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A comparison of different contract forms for consumers with switching costs and changed preferences

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ABSTRACT

This paper compares three contract forms, including short-term contract with price discrimination, short-term contract without price discrimination, and long-term contract with price commitment for consumers with switching costs and changed preferences. We find that long-term contract generates the largest profit for firms. Moreover, we find that switching costs make the market more competitive when consumers have changed preferences, and the higher the switching costs, the more competitive. Our theory combines linear-city duopoly and switching-cost model and the results are consistent with literature, for example price commitment is valuable. Our findings shed light on the practice of different forms of dynamic pricing in various industries including telecommunication industry and airline industry.

1. Introduction

In many markets, when consumers change from one merchant brand or service provider to another, they face substantial costs of switching. A large body of literature has studied switching cost. However, the existing literature only directs limited attention towards the difference between switching cost and brand preference. For example, Shaffer and Zhang (2000) define consumer switching cost as the minimum price differential necessary to induce the consumer to switch to the competing brand. This definition can also measure consumer brand loyalty. However, switching cost and brand preference are distinct. When consumers exhibit a locational preference about where to shop, we call it brand preference. Once a product/service is purchased, a consumer is faced with a switching cost if she wants to change the product brand or service provider. In other words, brand preference refers to the ex ante product differentiation, whereas switching cost is incurred after the initial purchase is made. Both switching cost and brand preference are important to consumer purchasing decisions.

Brand preference and switching cost may work in a complementary manner or act as two competing forces. If consumers are loyal to the current merchant, the brand preferences and switching costs will make them reluctant to switch to a higher degree. If consumers are not loyal to the current merchant, the changed preferences and switching costs act as two competing forces. Switching costs make consumers reluctant to switch, whereas changed preferences motivate them to switch. For example, when a person travels, she needs to choose an airline. This consumer previously flew with airline A and joined its frequent flyer program, which serves as switching cost. However, the consumer is unsatisfied with airline A and wants to try other airlines this time. Thus, the consumer faces a dilemma: brand preference motivates her to switch but the frequent flyer program makes her reluctant to switch. Such situation is common in daily life.

Identifying the specific function of brand preference will help us gain deeper understanding on market with switching costs. Moreover, we need to identify the difference when consumers have changed preferences and unchanged preferences. For example, Klemperer (1987) finds that firms will be better off with switching costs than without such costs if all consumers have unchanged preference. However firms will be worse off with switching costs if all consumers have changed preferences. In reality, the heated competition among firms, the diversified product and service, the various marketing schemes, and so on cause consumers to display low levels of brand loyalty. A recent study released by eDigital Research[3] (2013) finds low levels of customer loyalty across all major consumer-facing industries in UK. Safa and Ismail (2013) indicated that the customer loyalty may be even lower for electronic commerce. Therefore, consumers' changed preference provides an interesting and practical perspective to the research on markets with switching costs.

A large body of literature on switching costs exists, and researchers are particularly interested in the pricing strategies applied in markets with switching costs. In subscription markets, firms deliver a flow of goods or services directly to their consumers. In particular, with the development of information technology, firms can determine whether a

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given consumer is a new consumer or current consumer. Firms can price discriminately based on consumer purchasing history. Typical examples of goods/services in subscription markets include credit cards, long-distance telephones, newspapers and magazines, health-club memberships, and airline tickets, among others.

However, in conventional retail markets, explicit price discrimination is impossible. Coco-cola is sold at the same price, regardless of whether the consumer is a new or existing customer. Moreover, policy bans history-based price discrimination in some markets. For example, mobile number portability, which was launched by the government in 1999, enables customers to retain their mobile phone numbers when changing from one mobile network operator to another operator in Hong Kong. Therefore, an existing mobile number is no longer a switching barrier, and mobile network operators cannot discriminate between customers applying new mobile numbers and those already have mobile numbers.

Aside from discriminatory and non-discriminatory pricing, price commitment is another commonly used pricing strategy. Price commitment is a long-term contract with promises of future prices, which may be higher than, lower than, or the same as current prices. For example, many computer firms provide a computer maintenance program. Consumers can choose to buy warranty plans covering one year, two years, or longer. Compared with a one-year warranty, a plan for two years or longer is a long-term contract with price commitment. For another example, in airline industry, a consumer can buy either single trip ticket or round trip ticket. Compared with single trip ticket, round trip ticket is a long term contract with second trip price commitment.

A natural question arises as regards which kind of pricing strategy is more profitable for firms when consumers have switching costs and changed preferences. Chen (1997) compares two contract forms: uniform pricing and discriminatory pricing. Similarly, Shaffer and Zhang (2000) consider two game forms: one in which neither firm can price-discriminate and another game in which both firms can price-discriminate. Fudenberg and Tirole (2000) study long-term and short-term contracts. It is interesting to give a thorough comparison among all kinds of contract forms.

This paper aims to address the following questions. First, what is the optimal contract form for firms in market where consumers have switching costs and changed preferences. We compare three kinds of contract forms, including short-term contract with price discrimination, short-term contract without price discrimination, and long-term contract with price commitment. We try to determine which contract will generate the largest profit for firms in equilibrium. Second, what will be the equilibrium prices, firm profits and consumer switching behavior under different contract forms? Third, when consumers have changed preferences, will switching costs make the market more competitive? Further, what about the market competition when consumers have higher switching costs compared with lower switching costs. This paper contributes to literature by investigating the relationship among contract forms, market equilibrium prices, firm profits and consumer switching behavior when consumers have switching costs and changed preferences.

This paper combines linear-city duopoly and switching-cost model, thus is related to several classical models in the literature. Klemperer (1987) uses a two-period differentiated product duopoly model to show the competitiveness of markets with switching costs. He only considers short-term non-discriminatory contracts, and we will extend his model by considering other contract forms. Fudenberg and Tirole (2000) are the first to study the situation that competing firms offer a menu of long-term and short-term contracts. However, consumers may choose from the menu, such that a self-selection problem exists. We will extend their work by considering different contract forms separately and providing a complete comparison among different contract forms. Chen (1997) uses a two-period homogeneous good duopoly model to study the practice of offering discounts to new consumers. However, the purchasing decision in this model is only affected by switching costs. We extend Chen's study by considering consumer preferences for different firms, and we let the preferences be independent during the two periods. This assumption is drawing more and more attention in literature (e.g., Cabral, 2014) and it captures current consumers' behavior in that they have brand preferences which are not fixed. Therefore, our paper has both academic contribution and practical value.

The basic model is presented in Section 2. Three different contract forms are analyzed in Sections 3, 4, and 5. Section 6 makes extension by comparing consumers with high and low switching costs. Section 7 discusses the results and the last section concludes.

2. Basic model

Most of our model setup follows standard assumptions in the product differentiation literature (Becchetti et al., 2014). Two firms A and B in this market produce differentiated goods with constant marginal cost c ($0 < c \le 1$). We use a non-cooperative duopoly model in which the two firms are identical. They compete with each other, and consumers buy from either A or B. The firms charge p_A, p_B to consumers when they buy q_A, q_B, respectively. When a consumer buys from firm A, his utility is

$$V(q_A) + (1-\theta) - p_A. \tag{1}$$

When a consumer buys from firm B, his utility is

$$V(q_B) + \theta - p_B. \tag{2}$$

For simplicity, we suppose each consumer buys one unit of products, and $V(q_A) = V(q_B) = V(1) = R (R > 0)$. The simplified utility functions are:

$$\begin{array}{ll} R + (1-\theta) - p_A & (\text{if buy from A}) \\ R + \theta - p_B & (\text{if buy from B}) \end{array} \tag{3}$$

θ is the brand preference parameter, which is uniformly distributed from 0 to 1. That is, the consumers are arrayed with unit density along the line segment [0,1] with firms A and B standing at points 0 and 1, respectively. In our model, consumers have changed preferences, that is, their preferences in the second period are independent of their first period preferences. Consumers know their changed preferences at the beginning of the second period of the game, but know the possible distribution at the very beginning. We use θ' to denote the changed preference in the second period.

The consumers have switching costs when they change firms. Consumers know their switching costs at the beginning of the second period of the game, but they only know the possible distribution at the very beginning. The switching cost is private information that firms are unaware of. We suppose the switching cost s is uniformly distributed from 0 to 1. We make this assumption because consumer preference is distributed from 0 to 1, such that at least some consumers' preferences for an underlying product can outweigh the switching costs.

Supposing there are two periods, and poaching can only occur in the second period. Both firms and consumers have rational expectations and discount second-period revenues and utilities by a factor $\delta \in [0, 1]$ in first-period terms. If $\delta = 0$, firms/consumers will be myopic, not considering the second period at all. If $\delta = 1$, the second period is as important as the first period.

The firms act to maximize their profits by providing different contracts to consumers. We consider the following contract forms. In short-term discriminatory pricing (STDP), both firms offer price p_A, p_B in the first period. In the second period, firms offer p'_A, p'_B to new consumers and offer p''_A, p''_B to existing consumers. The contract is a short-term one with price discrimination. In short-term uniform pricing (STUP), both firms offer price p_A, p_B in the first period and price p'_A, p'_B in the second period, regardless of whether the consumers are existing or new. The contract is a short-term one without price discrimination. In long-term committed pricing (LTCP), both firms offer a two-period