacturer's direct channel. Moreover, little research has explicitly considered the importance of the operating cost structure to channel decisions. We study the multi-channel selection strategy of a supply chain that comprises a manufacturer with a direct online channel and a dominant multi-channel retailer. Supposing the latter is the leader of the supply chain in pricing, we take the heterogeneous operating costs of different channels into consideration in performing our analysis. Specifically, we address the following fundamental research issues:

a) What are the impacts of operating costs on the multi-channel retailer's choice of its channel selection strategy?
b) What are the pricing equilibria of the multi-channel retailer and the manufacturer?
c) How does the market environment influence the equilibria?

We make three contributions to the literature on the multi-channel selection strategy in a retailer-led supply chain. First, we find that multi-channel selling is the best choice for the retailer only when the cost-gap is narrow enough. Conversely, the retailer should only select the low-cost channel if the cost-gap is too large. Second, we obtain the counter-intuitive finding that the manufacturer tends to reduce the product differentiation in a retailer-led supply chain. In fact, small product differentiation forces the retailer to reduce its margin and retail price, while benefiting the manufacturer by a rise in the wholesale price and increasing demand in the retail channel. Finally, we consider the case where the manufacturer, instead of the retailer, has the power to control the distribution channel. We find that in theory the manufacturer will adopt the same channel selection strategy as the retailer in this case.

We organize the rest of the paper as follows: In Section 2 we review the related literature. We introduce the notation and assumptions of the model in Section 3. In Section 4 we present the equilibrium analysis of the model starting with pricing equilibrium, followed by channel selection, and then comparative statics analysis. In Section 5 we discuss the case where the manufacturer acts as the decision maker for channel selection. In Section 6 we conclude the paper and discuss the managerial implications of the research results. We provide all the proofs in the appendices.

2. Literature review

Our paper is related to the vast literature on channel competition and selection. A stream of the literature examines the channel decisions of retailers from a horizontal competition perspective. Balasubramanian (1998) presented the seminal work on modeling the horizontal competition between a direct marketer and conventional retailers, showing the importance of information and market coverage in channel competition. Lal and Sarvary (1999) explored the impact of the Internet on competition in different shopping and distribution contexts, showing that the Internet channel only increases firm profits under certain conditions. King et al. (2004) and Bernstein et al. (2008) supported Lal and Sarvary (1999), highlighting the strategic necessity of the Internet channel. Liu et al. (2006) examined the entry-deterrence strategies of a multi-channel retailer based on the previous literature. Yan (2010) introduced product differentiation into research on horizontal channel competition. Following this stream of research, we explore the channel selection strategy of a multi-channel retailer that has both the online and offline channels in the context of a supply chain. Similar to Lal and Sarvary (1999), we find that channel operating costs are a critical factor in the retailer's channel selection strategy. The multi-channel strategy should be adopted only when the gap between the online and offline channel operating costs is narrow enough. Although many studies have highlighted the importance of the operating cost structure to channel decisions, e.g., Park and Keh (2003), and Khouja et al. (2010), there is no research that addresses the issue of how to make the optimal channel selection decision given the channel operating costs. Recently, Hsiao and Chen (2014) studied the channel selection of a supply chain with multi-channel retailers, but they ignored costs in their model. We endeavor to fill the research gap by exploring the role of channel operating costs in retailers' choice of channel selection strategies. Specifically, we provide the critical conditions related to the channel operating costs in a retailer's channel decisions. Moreover, we consider product differentiation in our model and find that small differentiation is profitable to the retailer only when it has a price advantage over the manufacturer.

Another stream of research examines the channel strategy of the manufacturer in a supply chain. Choi (1991, 1996) presented the seminal papers examining vertical competition in a supply chain. In particular, Choi (1996) took product differentiation into consideration, finding that product differentiation helps manufacturers but hurts retailers. Recent papers pay more attention to the direct channel entry strategy of the manufacturer in a supply chain. Chiang et al. (2003) constructed a pricing game between a manufacturer and an independent retailer. They argued that the manufacturer's direct channel can be used to constrain the retailer's pricing behavior, thus increasing the performance of the supply chain. Tsay and Agrawal (2004) reached similar conclusions, establishing that the addition of the direct channel can make both the manufacturer and retailer better-off. Wang et al. (2011), however, found that the introduction of the direct channel can be detrimental to manufacturers when they compete along dimensions that differ from prices. Other studies such as Park and Keh (2003), Kumar and Ruan (2006), Guo and Liu (2008), Khouja et al. (2010), and Li et al. (2015) reached the general conclusion that whether a hybrid channel structure benefits the manufacturer and the retailer depends on specific circumstances. However, most of the studies cited above use a manufacturer-Stackelberg game to analyze channel selection decisions. In this paper we extend the research on channel selection by involving a multi-channel retailer that is the leader of the supply chain in pricing. We highlight the strategic necessity of the manufacturer's direct channel in a retailer-led supply chain because it helps to counter the retailer's pricing power. Specifically, relying on the direct channel, the manufacturer can force the retailer to cut price when product differentiation is small. Counter-intuitively, small product differentiation is more favorable to the manufacturer in the retailer-led case, which challenges the consensus of the extant literature.