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Channel coordination and transaction cost: A game-theoretic analysis

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Abstract

Traditional research identified equilibrium marketing channel coordination by using a classical demand function, and classical economic theory often ignored transaction costs. This paper develops a transaction cost linear demand function to investigate channel decision marking when transaction costs exist. Game theory is used to compare a non-cooperative equilibrium of a differential game played under Stackelberg strategies. By focusing on the effect of the distributor's transaction costs with respect to the marketing decision variables, especially the transaction cost and profit distribution, a fuller understanding of the entire decision structure is obtained. Some results are surprising, which set up the benchmark comparisons for future work in this area.

Keywords: Transaction cost; Channel coordination; Distributor; Game theory

1. Introduction

Over the past decade marketing scientists have developed a significant and multifarious literature concerning the structure and coordination in distribution, and its related issues have also generated considerable researches in both the marketing and economic literature (Choi, 1991; Coughlan, 1985; Douglas, 1975; Ingene & Parry, 1995; Jeuland & Shugan, 1983; McGuire & Staelin, 1983). Many of these studies have only limited to manufacturers and their channel intermediaries, and the analysis of competition and cooperation were confined to members in the general demand function. For example, the linear demand function is $q = A - bp$ (where q = demand or sold volume, A = constant denoting demand or sold volume when price is zero, b = constant denoting the slope of the demand curve, p = the pricing (monetary cost). Thus at price p, $A - bp$ units will be demand or sold volume. The slope of the demand curve is negative, indicating that customers will buy less of the product as its price increases). In reality, when the general demand function was being used, most of the past research papers have neglected the extra cost in price which are needed to be paid by customers. The extra cost is a nonmonetary expenditure, for example; the searching cost of information (Salop & Stiglitz, 1997). Such as total customer cost, addressed by Kotler (2003, p.60) is the bundle of costs customers expect to incur in evaluating, obtaining, using, and disposing of given market offering.

As Adam Smith had addressed over two centuries ago, "The real price of anything is the toil and trouble of acquiring it." In other words, this total customer cost includes the buyer's time, energy, psychic and other costs. The buyer evaluates these elements together with the monetary cost to form a total customer cost (Kotler, 2003). These abstractions are useful in order to understand the customer's transaction cost. Therefore, the linear demand function can be written such as $q = A - bp$, in accordance with the concept of real price (p) from Adam

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Smith, that the $p=p_m+\alpha$, α is the extra cost for buyers to pay, which is identical with transaction cost. On the other hand, sellers also need to provide some extra cost in proportion, such as time, energy, and psychic costs that associated with buyers. The following example will support the point: more customers would be drawn and attracted to the sellers who offer free services such as information, delivery, training and maintenance (e.g., in order to improve the service to these dealer, Whirlpool developed a B2B trading partner portal to reduce the dealer's nonmonetary costs). Above example has clearly pointed out that a customer would estimate which offer delivers the most value. Customers are value-maximizes, within the bounds of time costs and energy cost (Kotler, 2003). Whether or not the offer lives up to the value expectation affects both satisfaction and repurchase probability.

Many factors may affect a customer's decision to purchase from certain channel stores. One particular aspect that is being examined closely is the costs which associated with the transaction process. In other words, if all other factors are equal; a customer would go with a channel that offers lower transaction costs. When customers purchase a product from a seller, they would go through a process which is called transaction cost analysis to evaluate the complete cost of acquiring the product from a specific source.

If products are identical, then transaction cost is the major concern when a customer is choosing among several distributors. The transaction cost has been applied to analyze many issues such as strategic impact of information systems, resource allocation, and outsourcing decisions; however, little attention has been paid to marketing channel structure. Transaction cost is a viable theory to explain the acquisition decision in marketing channel.

By focusing on a case of a single manufacturer selling an identical product to two competing distributors and adopting the two most popular powerful structures in pervious studies; (1) Manufacturer–Stackelberg; in this scenario the manufacturer uses the distributors' response function to decide its promotion allowances. The distributors determine the transaction cost so as to maximize total profit from the manufacturer given the respective promotion allowance. (2) Retailer–Stackelberg; the distributors use the manufacturer's response function to decide their transaction cost. The manufacturer determines the promotion allowance so as to maximize total profit from the distributors given the respective transaction cost (e.g., Choi, 1996). In game theoretic terms the first steps is to assume the manufacturer acts as a Stackelberg leader, second step is to assume the distributor acts as a Stackelberg leader; and then develop a transaction cost linear demand function model to investigate the following questions:

1. When the manufacturer or the distributor is a leader, will the leader be the more powerful player and receive higher profit?
2. When a manufacturer or a distributor is a leader, how do transaction cost, margin, sold quantities and the manufacturer's promotion allowance profit compare with the case of the Maunfacturer–Stackelberg and the Retailer–Stackelberg games?
3. How does the transaction cost sensitivities and the transaction cost efficiency index affect the channel's decision variables?

The following Sections will review the literature on the use of marketing channel coordination and transaction cost. Section 3 develops a transaction cost linear demand function model derived from analytical equilibrium solutions for various quantities such transaction cost, sales volume and profit which lead back to the questions that are raised in this paper. Section 4 compares and analyzes the decision variables affected by the transaction cost sensitivity and the efficiency index of transaction cost. The final Section presents managerial implications and suggestions for future researches.

2. Literature review

2.1. Channel coordination

McGuire and Staelin (1983) studied the impact of product substitutability on Nash equilibrium distribution structures in a duopoly where each manufacturer distributes its goods through an exclusive distributor. Jeuland and Shugan (1983) focused on channel coordination in the context of a single producer and a single distributor channel. They found that coordination between a producer and a distributor via a quantity discount schedule could lead to higher profit for channel members. Jeuland and Shugan (1988) analyzed the possibility of channel coordination without formal arrangement such as vertical integration or contracts. They argued that channel members, being aware of interdependencies between themselves, might form conjectures concerning other members' reactions to their own actions. Iyer (1988) studied channel coordination under both price and non-price (e.g., customer service) competition.

In another expansion, Choi (1991) addressed channel profits when the channel structure consists of two manufacturers and a single common distributor. The model consisted of three non-cooperative games: the Manufacturer–Stackelberg game, the Retailer–Stackelberg game and Vertical–Nash equilibrium. Choi proposed product differentiation and cost reduction as methods to encourage channel coordination. Sudhir (2001) extended Choi's channel structure by studying vertical manufacturer and distributor interaction as well as horizontal interactions between the manufacturers. Sudhir (2001) modeled manufacturer–retailer interactions by using the Manufacturer–Stackelberg and Vertical–Nash equilibrium games.