European Journal of Operational Research 240 (2015) 415–424

Contents lists available at ScienceDirect

European Journal of Operational Research

journal homepage: www.elsevier.com/locate/ejor

Production, Manufacturing and Logistics

Contract type and decision right of sales promotion in supply chain management with a capital constrained retailer ☆

Yannan Jin [a], Sujuan Wang [b], Qiying Hu [a,*]

[a] School of Management, Fudan University, Shanghai 200433, China
[b] School of Economics and Management, Shanxi University, Shanxi 030006, China

ARTICLE INFO

Article history:
Received 25 June 2013
Accepted 21 July 2014
Available online 30 July 2014

Keywords:
Supply chain management
Decision right of sales promotion
Wholesale price contract
Consignment contract
Social welfare

ABSTRACT

From the practices of Chinese consumer electronics market, we find there are two key issues in supply chain management: The first issue is the contract type of either wholesale price contracts or consignment contracts with revenue sharing, and the second issue is the decision right of sales promotion (such as advertising, on-site shopping assistance, rebates, and post-sales service) owned by either manufacturers or retailers. We model a supply chain with one manufacturer and one retailer who has limited capital and faces deterministic demand depending on retail price and sales promotion. The two issues interact with each other. We show that only the combination (called as chain business mode) of a consignment contract with the manufacturer's right of sales promotion or a wholesale price contract with the retailer's right of sales promotion is better for both members. Moreover, the latter chain business mode is realized only when the retailer has more power in the chain and has enough capital, otherwise the former one is realized. But which one is preferred by customers? We find that the former is preferred by customers who mainly enjoy low price, while the latter is preferred by those who enjoy high sales promotion level.

1. Introduction

This paper is motivated by practices of supply chain management in the Chinese consumer electronics industry which experienced enormous growth during the past few decades. It was reported that in 2011, the Chinese consumer electronics market achieved a total sales of RMB 1.2 trillion (Hu, 2012), which accounted for about 2.5% of the nation's GDP (State Statistics Bureau, 2011). In particular, Gome and Suning, two leading retailers in the Chinese consumer electronics market, have experienced unprecedented growth in such a time period. Fig. 1 shows sales and number of branches at these two firms from 2001 to 2011, with all the data from their annual reports. The vast Chinese market has also attracted many foreign retail giants. For example, Best Buy, a leading American multinational consumer electronics corporation, entered the market in 2003.

Gome, Suning, and Best Buy have gone through interesting journeys in how they managed the contractual relationship with their manufacturers. This story was reported in China Business News Weekly (Shi, 2008) and we briefly summarize it as follows. In 1987, Gome's first retail outlet was opened in Beijing. At her early development stage, Gome basically served as a selling platform, on which her suppliers sold their products and employed their own persons for sales promotion. Gome simply charged a commission fee (or shared a portion of the revenue) for each transaction; that is, Gome and her manufacturers started with a consignment contract with revenue sharing arrangement (shortly a consignment contract). In 2005, Gome proposed "the zero sales promotion program" to take over the sales promotion decision right from her manufacturers. However, the program was boycotted by most manufacturers and soon abandoned. In May 2007, Gome raised 6.55 billion Hong Kong dollars to try again to gain the decision right of sales promotion and at the same time to change the contract type. As explained by Xiao Chen, the CEO of Gome at that time, they were planning a two-step transition. First, Gome would like to select some manufacturers (such as Haier, Changhong, Siemens, Sony, and Philips) to test wholesale price contracts (rather than to continue consignment contracts), and eventually spread such a practice to all manufacturers. Second, Gome would like to take back the decision right of sales promotion from her manufacturers. Later, Gome had achieved this goal in all the stores in Hong Kong and Macao, and some of the stores in Shanghai. Suning, another major Chinese consumer electronics retailer, was set up in 1994 and has experienced a similar development path to Gome.

☆ The project was supported in part by the National Natural Science Foundation of China through Grants No. 71271059 and No. 71101082.

* Corresponding author. Tel.: +86 21 25011169; fax: +86 21 65642412.
E-mail addresses: 09210690005@fudan.edu.cn (Y. Jin), wangsujuan-1981@163.com (S. Wang), qyhu@fudan.edu.cn (Q. Hu).

http://dx.doi.org/10.1016/j.ejor.2014.07.030
0377-2217/

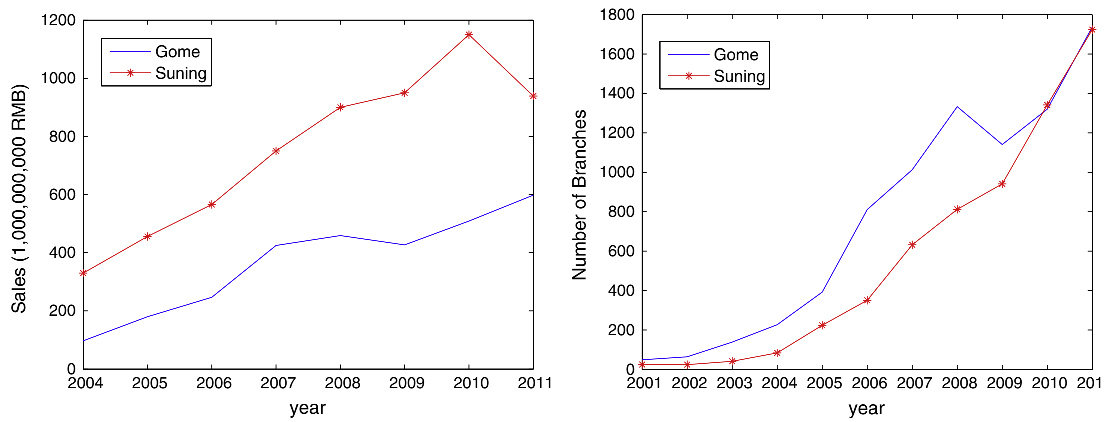

Fig. 1. Gome and Suning's sales and branch numbers.

Interestingly, such a growth pattern has been exemplified by Best Buy as well in the U.S. in the late 1980s. After entering the Chinese market in 2003, Best Buy attempted to copy her practice in the U.S. (i.e., take wholesale price contracts and simultaneously control sales promotion). Unfortunately, Best Buy did not work well and finally closed all nine stores in China in 2011 (Lu et al., 2011).

From the above industry observations, there are two issues that the consumer electronics retailers and their manufacturers have been wrestling with. One is about which contract type to take. Two contract types have been commonly used in supply chains: a consignment contract (where the manufacturer sets a retail price and the retailer is rewarded by a portion of sales revenue) and a wholesale price contract (where the manufacturer sets a wholesale price and the retailer then determines a retail price). The other issue is regarding the decision right of sales promotion, i.e., who should own the sales promotion decision. When analyzing Best Buy's failure in China, Wharton Knowledge Online (2011) also points out that these two issues play important roles. For convenience, we refer to each combination of a contract type and an owner of the decision right as a chain business mode, or simply mode.

This leads to a number of questions on how to manage a distribution channel in the consumer electronics industry. What are the preferences of channel members with respect to the contract type and sales promotion decision right? What factors cause Gome, Suning, and Best Buy change their original chain business mode? What is the impact of the supply chain management practice on consumer and social welfare? How to explain the aforementioned firm behaviors in the Chinese market?

The purpose of this paper is to develop a framework to shed some lights on these questions. To our knowledge, this is the first study to understand the chain business mode's change and the interaction between the contract type and decision right of sales promotion. We consider a distribution channel consisting of a retailer and a manufacturer. Market demand depends on both retail price and sales promotion. As explained above, there are two contract types and the decision right of sales promotion can be assigned to either the manufacturer or retailer. So there are four modes.

The main findings of this paper include the following several aspects. First, it is better that one firm fully controls the market demand and the other firm moves first. That is why in the consumer electronics industry, the common mode is either a consignment contract with the manufacturer's right of sales promotion (Gome and Suning's original mode under which the manufacturer fully controls the market demand) or a wholesale price contract with the retailer's right of sales promotion (Best Buy's mode under which the retailer fully controls the market demand). This interaction of the two issues has never been revealed in the literature. Second, Best Buy's mode will be applied only when the retailer has more power than or equal power to the manufacturer and at the same time has enough available capital; Otherwise, Gome and Suning's original mode will be applied. This result explains why Gome and Suning wanted to change their modes with their fast growth. The third important result is from the viewpoint of the chain, consumers, and social welfare that among the four modes: Gome and Suning's original mode generates the lowest retail price and the largest demand; While Best Buy's mode generates the highest level of sales promotion, chain and consumer surpluses, as well as social welfare. The results above are based on iso-elastic demand. We also study what happens under linear demand, in which case the chain members prefer the first-mover advantage and the retailer's right of sales promotion. However, we find evidences that iso-elastic demand is proper for the Chinese consumer electronics industry.

The remainder of this paper is organized as follows. Section 2 reviews the related literature and Section 3 presents the model and preliminary analysis. We analyze the interaction between the contract type and decision right of sales promotion in Section 4 and the chain members' strategic preferences in Section 5. Section 6 discusses social welfare implications under different chain modes. Section 7 extends the analysis to linear demand. The paper concludes with Section 8. All proofs are given in the appendix.

2. Related literature

There are three streams of research related to our paper. The first stream considers performance of the two contract types. Both types of wholesale price contracts and consignment contracts are widely used in practice and studied by Lariviere and Porteus (2001) and Sun and Debo (2014), and by Hu, Li, and Govindan (2014), respectively. However, the revenue sharing arrangement used in a consignment contract has also been implemented under settings other than consignment (Wang & Hu, 2011; Yao, Leung, & Lai, 2008). Several papers investigate which contract type channel members prefer under different settings. Yao et al. (2008) find that the provision of revenue sharing in a contract leads to better chain performance than a wholesale price contract. Pan, Lai, Leung, and Xiao (2010) discuss and compare different channel power structures to check whether it is beneficial for manufacturers or retailers to use a wholesale price contract or a consignment contract. Similar to Pan et al. (2010), we also consider the manufacturer's and the retailer's preferences over the two contract types;