



On supplier encroachment with retailer's fairness concerns



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ABSTRACT

With the development of e-commerce, many wholesale suppliers establish direct channels competing with their retailers. Such competition is often referred to as supplier encroachment. Previous studies assume the perfect rationality of retailers. However, supplier encroachment may trigger the fairness concerns of the retailers as a supplier is also a competitor of its retailer if the supplier encroaches. Thus, we introduce retailer's fairness concerns into the encroachment problem and explore its impact. It is shown that encroachment may be detrimental to the supplier when the retailer has strong fairness concerns and a significant marketing advantage. If the retailer has a significant marketing advantage, retailer's profit may decrease as her fairness concerns become much stronger. Numerical illustrations demonstrate that, when the retailer is fairness concerned, the supplier has more flexibility to encroach and the retailer has more possibility to benefit from encroachment in most cases. Moreover, retailer's fairness concerns can bring a remarkable improvement to the system profit.

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1. Introduction

Nowadays, with the development of e-commerce, other than a single channel (through retailers) to sell products, wholesale suppliers have an opportunity to establish a direct (self-owned) marketing channel. This may cause competition between the two channels which is often referred to as “encroachment” (Arya, Mittendorf, & Sappington, 2007). The consequence of encroachment is twofold. On one hand, the suppliers may encroach on the retailers' profit (Hendershott & Zhang, 2006; Liu & Zhang, 2006), causing the dissatisfaction of the retailers. A letter sent by Home Depot to more than 1000 of its suppliers states that, if those suppliers add direct channels, Home Depot has “the right to be selective in regard to the vendors we select ... a company may be hesitant to do business with its competitors” (Brooker, 1999). On the other hand, the retailer may benefit from encroachment due to the lower wholesale price brought by encroachment (Chiang, Chhajed, & Hess, 2003; Tsay & Agrawal, 2004; Arya et al., 2007).

Although existing studies show the possible advantage of encroachment, it is noticed that all these papers assume the perfect rationality of retailers. However, if a supplier encroaches, the supplier is also a competitor of its retailer, which may trigger the fairness concerns of the retailer, as stated by Arya et al. (2007):

“Dissent often is expressed as outrage that mercenary suppliers, bent on becoming vertical behemoths, are viciously exploiting their faithful retailers”. Many papers in economics have indicated that fairness concerns have a significant impact on decision making (Rabin, 1993; Fehr & Schmidt, 1999; Ho & Su, 2009). In reality, “there is a significant incidence of cases in which firms, like individuals, are motivated by concerns of fairness” in business relationships, including channel relationships (Kahneman, Knetsch, & Thaler, 1986). Fairness plays an important role in developing and maintaining relationship between suppliers and retailers (Kaufmann & Stern, 1988; Anderson & Weitz, 1992; Corsten & Kumar, 2003, 2005). Therefore, to develop good descriptive models, fairness concerns are a factor that analytical modelers may not want to ignore (Cui, Raju, & Zhang, 2007).

The motivation of this paper is to examine the impact of retailer's fairness concerns on supplier's encroachment decision and on retailer's profit. We examine a situation which is often observed in reality where a supplier wholesales products to many identical retailers in independent markets while the retailer only sells the products of the supplier. As the supplier wholesales products to many retailers, the supplier will not compare his monetary payoff with the retailer's, thus does not care about fairness. About the retailer, she does not care about fairness when the supplier does not encroach because she does not have equal status as the supplier. However, if the supplier encroaches, the supplier is also a competitor of the retailer, which triggers the fairness concerns of the retailer. To our knowledge, this paper is the first to introduce

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fairness concerns into the encroachment problem. We find that encroachment is detrimental to the supplier when the retailer has strong fairness concerns and a significant marketing advantage. When the retailer has a significant marketing advantage, her profit may decrease as her fairness concerns become much stronger. Numerical illustrations demonstrate that, when the retailer is fairness concerned, the supplier has more flexibility to encroach and the retailer has more possibility to benefit from encroachment in most cases. Moreover, the retailer's fairness concerns can bring a remarkable improvement to the systemwide profit.

The remainder of this paper is organized as follows. Section 2 provides reviews of the related literature. Section 3 describes the key elements of the model and introduces notation. Section 4 outlines the models in two settings—the no-encroachment setting and the encroachment setting. Section 5 numerically examines the impact of the retailer's fairness concerns on the supplier's encroachment decision and on the retailer's profit. Section 6 concludes the paper. The proofs of the propositions and corollaries are collected in Appendix.

2. Literature review

Our research is related to the large and growing body of work on channel conflict and management (Chiang et al., 2003; Kumar & Ruan, 2006; Arya et al., 2007). Within this body of work, research that analyzes the strategic interactions between the supplier and retailer when the supplier serves the consumers using a direct channel, which competes with the traditional retail channel, is perhaps the most relevant. Hendershott and Zhang (2006) examined a setting in which an upstream firm can sell products to heterogeneous consumers engaging in time-consuming search through direct channel and intermediaries. They showed that encroachment by the upstream firm increases consumer surplus at the expense of intermediaries. Liu and Zhang (2006) found that a downstream retailer is worse off when an upstream supplier enters the market, but the retailer can deter the supplier from entering the market by acquiring personalized pricing.

While Hendershott and Zhang (2006) and Liu and Zhang (2006) showed that encroachment is detrimental to retailers, there are also papers demonstrating that encroachment may be beneficial to retailers. Chiang et al. (2003) showed that direct marketing may benefit the retailer as direct marketing may be accompanied by a wholesale price reduction. Moreover, direct marketing increases the flow of profit through the retail channel and improves overall profitability by reducing the marginalization. Tsay and Agrawal (2004) showed that the addition of a direct channel is not necessarily detrimental to the retailer, given the associated adjustment in the supplier's pricing. They also examined ways to adjust the supplier-retailer relationship. In order to investigate the product-market characteristics that influence the optimality of adding a direct online channel, Kumar and Ruan (2006) contemplated a market with a single strategic supplier (focal supplier) selling products through a single strategic retailer. The retailer carries products of both the focal supplier and an exogenous supplier, and provides retail supports for the products which impact the demand of the two suppliers' products. Arya et al. (2007) demonstrated that the retailer can benefit from encroachment even when encroachment admits no synergies and does not facilitate product differentiation or price discrimination. Yan and Pei (2009) focused on the strategic role played by the retail services in a dual-channel competitive market. The supplier uses a direct channel as an effective tool to motivate the retailer to improve its retail services. Their results suggest that the improved retail services effectively alleviate the channel conflict and improve

the supply chain performance in a competitive market. Li, Gilbert, and Lai (2013) extended the investigation of supplier encroachment to the environment with information asymmetry where the retailer is better informed of the market size than the supplier. They found that supplier encroachment can result in costly signaling behavior of the retailer, in which the retailer reduces his order quantity when the market size is small. Such a downward order distortion can amplify double marginalization. Li, Xie, and Zhao (2015) studied supplier encroachment in competitive supply chains and showed that there may exist the prisoner's dilemma phenomenon for the suppliers. Furthermore, encroachment may lead to the "lose-lose" outcome for the suppliers and the retailers. Ha, Long, and Nasiry (2015) studied supplier encroachment when product quality is endogenous and customers have heterogeneous preferences for quality. They found that, when the supplier has enough flexibility in adjusting quality, encroachment always makes the retailer worse off in a large variety of scenarios.

Beyond the above, extensive papers study the dual channel management problem (Geng & Mallik, 2007; Chen, Kaya, & Özer, 2008; Huang, Yang, & Zhang, 2012; Lu & Liu, 2013). Huang et al. (2012) developed a two-period pricing and production decision model in a dual-channel supply chain that experiences a demand disruption during the planning horizon. Lu and Liu (2013) examined how the pricing mode, game schemes, and efficiency of e-channels impact the wholesale prices, selling prices, and profits of both the supplier and retailer in a dual-channel supply chain system. They analyzed three types of pricing games: the Stackelberg game with uniform pricing, the Stackelberg game with differential pricing, and the Nash game with uniform pricing. All the above papers assume the perfect rationality of retailers. However, supplier encroachment may trigger the fairness concerns of the retailers. In this paper, we take into account the retailer's fairness concerns and examine its impact on the encroachment decisions of the supplier and the profit of the retailer.

Another stream of literature is relevant to our research, i.e., the fairness concerns problem. There is a long literature documenting the importance of fairness (Güth, Schmittberger, & Schwarze, 1982; Kahneman et al., 1986; Anderson & Simester, 2010; Camerer, 2011). It has been shown that fairness concerns have a significant impact on decision making. Rabin (1993) introduced the concept of fairness into game theory and explained the fact that people like to help those who are helping them and to hurt those who are hurting them. Fehr and Schmidt (1999) proposed an "inequality-aversion" model to characterize the fairness concerns. There is also empirical evidence indicating that fairness plays an important role in certain business contexts (Kumar, Scheer, & Steenkamp, 1995; Olmstead & Rhode, 1985; Scheer, Kumar, & Steenkamp, 2003; Liu, Huang, Luo, & Zhao, 2012). Through a survey of 216 paired suppliers and distributors in China, Liu et al. (2012) presented an analysis exploring how four types of fairness (distributive, procedural, interpersonal, and informational) influence dyadic relationship performance in the buyer-supplier context.

Furthermore, many papers study fairness concerns in supply chain management context. Cui et al. (2007) incorporated the concept of fairness in a dyadic channel and found that when channel members are concerned about fairness the supplier can use a simple wholesale price to coordinate the channel. Yang, Xie, Deng, and Xiong (2013) took an initial step to incorporate fairness concerns of channel members into the study of co-operative advertising in a distribution channel consisting of a single supplier and a single retailer. They showed that when the retailer has fairness concerns, the channel can be coordinated by co-operative advertising under certain conditions. Fehr, Klein, and Schmidt (2007) conducted experiments to show that fairness concerns may have a decisive impact on designing contracts in a moral-hazard context. They also

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