

# Pricing Considering Salient Thinking

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**Abstract:** Empirical studies have proved the significant impact of consumers' salient thinking on their purchasing decisions, especially when there is more than one product in the market. This study establishes a pricing model to study the corresponding pricing strategies when consumers' purchasing decisions are influenced by salient thinking. Our analysis finds that price salience is optimal when the cost of the high-quality product is low; quality salience is optimal when the cost of the high-quality product is high.

**Keywords:** Salient thinking; Pricing strategy.

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## 1. Introduction

The rapid development of society has brought about the development of global economic. According to the profit data showed by the National Bureau of Statistics of China on July 27, the total profit of industrial enterprises above designated size reached 4.21833 billion yuan in the first half of the year, year-over-year increase 66.9 percent, a 45.5 percent over the first half of 2019, and a 20.6 percent increase on average in the two years. The rapid economic growth makes market competition increasingly severe. At the same time, more and more empirical studies indicate that consumers are subject to behavioral biases in many cases, and thus enterprises can adjust their marketing strategy to pursue a broader profit margin and a place in the competitive market.

There has been plenty of behavioral research and laboratory experiments found that preferences of customers can vary with the context. For example, the introduction of one dominant product may increase demand for another, which is called decoy effect and compromise effect. The context-dependence preference can be explained by salient thinking of customers. Bordalo et al. explain the wine example by salient theory [1]. According to salient theory, the consumers give more attention to the salient attributes of the product, which are then overweighted in his decision. The influence of salience can be relevant especially when there is more than one product in the market. In response the existence of salient thinking of consumers, more and more multi-product firms facing heterogeneous preferences change their product line design or pricing strategies, so as to influence consumers' choice and make the firm better off. In this paper, we only consider products which are defined by two attributes, quality and price, the consumers' preferences are biased by the products portfolio the firm offered and pricing decisions with respect to different products.

Rooted in the background above, we intend to study the following question: How do consumers' salient thinking affect a firm's pricing decisions?

The main research methods of this study are as follows:

(1) Literature research method. Through a certain amount of literature reading, to explore the direction of further research. After the research question is determined, relevant Chinese and foreign literature is searched with keywords such as "salient thinking", "firm pricing" and "reverse induction", and the research process, research status and latest research

results of relevant issues are summarized. Therefore, theoretical basis, research method, basic model and solution method can be found out for reference, combined with the actual situation, the model is built and solved and analyzed, and some innovative conclusions and suggestions are drawn.

(2) Numerical simulation method. In this paper, after establishing a mathematical model and obtaining the optimal solution to the profit maximization problem by using the reverse induction method, due to the complexity of mathematical calculation, it is necessary to assign values to variables involved in the model and conduct numerical calculation, so as to further obtain the influence of the change of significance thinking and reference price effect parameters on the optimal pricing and optimal private brand introduction strategy of retailers.

## 2. Literature Review

As proposed by psychologists Taylor and Thompson [2], "salience refers to the phenomenon that when one's attention is differentially directed to one portion on the environment rather than to others, the information contained in that portion will receive disproportionate weighing in subsequent judgments". This idea has been widely applied to the explanation and study of numerous context-dependent behavior of consumers. Bordalo et al. proposed a new explanation for endowment effect based on salience and context dependence [3]. Bordalo et al. introduce the conception of salience to the risk choice and present a theory of choice among lotteries, they provide explanation of some fundamental puzzles, such as the Allais paradox [4]. Then, Bordalo et al. extend the conception to the riskless choice condition to account for a wide range of disparate evidence, decoy and compromise effects, they also make new predictions based on salient theory [1]. Cosemans and Frehen provide empirical evidence for the influence of salience theory on asset pricing [5]. Herweg et al. consider a manufacturer who can offer high-quality product and decoy good and face with a competitor producing low-quality product [6]. They show that when consumers' purchasing decisions are significantly distorted by salient thinking, the manufacturer can stimulate the demand for main products by offering decoy good.

### 3. Model Development

Consider a pricing model of a monopoly firm. The monopoly firm sells two vertically differentiated products to consumers in each period. Let  $q_i$  and  $c_i$  ( $i = h, l$ ) denote firm's quality and marginal production cost respectively, we assume  $q_h > q_l$ ,  $q_i > c_i$ , and  $c_h > c_l$ .

#### 3.1. Consumer utility

Consumers differ in their valuation of quality and each consumer demands at most one unit of product in each period. When consumers are salient thinkers, the perceived utility that the consumer of type  $\theta$  obtains from a product of quality  $q_i$  at price  $p_{ij}$  in period  $j$  is given by:

$$U_{ij} = \begin{cases} \theta q_i - \delta p_{ij}, & \text{if quality is salient} \\ \delta \theta q_i - p_{ij}, & \text{if price is salient} \end{cases} \quad (1)$$

where  $\theta$  denotes the consumer's marginal willingness-to-pay for quality and is uniformly distributed over  $[0,1]$ .

Following Bordado [8], We assume that if  $\frac{p_h}{q_h} < \frac{p_l}{q_l}$ , quality is salient; if  $\frac{p_h}{q_h} > \frac{p_l}{q_l}$ , price is salient; otherwise, quality and price are equally salient.

#### 3.2. Demand and profit functions

Given the firm's salient strategies, we derive demand functions based on consumers' purchase decisions.

When the quality is salient, i.e.,  $\frac{p_h}{q_h} < \frac{p_l}{q_l}$ , we have  $\theta_h^Q = \frac{\delta(p_h - p_l)}{q_h - q_l}$  and  $\theta_l^Q = \frac{\delta p_l}{q_l}$  with  $\theta_h^Q > \theta_l^Q$ , where the superscript "Q" signifies the case where quality is salient. Hence, the demands for the national brand and the store brand are given by  $D_h^Q = 1 - \frac{\delta p_h}{q_h}$  and  $D_l^Q = 0$ , respectively.

When the price is salient, i.e.,  $\frac{p_h}{q_h} > \frac{p_l}{q_l}$ , we have  $\theta_h^P = \frac{p_h - p_l}{\delta(q_h - q_l)}$  and  $\theta_l^P = \frac{p_l}{\delta q_l}$ , with  $\theta_l^P < \theta_h^P$ , where the superscript "P" signifies the case where price is salient. Hence, the demands for the national brand and the store brand are given by  $D_h^P = 1 - \frac{p_h - p_l}{\delta(q_h - q_l)}$  and  $D_l^P = \frac{p_h - p_l}{\delta(q_h - q_l)} - \frac{p_l}{\delta q_l}$ , respectively.

The firm's profit in the first period is given by

$$\pi = (p - c_h)D_h + (p - c_l)D_l. \quad (2)$$

### 4. The Firm's Optimal Strategy

In this section, we consider the optimal decisions of the firm under the salient model. In the following subsections, we will discuss the firm's pricing strategies in each situation separately. According to the firm's demands and profits in Section 3.2, we derive the optimal solutions under each situation in Proposition 1.

Proposition 1. When consumers are salient thinkers, the firm's pricing decisions under different attribution salience is given by:

**Table 1.** The pricing strategies under different situation

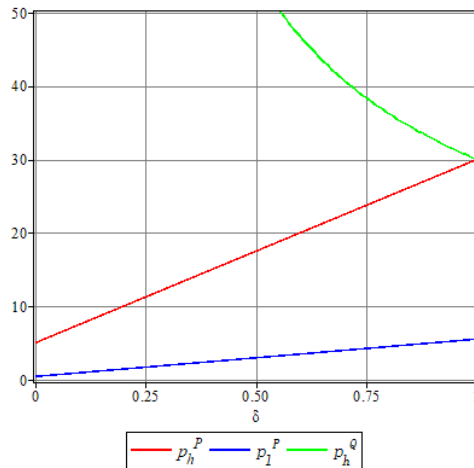
	$\frac{p_h}{\delta q_h + c_h}$	$\frac{p_l}{\delta q_l + c_l}$
P	$\frac{2}{q_h + \delta c_h}$	$\frac{2}{2}$
Q	$\frac{q_h + \delta c_h}{2\delta}$	n/a

Proposition 2. When consumers are salient thinkers, the firm's optimal strategy is: when  $c_{h1} < c_h < c_{h2}$ , quality salience; otherwise, price salience.

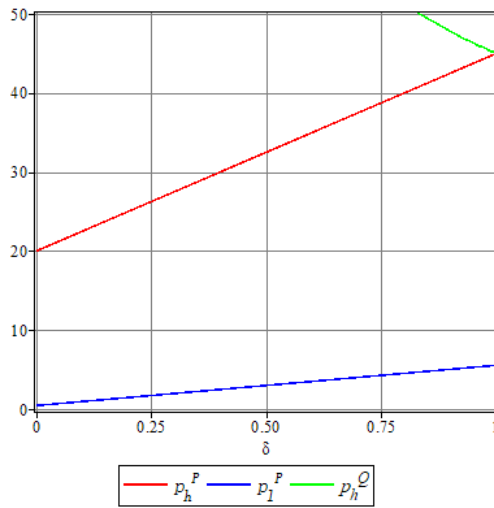
Proposition 2 points out that when the cost of the high-quality product is low, the quality salience is optimal. This is because the retailer can make profits by selling more high-quality products under the quality salience, and the retailer can set higher product prices because consumers have a higher valuation of products. However, when the cost of the high-quality product is high, the price salience is optimal,

because the high cost makes it no longer advantageous to sell more high-quality products, and in this case, selling the low-quality product at the same time can make up for the sales loss caused by the high cost.

We resort to numerical examples to obtain some managerial insights. We set the following parameter values: quality parameters:  $q_h = 50, q_l = 10$ ; cost parameters:  $c_l = 1$ ; salience parameter:  $\delta \in [0,1]$ .



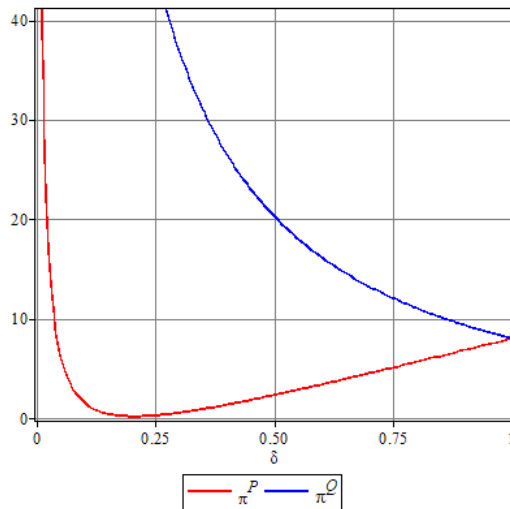
**Figure 1.** The pricing under different salience strategy when  $c_h = 10$



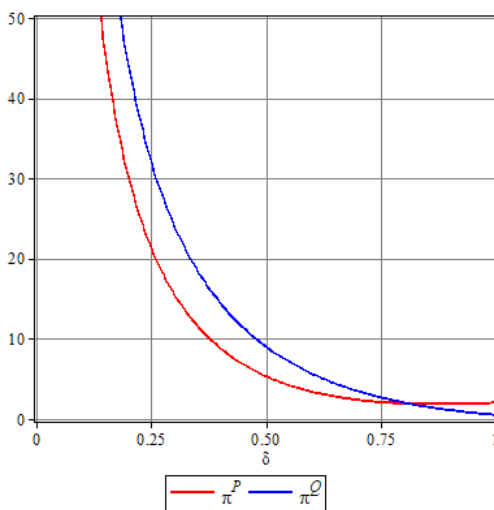
**Figure 2.** The pricing under different salience strategy when  $c_h = 40$

As can be seen from Figure 1 and Figure 2, regardless of whether the cost of high-quality product is high or low, the prices of the two products in two periods increase with the decrease of salient thinking, because the sensitivity of

consumers to price decreases. On the contrary, if the quality is salient, the prices of the high-quality product in both periods decrease with salient thinking, because consumers' valuation of quality decreases.



**Figure 3.** The profits under different salience strategy when  $c_h = 10$



**Figure 4.** The profits under different salience strategy when  $c_h = 40$

## 5. Conclusion

Following the previous literature, we assume that when the firm sells two vertically differentiated products to consumers in each period, consumers make purchasing decisions, choosing whether and which product to buy in each period. We assume that consumers are salient thinkers. We summarize the main findings.

When consumers are salient thinkers, the prices of the two products in two periods increase with the decrease of salient thinking; on the contrary, if the quality is salient, the prices of the high-quality product in both periods decrease with salient thinking. In addition, when the cost of the high-quality product is low, the quality salience is optimal; however, when the cost of the high-quality product is high, the price salience is optimal. In a word, salient thinking has important influence on the optimal pricing decisions of the firm.

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