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Supply chain structure in a market with deceptive counterfeits

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ABSTRACT

Deceptive counterfeits differ from non-deceptive ones in that they are packaged and sold as authentic brand name products so that consumers may buy counterfeits unknowingly. When a distribution channel, referred to as the general channel, has been penetrated with deceptive counterfeits, a brand name company may need to restructure the way its products are distributed and rely on reliable channels such as certified stores or manufacturer-owned stores to guarantee 100% authenticity. In this paper, we first identify the conditions under which the general channel will carry deceptive counterfeits, and then analyze the optimal supply chain structure in the presence of counterfeits as well as by incorporating the wholesale price decisions, consumers' risk attitude towards counterfeits and consumer loyalty towards the reliable stores. Our main finding is that the brand name company should continue to sell, sometimes exclusively, through the general channel despite deceptive counterfeiting under various conditions.

1. Introduction

Once called "the world's fastest growing and most profitable business" (O'Donnell, 1985), the counterfeiting business covers almost all economies. According to a recent study by the Organization for Economic Co-operation and Development (OECD), counterfeits and pirated goods in international trades grew steadily and doubled during the period 2001–2007 (OECD, 2009). Counterfeits are often categorized into two types: non-deceptive and deceptive (also referred to as counterfeits in the primary and secondary markets by the OECD, 2008), first defined by Grossman and Shapiro (1988a, 1988b). Non-deceptive counterfeits are those which consumers are able to distinguish from the authentic products due to the price, quality and location of sales, e.g., \$1 DVDs and \$20 Louis Vuitton handbags. They are typically sold through channels independent of the brand name companies'. On the contrary, deceptive counterfeits, the focus of this paper, sneak into a brand name company's supply chain with very similar packages and are sold as the authentic products at similar prices. Under these circumstances, consumers may purchase counterfeits unknowingly. A deceptive counterfeit usually causes more harm to consumers as it may involve health and safety risks. For example, counterfeiting medicines, which are "deliberately and fraudulently mislabeled with respect to identity and/or source", may cause therapeutic failure or adverse events observed in patients as they include wrong or insufficient active ingredients (Reggi, 2007). Although counterfeiting medicines are traditionally more of a concern in developing countries, the discovery of a fake version of the widely used cancer medicine Avastin recently raised new fears of fake medicines in US and other developed countries (Perrone, 2012).

Different counterfeits call for different fighting strategies. According to the OECD (2008), *"The policies and measures to combat counterfeiting and piracy in the two markets differ; it is therefore important to know how much of a threat each poses when considering product-specific strategies."* For instance, improving the authentic product's quality has been proved to be a successful strategy to compete with non-deceptive counterfeits in the Chinese shoe market (Qian, 2008). However, the same strategy may not be as effective in fighting deceptive counterfeits as a high-quality product tends to attract more counterfeits. Instead, in a market with deceptive counterfeits, a brand name company may need to monitor and control its supply chain more closely. Green and Smith (2002) show that an international spirit company which once failed to stop deceptive counterfeits through quality improvement eventually succeeded by strengthening the control on its supply chain in the Thailand market. However, few study has been conducted to analyze the restructuring of supply chains as an anti-deceptive-counterfeiting strategy, which is the focus of the paper.

To protect its brand name and guarantee 100% authenticity in the presence of deceptive counterfeits, a brand name company, e.g., a manufacturer of luxury goods, may have to establish and sell all of its products through reliable distribution channels such as an independent certified retail store or a manufacturer-owned one,

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e.g., a flagship store or an online store in its official website. However, many brand name companies continue to sell through their existing distribution channels exclusively despite the counterfeits, while others adopt a dual channel structure by selling through both a reliable and its existing unreliable channel. While dual channel structures have been widely studied in the literature of operations management, they have not been considered as a means of mitigating counterfeiting activities.

Since counterfeits are so widely spread in certain markets despite the efforts by both brand name companies and governments, our focus is not on strategies to eliminate deceptive counterfeits. Rather, we examine from operations perspective, given that deceptive counterfeits have already penetrated into a brand name company's supply chain, whether and how a brand name company should restructure its supply chain to counter counterfeiting. Furthermore, given that deceptive counterfeits will soon follow, we examine how the brand name company should structure its supply chain when it enters a market. Specifically, we try to answer the following questions: (1) To what extent will a general channel sell counterfeits, referred to as the rampancy level of the counterfeits? (2) Knowing that a general distribution channel has been penetrated by deceptive counterfeits, should a brand name company completely abandon it and only rely on a reliable channel that can guarantee 100% authenticity? (3) What supply chain structure should a brand name company adopt when entering a market where deceptive counterfeits will soon follow?

Adopting the vertical differentiation model (Mussa & Rosen, 1978; Shaked & Sutton, 1982), we describe consumers' utility towards the brand name product as a function of the price and their perceived quality towards the product. We define the rampancy of the counterfeits as the probability that a consumer purchases a counterfeit at the general channel. We first try to understand the impact of deceptive counterfeits when the product is sold exclusively through the general channel. Since mixing deceptive counterfeits with the authentic ones lowers the overall cost, the retailer is able to charge a lower price which increases the total sales. However, since only a portion of the total sales is the authentic product, the sales as well as the profit of the brand name company is most likely lowered in the presence of counterfeits. We characterize the rampancy level that maximizes the general store's profit and provide the conditions under which the retailer will carry none, some, or all counterfeits.

We then consider channel restructuring as a means to counter counterfeiting at the general channel. Suppose that the brand name company has access to a reliable distribution channel, either a certified one or a self-owned store. The key difference between a certified store and a manufacturer-owned one is that the certified store is an independent outlet and will decide the selling price while the brand name company is able to set the selling price in the manufacturer-owned store. We show that it may be optimal for a brand name company to continue selling through the general channel even when a certified or a manufacturer-owned store exists. The brand name company may even let the general store sell the product exclusively despite the existence of a certified store. However, selling exclusively through the general store is never optimal with a manufacturer-owned store as a self-owned store is not only more efficient than a certified store but also allows the brand name company to decide its selling price. Thus, it can better compete with the general store and the brand name company should always carry its product at its own store.

Finally, we extend our model to take into consideration of (1) brand name company's optimal wholesale price decision; (2) consumers' risk attitude towards the products sold at the general channel; and (3) consumers' loyalty towards the reliable store. If the brand name company is able to adjust its wholesale price, we show that the brand name company is more likely to sell through dual channels since the flexibility in its wholesale price allows it to better control the general channel. With risk averse consumers, although the brand name company is in general more likely to rely on its reliable channel, it may still sell exclusively through the general channel with a certified channel. Finally, with loyal consumers, the brand name company has some profit guarantee if it sells through a reliable channel. Thus, selling through dual channels is almost always a dominant strategy with a certified store. However, with a manufacturer-owned store, selling through dual channels is less likely to be optimal since fewer consumers will buy at a general store at a relatively high rampancy level.

The paper is organized as follows. Section 2 summarizes the existing research on counterfeiting and related literature on channel management. Section 3 analyzes the impact of counterfeits on the brand name company's profit and the optimal rampancy level at the general store. Section 4 examines the brand name company's channel structure in response to counterfeits and Section 5 studies the brand name company's channel decision when entering a new market where counterfeits will soon follow. Some extensions are discussed and analyzed in Section 6 and the paper is summarized in Section 7. The proofs of the propositions can be found in the online appendix.

2. Literature review

The earliest research on counterfeiting focuses mainly on business ethics and is qualitative in nature, e.g., warning consumers of potential harm of counterfeits and raising public awareness to protect intellectual property (Harvey, 1987; Harvey & Ronkainen, 1985), establishing laws against counterfeiting and raiding factories and stores of counterfeit products (Bamossy & Scammon, 1985; Bush, Bloch, & Dawson, 1989; Olsen & Granzin, 1992; Onkvisit & Shaw, 1989), and labeling genuine products to make them less vulnerable to counterfeiting (Chaudhry & Walsh, 1996). Jacobs, Samli, and Jedlik (2001) summarize these protective strategies and provide a structure leading to a whole prevention strategy. Later, some marketing researchers conduct field studies on consumer behavior in purchasing counterfeits (Bloch, Bush, & Campbell, 1993; Cordell, Wongtada, & Kieschnick, 1996; Kwong, Yau, Lee, Sin, & Tse, 2003; Tom, Garibaldi, Zeng, & Pilcher, 1998). Staake, Thiese, and Fleisch (2009) conduct a comprehensive review on the literature of the existing qualitative and empirical work.

There are a few analytical studies on counterfeiting, most of which focus on non-deceptive counterfeits. Grossman and Shapiro (1988b) discuss government policies towards non-deceptive counterfeiters, and show that the policies that discourage foreign counterfeiting may reduce the home country's welfare since non-deceptive counterfeits contribute positively to consumers' welfare due to their low prices. Scandizzo (2001) considers a market with competing firms where the firms who do not invest in quality improvement will become counterfeiters, and obtains the equilibrium number of counterfeiters in the market. He also brings the distribution of consumers' income level into the model. Assuming two possible quality levels for a brand name product, high or low, Qian (2006) shows that a brand name company will choose a higher quality level after a counterfeit's entry if the additional cost is below a certain threshold as well as raise the price if the counterfeit's quality is low. Zhang, Hong, and Zhang (2012) compare different fighting strategies in a market with one brand name product and a counterfeit, and derive the equilibrium fighting strategies in a market with two competing brand name products and a counterfeit under general conditions. There is also some literature on software piracy (Conner & Rumelt, 1991; Givon, Mahajan, & Muller, 1995; Jain, 2008) with the focus on consumers' illegal copying rather than an organized commercial behavior.