Applied Economics and Finance; Vol. 11, No. 3; 2024
ISSN 2332-7294 E-ISSN 2332-7308
Published by Redfame Publishing

Strategic Pricing and Positioning in the Telecommunications Industry: Retaining Customers and Attracting Subscribers

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Received: April 22, 2024 Revised: May 16, 2024 Accepted: August 21, 2024

Available online: August 30, 2024 URL: https://doi.org/10.11114/aef.v11i3.7152

Abstract

The telecommunications industry provides a real-world example of the strategic use of pricing and positioning strategies to retain existing customers and attract new subscribers. Telecom companies offer special discounts and incentives to retain long-term customers, acknowledging the challenges and costs associated with switching service providers. Loyalty programs and exclusive offers are designed to cater to both inertial and variety-seeking consumers, aligning with the concepts explored in the paper. In addition, telecom companies may offer discounted plans and promotional deals to attract new subscribers, targeting consumers with lower switching costs. These strategic pricing and positioning strategies demonstrate how businesses in the telecommunications industry adjust their pricing and promotional strategies based on consumer behavior and market dynamics, aligning with the concepts explored in the paper. This model was solve with two-period duopoly method concentrating on Switching and remaining cost to figure out how consumers behavior effect on companies strategies.

Keywords: strategic consumers, dynamic pricing, positioning, staying cost

1. Introduction

In today's digital age, the telecommunications sector serves as a leading example of strategic pricing and positioning. This industry skillfully employs innovative strategies to retain current customers and draw in new subscribers. Telecommunication companies utilize cutting-edge information technologies to monitor customer purchasing patterns, facilitating the execution of comprehensive customer relationship management strategies, including micro-segmentation. A pivotal strategy within customer relationship management is behavior-based price discrimination (BBPD), where pricing is customized based on individual purchase histories. This method enables companies to extend special discounts and incentives to maintain long-term customers, recognizing the hurdles and expenses linked to changing service providers. Furthermore, telecom companies might also implement discounted packages and promotional offers to entice new subscribers, strategically focusing on consumers with lower switching costs. Over recent years, companies have developed advanced information technologies that enable them to monitor customer purchasing histories in markets where repeat purchases are common. These new data collection methods have been utilized by businesses to implement comprehensive customer relationship management strategies through micro-segmentation. A key method in customer relationship management is Behavior-Based Price Discrimination (BBPD), where companies set different prices for different customers based on their purchase histories (Varian and Acquisti, 2005). Some companies offer reduced prices to competitors' customers (potential new customers), while others provide discounts to their previous customers. For instance, companies in sectors like mobile telephony, internet services, newspapers, and magazines offer attractive deals to businesses switching from their competitors which causes switching. Similarly, within the telecommunications sector, companies often employ loyalty programs to reward their devoted customers. Consider mobile network providers offering exclusive benefits, such as discounted plans, additional data allowances, or priority customer service, to subscribers who exhibit long-term loyalty through extended contracts or consistent bill payments.

In this scenario, the telecom companies serve as prime examples of entities rewarding their existing customer base. Through loyalty programs and tailored incentives, these companies acknowledge and appreciate the loyalty of their subscribers. By fostering a sense of appreciation and value, they aim to retain their customer base amidst a competitive

landscape where consumer preferences constantly evolve. These companies can be seen as rewarding their existing customers for their loyalty.

I introduce a simple model to shed light on why some telecom companies incentivize switching between brands, while others prioritize customer loyalty. This duopoly model spans two periods and delves into pricing and positioning strategies within the telecommunications sphere. The primary focus is on customer costs beyond mere switching expenses. The telecommunications industry is no stranger to the complexities of customer behavior and the impact of switching costs on consumer decision-making. The incurred charges when clients transition between brands or services result in a sense of inertia, influencing customer loyalty and brand switching within the industry. This phenomenon has been a subject of interest in various studies, including those by Chen (1997) and Taylor (2003), which have delved into the dynamics of switching costs and their influence on customer decision-making in the context of pricing strategies. This inertia arises as consumers seek diversity due to escalating costs, often stemming from monotony or satiation with a consistent product over time.

In the world of telecommunications, inertia, or the unwillingness to move, is sometimes viewed as a negative component of consumer behavior. As a result, this study digs into a thorough examination of total staying expenses and switching prices within this market. This evaluation includes calculating net switching expenses, which are calculated by adding switching costs and subtracting switching benefits.

Customers who have a positive net switching cost are labeled as 'variety-seeking consumers.' These people are more likely to investigate other options, desire diversity, and may be willing to move telecom providers to gain access to new services or perks. Those with a negative net switching cost, on the other hand, are classified as 'inertial consumers.' These clients have a strong preference to stick with their present telecom provider since the perceived benefits outweigh any possible rewards from switching.

This distinction between variety-seeking and inertial consumers sheds light on the broad range of consumer behaviors found in the telecommunications industry. Understanding these divisions is critical for telecom businesses because it allows them to adjust strategies to the individual demands and motivations of each group, eventually influencing retention efforts and customer engagement. Real-world markets mirror these customer characteristics. For instance, some customers prefer familiar telecom providers or services, while others actively seek novel experiences by exploring different options. In this model, I acknowledge that not every variety-seeking individual will alter their selection or switch back.

BBPD is common in the mobile telecommunications sector, as companies innovate to differentiate their products and services and then copy competitors' features to stay competitive. Over time, all organizations have evolved to offer equivalent goods and services. Keeping all these aspects in mind, I propose a two-period duopoly model with placement and pricing methods in which two enterprises compete for clients in the style of telephony.

In the telecom industry, companies will decide the placement of their products within the same range of product characteristics as in the initial period once the second period commences. Then, they introduce new products. Subsequently, these companies set prices again according to their pricing policies, and customers make purchases of these new products. Since customers have to deal with new products and services all the time, like in the mobile phone business, In this article, I believe that consumer tastes don't change over time.

As the telecommunications business evolves, corporations are set to use different pricing tactics in the second phase. This model predicts that each telecom firm will have its own pricing policy in this complex terrain.

Our analysis focuses on the critical scenarios where these companies converge: either through the simultaneous adoption of Uniform Pricing (UP), presenting a uniform rate structure across their offerings, or through strategic alignment in adopting Behavioral Pricing. These pricing tactics affect telecom customer behavior, market competitiveness, and the industry landscape. This strategic decision affects their pricing policies, market positioning, and capacity to meet varied consumer tastes and market dynamics, affecting customer retention, market growth, and telecommunications industry success.

In this scenario, several key points are considered. Firstly, the question arises whether companies using BBPD extend offers to new customers or to those who have previously made purchases. Secondly, I investigate how switching and retention costs influence product positioning strategies in the telecommunications industry. Lastly, the effectiveness of BBPD as a strategy for all businesses is evaluated.

The findings that were gathered from this article are described below. In the telecommunications sector, when telecom companies adopt Behavior-Based Price Discrimination (BBPD), they often offer discounts or special deals to customers switching from competitors. For instance, consider a scenario where a customer has been with Telecom Company A but is considering switching to Telecom Company B. Here, if Telecom Company B offers discounted rates or incentives tailored to attract these switchers, that aligns with the BBPD strategy. This strategy becomes more prevalent in markets

where customers are less likely to change providers due to higher costs associated with switching. For instance, in areas where consumers are reluctant to switch due to contractual obligations or high switching fees, telecom firms might strategically implement BBPD to entice these customers to make the switch.

On the other hand, those marketplaces that have a greater number of customers and high costs of staying should provide discounts to their previous consumers. Furthermore, when there are consumers who are inertial as well as consumers who are looking for variation, it is necessary to provide evidence of the principle of minimum differentiation. In this step, it would be better for the telecommunication industry to be in the middle of the line. (As I will explain in the following, each company's cost depends on the distance.)

In the following, I discussed prior articles related to this subject. Following that, I provided a detailed explanation of the model and hypotheses. In Chapter Four, I delved into scenarios where each company's location was chosen, computing the profits and demand for both companies in the second period under the strategies of (UP, UP) and (BP, BP). Moving on to Chapter Five, each company can choose its own place. From this assumption, demand and profit calculations are made. I conclude in the final chapters, particularly focusing on Chapters 4 and 5.

2. Literature Review

The study of Behavior-Based Price Discrimination (BBPD) encompasses a wide range of methodologies aimed at understanding its implications. Chen (1997) contributed to this field by investigating the role of "switching costs" in BBPD, shedding light on the impact of customer decision-making in the context of pricing strategies. Additionally, Taylor (2003) conducted a study focusing on the influence of a customer's decision based solely on the payoff, providing valuable insights into the dynamics of customer behavior and its implications for pricing strategies (Boivin, 2006). These studies have significantly contributed to the understanding of BBPD and its impact on consumer behavior and market outcomes, providing valuable insights for businesses and policymakers. A "pure" BBPD model was formulated by Villas-Boas (1999) and Fudenberg and Tirole (2000), emphasizing the significance of purchase history in deciphering consumer preferences (Gehrig et al., 2011). Fudenberg and Tirole (2000) and Villas-Boas (1999) probed into a multi-period duopoly model in a market with horizontally diversified products and no switching costs (Colombo, 2015

The societal implications of BBPD are also discussed in the literature. Gehrig et al. (2011) found that consumers gain from behavior-based price discrimination when both small and dominant firms can employ it, but it diminishes consumer surplus when only the dominant firm has exclusive rights to price discrimination (Esteves, 2014; Colombo, 2015).

Moreover, recent studies in the economics of privacy have centered on the correlation between personal data and intertemporal pricing discrimination, showcasing the evolving nature of BBPD and its ties with consumer privacy concerns. Chung (2015) further explored the profitability of BBPD by duopolists manufacturing horizontally differentiated experiential goods, illuminating the economic consequences of such discriminatory practices.

In conclusion, the BBPD literature encompasses a broad spectrum of research, from the effects of switching costs and purchase history to welfare implications and ties with consumer privacy. These studies provide a comprehensive understanding of the various facets of BBPD and their repercussions for businesses, consumers, and market competitiveness.

The profitability of offering discounts to new clients versus existing customers has been a topic of significant academic and practical interest. Shaffer and Zhang (2000) examined a single-period duopoly with horizontal differentiation and brand loyalty, akin to the second period of Fudenberg and Tirole's (2000) two-period model. In situations of symmetric demand, the firms in the study offered discounts to their competitors' customers (new customers). However, if a firm has diminished brand loyalty and consequently lower switching costs for its customers, it may charge a lower price to returning customers than to new customers. This finding suggests that both firms can offer discounts to their own previous customers even if demand is symmetric, contradicting Shaffer and Zhang's (2000) assertion that it is never optimal for both firms to offer discounts to their own previous customers. Moreover, the analysis indicates that the decision to offer discounts to previous or new customers hinges on the distribution of net switching costs among consumers.

This subject has also been explored in the context of dynamic pricing schemes. For instance, recent research by Chen and Xie (2010) delves into the dynamics of pricing strategies, considering the balance between offering discounts to new customers and retaining existing ones. Their research underscores the importance of understanding consumer behavior and preferences in devising the optimal pricing strategy for businesses.

Additionally, the profitability of offering discounts to new clients versus existing customers has been discussed in marketing literature. Smith and Johnson (2015) conducted an exhaustive analysis of customer retention strategies and the impact of offering discounts to previous customers. Their findings suggest that, under certain market conditions,

offering discounts to previous customers can lead to increased long-term profitability and customer loyalty, challenging the conventional belief that discounts should primarily target new customers. Indeed, recent academic research has concentrated on determining which is more profitable.

The study presented in this article shares a close connection with Sajeesh and Raju's research from 2010, where they explored a two-phase competitive model involving consumers actively seeking variety. Their study observed that in a market where consumers actively seek variety, the level of differentiation between products tends to be lower compared to markets without such consumers. However, their analysis did not encompass behavior-based price discrimination (BBPD). In contrast, the present research delves into the impact of BBPD on positioning and pricing strategies in a two-period duopoly model with heterogeneous switching costs and staying costs. This highlights the evolving understanding of the impact of consumer behavior and pricing strategies in competitive markets, shedding light on the complexities of BBPD and its implications for firms' profitability and product differentiation. Further research is needed to explore the interplay between consumer behavior, market competition, and pricing strategies, considering the diverse market settings and consumer preferences.

3. The Fundamental Model and Hypothesis

In my opinion, there are two different providers of telecom services, and clients will choose between firms C and D based on the distance between the two. As a result, prices will fluctuate depending on the distance between the consumer and the location of the business. Because both businesses are placed in the 0 to 1 range, the answer will be either x or 1-x. We assign a specific address to each telecom firm at the first stage of the process. The second stage, on the other hand, includes each individual company selecting a location.

The first and most crucial thing that every firm is aware of is their prior consumers. During the first phase, clients will buy from the first company if the distance between them is equal to β and from the second company if the distance is equal to 1-β. The most crucial assumption I make is that the choices made by each individual consumer have nothing to do with the second period. Customers would most likely consider the distance between them and the cost of the destination while making decisions during the first phase. However, during the second period, they will take into account their own costs, (I will elaborate on this element later). Businesses can accomplish this by using longer contracts or periodic subscription arrangements, which are common in industries such as newspapers, cable television, mobile phones, and insurance services.

The first period's cost, which is intended to be dependent on distance, is evident; nevertheless, the second step's cost will be different. Every company incurs two prices for various customers; the benefit or cost of switching is what determines whether a customer stays with the company or leaves.

This signifies that the firm will either maintain the previous price or set a new one. A variety of ways will be used in this manner; this pricing mechanism is known as Behavioral Pricing or uniform pricing. The primary goal of this section is to identify which strategy will be more effective for the organization. ("Behavioral pricing" vs. "Uniform pricing"). Businesses must be able to evaluate which technique will be the most successful and generate the most money.

Businesses are unable to use recent purchases to estimate future purchases in this situation, thus their decisions will be made independently. This is how this piece is related to Colombo's (2016b)'standard' BBPD, as well as the switching cost approach to BBPD proposed by Chen (1997) and Taylor (2003). Customers that switch to a new provider during the second term either be charged a switching fee or receive a reward, depending on the impact of the switch. When the new product specifications were presented at the start of the second term, this information was disclosed in a confidential way. I will assume that the value of net switching cost “s”, which is calculated by subtracting switching benefit from switching cost, is an independent realization of a random variable distributed uniformly over the consumer population on the interval. This is the assumption that I will make. As a starting point, I will proceed with this idea. There exists a density equal to $1/(\mu + \pi)$ within the interval $[-\mu, \pi]$ where is greater than 0 and lower than π .In this article, I will make the assumption that firms are aware of the distribution function of s, but not of the value that it truly has for any specific consumer.

The game is broken into three phases, with each phase involving movement that are performed concurrently with no sits in between. Stage 1 refers to the first stage, which is the only stage addressed in the first session. Companies will first set prices for the first period, known as pC (or $p\ D$), and customers will buy their items during that time. This is the first stage of the procedure. In the second session, I will go over two stages. These levels are known as stage 2 and stage 3. During the second round, each company has the opportunity to select the locations for its new product. These places’ locations are indicated by the letters c and d, and their values vary from 0 to 1. Businesses make judgments about the prices they will charge for the second period at the third stage. Customers continue to acquire the new products, and these decisions are based on the pricing policy that will be adopted during the second period.

To acquire a thorough grasp of the impact that behavior-based pricing has on markets, I will look at two critical pricing methodologies: Behavioral Pricing and Uniform Pricing. These techniques have different consequences for how businesses set their prices and attract clients. When it comes to Behavioral Pricing (BP, BP), each organization takes a different approach. They develop pC (or $p\ D$), prices that are specially customized to their existing consumer base. Simultaneously, they develop distinct price points to attract new clients who migrate from other enterprises, which is known as $pC\ 2N$ (or $pD\ 2N$).

Assume that businesses can categorize each and every one of their customers based on the information contained in their purchasing history. According to the framework of our concept, every firm has the ability to identify and appeal to clients who will be subjected to price discrimination prior to price fixing. I will compare the circumstances in which both firms utilize behavioral pricing (BP, BP) at each level. Behavioral pricing is a pricing approach that predicts future costs based on past performance. A Behavioral pricing approach is represented by the letter "BP" in this context, whereas a uniform pricing strategy is represented by the letter "UP." So, if both enterprises opt not to adjust their pricing, the result will be (UP,UP)

4. The Second Period: Sub-Game Equilibrium

4.1 Pricing Practices that Are Behavioral

(BP, BP) Beginning with stage 3, it is possible to solve the game backward to determine the outcome of each strategy based on consumer behavior. Delving into the mature era of the telecoms market reveals intriguing dynamics when both competitors use Behavioral pricing (BP, BP). The presence of a cutoff point for net switching costs causes a specific pattern of consumer behavior. A notable trend emerges for consumers first identified with Company C: people loyal to Company C continue to patronize the company, building a dedicated consumer base. Consumers who fall below the cutoff mark, however, simply migrate to Company D, tempted by its goods and incentives.

This scenario mirrors the delicate balance within the mature telecommunications market, where consumer choices are influenced by factors like pricing strategies, service quality, and incentives. The interplay of these elements significantly shapes the consumer landscape, defining the strategies adopted by competing companies to retain and attract customers. The following is a fundamental assumption that was made throughout the article in order to simplify things:

Assumption 1. Both μ and π are large enough to ensure that all of the cutoff points are within the interval [−μ , π], and μ is not equal to π.

4.1.1 The C-buyer's Choice of Purchase

I was going to take into consideration the decisions made by the C-buyers who purchased from company C during the first period and the D-buyers who purchased from company D in a distinct manner. I'll look separately at the choices made by customers who bought from Company C and those who bought from Company D in the first period. Among those who bought from Company D, there might be some who have similar costs when switching and are indifferent whether to buy from Company C or Company D in the next period.

$$\mathrm{p}_2^{\mathrm{C}} + |\mathrm{x}_2 - \mathrm{c}| = \mathrm{p}_{2\mathrm{N}}^{\mathrm{D}} + |\mathrm{x}_2 - \mathrm{d}| + \mathrm{s}. \quad (1)$$

(i) If a consumer's ideal point (x2) is on the left side of firm C (that is, x2 ≤ c), the cutoff switching cost s (cutoff point) is determined by:

$$\mathrm{p}_2^{\mathrm{C}} + (\mathrm{c} - \mathrm{x2}\ ) = \mathrm{p}_{2\mathrm{N}}^{\mathrm{D}} + \ (\mathrm{d} - \mathrm{x2}\ ) \ + \mathrm{s}. \quad (2)$$

(ii) If a consumer's ideal point (x2) is on the right side of firm D (that is, d ≤ x2), the cutoff switching cost s (cutoff point) is determined by:

$$\mathrm{p}_2^{\mathrm{C}} + (\mathrm{x2}\ -\ \mathrm{c}) = \mathrm{p}_{2\mathrm{N}}^{\mathrm{D}} + (\mathrm{x2}\ -\ \mathrm{d})\ + \mathrm{s}. \quad (3)$$

(iii) If a consumer's ideal point (x2) is in a middle band (c < x2 < d), the cutoff switching cost is determined by:

$$\mathrm{p}_2^{\mathrm{C}} + (\mathrm{x2}\ -\ \mathrm{c}) = \mathrm{p}_{2\mathrm{N}}^{\mathrm{D}} + (\mathrm{d} - \mathrm{x2}\ ) + \mathrm{s}. \quad (4)$$

In general, the cutoff switching cost for C-buyers is a function of the consumer's location x2 and it is given by:

$$S_c(x_2; BP.BP) = \begin{cases} P_2^C - P_{2N}^D + c - d & \text{if } x_2 \le c. \\ P_2^C - P_{2N}^D + 2x_2 - c - d & \text{if } x_2 \in (c.d). \\ P_2^C - P_{2N}^D + d - c & \text{if } x_2 \ge d. \end{cases} \quad (5)$$

4.1.2 The D-buyer's Choice of Purchase

Similarly, among the D-buyers who bought from firm D in the first period, there exists a marginal consumer for whom

$$p_{2N}^C + |x_2 - c| + s = p_2^D + |x_2 - d|. \quad (6)$$

Using the same argument, the cutoff switching cost for D- buyers is a function of the consumer's location x 2 and it is given by

$$S_D(x_2; BP.BP) = \begin{cases} P_2^D - P_{2N}^C + d - c & \text{if } x_2 \le c. \\ P_2^D - P_{2N}^C - 2x_2 + c + d & \text{if } x_2 \in (c.d). \\ P_2^D - P_{2N}^C + c - d & \text{if } x_2 \ge d. \end{cases} \quad (7)$$

Now, we derive each firm's demand and profit in the second period. Let Dii2, ψ _ii2 be the demand and profit of firm i attributable to consumers who bought from firm i in the first period and continue to buy from firm i in the second period, and let Dji2, ψ _ji2 be the demand and profit of firm i attributable to consumers who bought from firm j in the first period and switch to firm i in the second period, where i, j = C,D and i ¹j. Using Eqs. (1) and (2), the demand and the profit of firm C in the second period are expressed as follows:

$$D_2^C(BP.BP) = D_2^{CC}(BP.BP) + D_2^{DC}(BP.BP). \quad (8)$$

The first part shows those consumers who buy from company from first period and later again will buy from company C, and the second part shows those consumers who buy from company D and then they will change to company C. where the C-buyers with higher switching costs than the cutoff point continue to buy from firm C. Thus, the inertial-consumer demand for firm C is given by

$$D_2^{CC}(BP.BP) = \frac{\beta}{\mu + \pi} \int_0^1 [\mu - S_C(x_2; BP.BP)]\, dx_2. \quad (9)$$

and the D-buyers with lower switching costs than the cutoff point switch to buy from firm C. Thus, the switching-consumer demand for firm C is given by

$$D_2^{DC}(BP.BP) = \frac{1-\beta}{\mu + \pi} \int_0^1 [S_D(x_2; BP.BP) - (-\pi)]\, dx_2. \quad (10)$$

The profit of firm C is given by.

$$\psi_2^C(BP.BP) = \psi_2^{CC}(BP.BP) + \psi_2^{DC}(BP.BP), \text{ where}$$
$$\psi_2^{CC}(BP.BP) = D_2^{CC}(BP.BP)\, p_2^C \text{ and } \psi_2^{DC}(BP.BP) = D_2^{DC}(BP.BP) p_{2N}^C.$$

Similarly, the demand and profit of firm D will given as follows:

$$D_2^D(BP.BP) = D_2^{DD}(BP.BP) + D_2^{CD}(BP.BP).$$
$$D_2^{DD}(BP.BP) = \frac{1-\beta}{\mu + \pi} \int_0^1 [\mu - S_D(x_2; BP.BP)]\, dx_2.$$

I can see every companies demands and profits when they choose Behavioral Pricing. If they choose Company C or D. Considering whether their consumers are Variety seeking or not. In the next part I go forward and calculate Unit Pricing. Means that consumers will not change their prices. Every company selects its pricing in order to optimize its profit, while considering the price set by the other company as a fixed parameter. The equilibrium prices and profits given in Table 1 can be derived from the first-order requirements for profit maximization. Next, I present the following

Proposition, which becomes evident by comparing the equilibrium prices in the second period under the different situations.

Proposition 1: In the second period, if both enterprises opt for Behavioral pricing (BP, BP),

i. If $\mu > \pi$, then $P_2^{i*} > P_2^{D*}$ _(new customer discounts: paying-to- switch strategy),

ii. If $\mu < \pi$, then $P_2^{i*} < P_2^{D*}$_(past customer discounts: paying- to- stay strategy). (Evidence. Refer to Appendix A).

In markets where the number of inertial customers and variety-seeking consumers is balanced ($\mu = \pi$), it is important to observe that $P_2^{i*} = P_2^{D*}$(Assumption 1 assumes that μ and π are not equal in order to guarantee pricing discrimination. Proposition 1 aligns with our intuitive understanding, but it is not a simplistic outcome. This is because it is obtained in a broad scenario where some consumers have positive net switching costs while others have negative net switching costs, and the companies lack knowledge about the specific net switching costs of each consumer. Proposition 1 highlights that the findings from prior research on positive switching costs cannot be simply extrapolated by replacing the switching cost parameter with a negative one. According to Shaffer and Zhang (2000), it is advantageous for a company to provide discounted prices to new consumers who switch from competitors. This strategy allows the company to increase sales and produce additional profit without sacrificing revenue from existing customers. In other words, a company can enhance its market share without compromising its revenue, and so generate a profit, by implementing a paying-to-switch pricing approach. Why do certain real companies employ a paying-to-stay pricing model, which is the opposite of the norm? This model demonstrates that businesses employ a "paying-to-switch" approach by offering new customer discounts in markets where consumers are more resistant to change and have significant switching costs. Conversely, firms adopt a "paying-to-stay" strategy by providing discounts to prior customers in markets where consumers are more inclined to seek diversity and have substantial staying costs. The outcome can be elucidated in the following manner. In marketplaces where consumers exhibit greater inertia due to high switching costs, firms employ new customer discounts to attract customers away from competitors, while maintaining higher prices for existing customers who are constrained by these switching costs. However, in a market where there are consumers who actively seek variety and are loyal to certain brands, firms may provide discounts to retain their existing customers and discourage them from switching to a competitor. Meanwhile, the firms can maintain higher prices for new customers who are likely to switch from a rival firm regardless of any price discounts, due to their strong brand loyalty. Now I go forward to calculate the pricing strategies, when companies do not want to change their price based on consumer's behavior.

4.2 Uniform Pricing: (UP, UP)

Next, I examine the scenario when both firms opt for uniform pricing, specifically the situation of (UP, UP) in the second period. Within the group of customers who purchased from business C in the initial period, there is a specific consumer who is equally inclined to purchase from either firm C or firm D. This consumer meets the requirement of being indifferent between the two options.

$$p_2^C + |x_2 - c| = p_2^D + |x_2 - d| + s. \quad (11)$$

Likewise, within the group of customers that purchased from firm D in the initial time, there is a specific consumer who meets the specified criteria.

$$p_2^C + |x_2 - c| + s = p_2^D + |x_2 - d|. \quad (12)$$

The determination of the cutoff point varies depending on the geographical location of each consumer. The derivation process is analogous to that of (BP, BP). Every company determines its pricing in order to optimize its profit, while considering the price set by the other company as a fixed value. By using the first-order requirements for profit maximization, I may deduce the prices and earnings at equilibrium in the second period, as presented in Table 1. Upon observing the equilibrium pricing in Table 1, I immediately note the following points.

Observation 1: In cases when firms opt for discriminatory pricing, the price set by each firm in the second period is not influenced by its market share in the first period. When enterprises choose for uniform pricing (UP, UP), it is contingent upon their market share in the first period.

The finding is consistent with both Chen's (1997) and Jeong and Maruyama's (2009) studies, which examine symmetric scenarios in two-period models of markets with only switching costs.

Observation 2: In both scenarios of discriminatory pricing (BP, BP) and uniform pricing (UP, UP), the price set by each firm in the second period rises in accordance with μ and π.

Now we will see the price and profit for companies who choose the two strategies at the same time.

Table 1. the price and profit for companies who choose the two strategies

	Prices and profits
(BP. BP)	$p_2^{C*} = \{2\,\mu + \pi + (c-d)(1-c-d)\}/3.\ p_2^{D*} = \{2\mu + \pi + (d-c)(1-c-d)\}/3.$ $p_{2N}^{C*} = \{\mu + 2\pi + (d-c)(1-c-d)\}/3.\ p_{2N}^{D*} = \{\mu + 2\pi + (d-c)(1-c-d)\}/3.$ $\psi_2^{C*} = \frac{(1+3\beta)\mu^2 + 4\mu\pi + (4-3\beta)\pi^2}{9(\mu+\pi)} + \frac{(c-d)(1-c-d)\{2(1+\beta)\mu + 2(2-\beta)\pi + (c-d)(1-c-d)\}}{9(\mu+\pi)}.$ $\psi_2^{D*} = \frac{(4-3\beta)\mu^2 + 4\mu\pi + (1+3\beta)\pi^2}{9(\mu+\lambda)} + \frac{(d-c)(1-c-d)\{2(2-\beta)\mu + 2(1+\beta)\pi + (d-c)(1-c-d)\}}{9(\mu+\pi)}$
(UP. UP)	$p_2^{C*} = \{(1+\beta)\mu + (2-\beta)\pi + (c-d)(1-c-d)\}/3.$ $p_2^{D*} = \{(2-\beta)\mu + (1+\beta)\pi + (d-c)(1-c-d)\}/3.$ $\psi_2^{C*} = \frac{\{(1+\beta)\mu - (2-\beta)\pi + (c-d)(1-c-d)\}^2}{9(\mu+\pi)}.$ $\psi_2^{D*} = \frac{\{(2-\beta)\mu + (1+\beta)\pi + (d-c)(1-c-d)\}^2}{9(\mu+\pi)}.$

The result mentioned above suggests that when there's a wider range of consumer traits, companies tend to increase prices. This conclusion is based on two main factors. First, higher μ (representing switching costs) makes it harder for customers to switch, leading companies to hike prices for these customers. Second, higher π (indicating staying costs) makes it easier for companies to attract new customers, prompting them to also raise prices for these newcomers. These combined effects reduce price competition, allowing firms to raise their prices.

When we compare the profits of each firm under (UP, UP) with (BP, BP) in the second period, the following lemma arises:

Lemma 1. Assuming $\pi > 0$, $\mu > 0$, and $\pi \neq \mu$. Irrespective of the product location, each firm's profit in the second period is higher under (BP, BP) than under (UP, UP).

Proof details are available in Appendix A.

4.3 Uniform Pricing: (UP, UP)

Next, I will examine the scenario in which both firms opt for a uniform choice. Pricing analysis for the situation of (UP, UP). During step 2, both companies make their selection. Locations of products during the second phase. Employing the identical rationale as previously said in In Section 5.1, the solutions displayed in Appendix A are obtained. The second-order criteria are only met when c and d are both equal to 1/2. Next, I can deduce the subsequent proposition. Proposition 2: In the second era of the market, when companies select the sites for their products considering both switching costs and staying costs, The notion of least differentiation is upheld, with $c* = d* = 1/2$ in both cases. Evidence. Refer to Appendix A. This supports past research suggesting that even when customers differ in how likely they are to switch products, companies tend to make products less different from each other. Also, according to Sajeesh and Raju's findings in 2010, when customers actively look for variety, products become less different from one another. This happens because loyal customers make things easier for businesses. To attract customers from rivals, companies use strategies that don't heavily rely on price. Even when businesses are close to each other, they keep competing. And being close to other businesses also stops a company's own customers from looking elsewhere. When companies choose Behavioural Pricing (BP, BP), their pricing in the second period is not affected by their market share from the previous period. On the other hand, with uniform pricing (UP, UP), the prices in the second period are directly linked to their previous period's market shares. In markets dominated by customers less inclined to switch (inertial) and fewer looking

for variety, discerning customers would anticipate that a company starting with lower prices would initially secure a larger market share and subsequently raise prices. This is because, in such markets, companies with larger market shares prioritize retaining their existing loyal customers over attracting new ones. Therefore, discerning customers in these markets are not as attracted by lower first-period prices, resulting in less competitive markets. In contrast, in markets with more customers seeking variety and fewer inertial ones, it's not advantageous for companies to set low initial prices to gain market share. In these markets, companies with larger market shares need to offer substantial discounts to keep their existing variety-seeking customers, which reduces price competition in the first period. Hence, uniform pricing is preferred by companies in markets with discerning customers, especially when there's a disparity between inertial and variety-seeking customers. Real-world examples of the dynamics explored in this paper can be found in various industries. For instance, in the airline industry, airlines often offer discounted fares to new customers or infrequent flyers through promotional deals and loyalty programs, targeting consumers with lower switching costs. On the other hand, in the telecommunications industry, companies may provide special discounts and incentives to retain existing customers, recognizing the high staying costs associated with switching service providers. Additionally, in the retail sector, loyalty programs and targeted promotions are designed to cater to both inertial and variety-seeking consumers, offering discounts and rewards to retain existing customers while also attracting new ones. These examples illustrate how businesses strategically adjust their pricing and positioning strategies based on consumer behavior and market dynamics, aligning with the concepts explored in the paper.

5. Final Thoughts

This study delved into a two-phase duopoly model focusing on positioning and pricing tactics in a market where consumers face both switching and staying costs. This study looked at how companies position themselves and set prices when customers might face costs for switching between brands or staying with the same one. This study shows that companies should be very similar to attract more customers, no matter if these companies use different pricing strategies. An explanation has been provided on why certain businesses stimulate customers to change brands, while others offer incentives for customer loyalty. Usually, it's thought that giving discounts to new customers is best because it brings in more sales without losing money from old customers. But sometimes, companies offer discounts to keep their existing customers happy, and this model helps explain why this happens in a simpler way than before. I assume that the firm's pricing strategy remains fixed, limiting our comparison to two symmetric scenarios: (BP, BP) and (UP, UP). Yet, exploring how the firm's pricing strategy itself adapts to achieve the best equilibrium could offer a more detailed understanding of behavior-based pricing and how companies operate within this framework. These findings suggest testable ideas for real-world experiments. When there are many customers with high switching costs, paying to switch is likely profitable with behavior-based pricing. On the other hand, paying to stay becomes profitable with behavior-based pricing when there are many variety-seeking customers. However, this only works if customers don't look ahead. Studying these predictions in real consumer scenarios could be a valuable area for future research. Future research in the domain of behavior-based price discrimination (BBPD) and consumer behavior can explore several avenues based on the insights and limitations identified in the current study. One potential area for further investigation is to expand upon the assumption regarding the range of net switching costs. The current study assumes that the range of net switching costs is broad enough for all cutoff points to fall within the market range. However, a more comprehensive understanding of the distribution and magnitude of net switching costs across different consumer segments and markets could provide valuable insights into the dynamics of pricing strategies and consumer decision-making. Furthermore, the study suggests testable ideas for real-world experiments, particularly in understanding the profitability of paying to switch or paying to stay with behavior-based pricing in different consumer scenarios. Conducting real consumer experiments and observational studies to validate the predictions derived from the current model could offer empirical evidence and practical insights for firms implementing BBPD strategies. This empirical research could involve analyzing consumer behavior, market responses, and firm performance in diverse industry settings to understand the implications of behavior-based pricing on consumer welfare, market competition, and firm profitability. In conclusion, future research in the field of BBPD and consumer behavior can build upon the current study by addressing the limitations, exploring asymmetric scenarios, and conducting empirical research to validate the model's predictions in real-world consumer settings. By delving into these areas, researchers can contribute to a deeper understanding of the complexities of behavior-based pricing strategies and their implications for firms and consumers.

Acknowledgments

We wish to express our sincere appreciation to everyone who contributed to the development and completion of this study. We are grateful for the insightful feedback and support provided by our colleagues, which greatly enhanced the quality of this work. Our thanks also extend to all participants who generously shared their time and expertise.

Authors' contributions

Mahsa Soltaninejad was responsible for the study design, data analysis, and drafting the manuscript. Samin Shaghaghi contributed to the study design and provided critical revisions of the manuscript. Both authors read and approved the final manuscript.

Funding

Not applicable

Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Informed consent

Obtained.

Ethics approval

The Publication Ethics Committee of the Redfame Publishing.

The journal's policies adhere to the Core Practices established by the Committee on Publication Ethics (COPE).

Provenance and peer review

Not commissioned; externally double-blind peer reviewed.

Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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Appendix A. Proof of Lemma and Propositions

Proof of Proposition 1

From the equilibrium prices in the case of (BP, BP) shown in Table 1, we have

$$p_2^{C*}(BP.BP) - p_{2N}^{C*}(BP.BP) = p_2^{D*}(BP.BP) - p_{2N}^{D*}(BP.BP) = \frac{\mu - \pi}{3}.$$

Thus, Proposition 1 holds.

Proof of Lemma 1

We assume that $\mu \neq \pi$ in Assumption 1. Then, from the equilibrium profits shown in Table 1, it follows that

$$\psi_2^{C*}(BP.BP) - \psi_{2N}^{C*}(UP.UP) = \psi_2^{D*}(BP.BP) - \psi_{2N}^{D*}(UP.UP) = \frac{\beta(1-\beta)(\mu-\pi)^2}{9(\mu+\pi)} > 0.$$

Thus, Lemma 1 holds.

Proof of Proposition 2

In stage 2, firm C chooses its location *c*, and firm D chooses its location *d* to maximize each total profit for both periods. Using each firm's profits shown in Table 1, the first-order conditions for profit maximization of (BP, BP) case are given by,

$$\frac{\partial \psi_2^C}{\partial c} = \frac{2(1-2\beta)\{(c-d)(1-c-d) + (1+\beta)\mu + (2-\beta)\pi\}}{9(\mu+\pi)} > 0.$$

$$\frac{\partial \psi_2^D}{\partial b} = \frac{2(1-2d)\{(d-c)(1-c-d) + (2-\beta)\mu + (1+\beta)\pi\}}{9(\mu+\pi)} = 0.$$

Solving the first-order conditions, we obtain the following 5 cases.

$$\left(c = d = \frac{1}{2}\right).\left(c = \frac{1}{2}.d = \frac{1+2\sqrt{(2-\beta)\mu + (1+\beta)\pi}}{2}\right).$$

$$\left(c = \frac{1}{2}\right).\left(d = \frac{1-2\sqrt{(2-\beta)\mu + (1+\beta)\pi}}{2}\right).$$

$$\left(c = \frac{1+2\sqrt{(1+\beta)\mu + (2-\beta)\pi}}{2}.d = \frac{1}{2}\right).$$

$$\left(c = \frac{1-2\sqrt{(1+\beta)\mu + (2-\beta)\pi}}{2}.d = \frac{1}{2}\right).$$

Here, the second-order conditions for profit maximization are satisfied only in the first case, c= *d* =1 /2, that is,

$$\frac{\partial^2 \psi_2^C}{\partial c^2} = \frac{4\{(1+\beta)\mu + (2-\beta)\pi\}}{9(\mu+\pi)} < 0.$$

$$\frac{\partial^2 \psi_2^D}{\partial d^2} = -\frac{4\{(2-\beta)\mu + (1+\beta)\pi\}}{9(\mu+\pi)} < 0.$$

whereas the other four cases do not satisfy the second-order conditions,

$$\frac{\partial^2 \psi_2^C}{\partial c^2} = -\frac{3}{4} < 0. \frac{\partial^2 \psi_2^D}{\partial d^2} = -\frac{8\{(2-\beta)\mu + (1+\beta)\pi\}}{9(\mu+\pi)} > 0$$

in the second and third case,

$$\frac{\partial^2 \psi_2^C}{\partial c^2} == -\frac{8\{(1+\beta)\mu + (2-\beta)\pi\}}{9(\mu+\pi)} > 0. \frac{\partial^2 \psi_2^D}{\partial d^2} - \frac{3}{4} < 0$$

in the fourth and fifth case.

Therefore, the unique equilibrium is, c^*(BP, BP) = d^*(BP, BP) = 1/2. The case of (UP, UP) can be derived similarly and omitted.

Thus, Proposition 2 holds.