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# New product pricing strategy under customer asymmetric anchoring

Joo Heon Park [a,1], Douglas L. MacLachlan [b,*], Edwin Love [c,2]

[a] Dept. of Economics, 23-1 Wolgok-Dong, Sungbuk-Gu, Dongduk Women's University, Seoul 136-714, Republic of Korea
[b] Dept. of Marketing & International Business, Michael G. Foster School of Business, University of Washington, Seattle, WA 98195-3226, United States
[c] Department of Finance & Marketing, Western Washington University, Bellingham, WA 98225, United States

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ABSTRACT

Potential customers' willingness to pay (WTP) for a new product can be affected by their observing a posted price and this can be modeled in terms of an anchoring mechanism. A theoretical argument and mathematical proof are developed, showing that if customers use an asymmetric WTP anchoring mechanism, it will normally be optimal for firms to price higher than otherwise. Experimental evidence is provided supporting the notion that an asymmetric anchoring mechanism can be involved in purchase decisions.



## 1. Introduction

Marketers often tell the story of a Native American jewelry shop that had trouble selling an allotment of turquoise jewelry to its customers, who were mainly tourists in Arizona. After trying several other promotions, the owner of the store left her assistant a note with instructions stating, “Mark down the items by 1/2.” Misunderstanding the note, the assistant instead doubled the price of each piece…and sold out (Cialdini, 1985).

A critical factor in this story is that the vacationing customers who bought the assortment were unfamiliar with turquoise jewelry. If they had a well-formed idea of how much this jewelry was actually worth, then they never would have responded as they did. Because they were unfamiliar with the product, they were strongly influenced by its price. Based on their behavior, we infer that these customers must employ a rationale for their purchasing decision different from the traditional rationale in which customers make their subjective valuation of a product independently of the product's listed price.

In these situations, customers are forced to make purchasing decisions regarding unfamiliar new products. In such cases, the listed price can be an important determinant of the customer's willingness-to-pay (WTP), which is defined as the maximum amount that a customer is willing to pay for a product. Just as the jewelry shop owner did not consider the influence of the price on her customers' WTP, the most common new product pricing strategies rarely consider the possibility that price setting can affect customers' WTP.

For new products in which WTP plays a key price-setting role, the two main pricing strategies are skimming and penetration. Businesses that employ a skimming strategy price their products higher than the average customer's WTP. By doing so, the businesses first attract early adopters, who presumably have relatively inelastic demand. After setting the initial price at a higher level, the businesses could attract later customers with lower WTP by reducing their prices. Businesses that utilize the penetration strategy price their new products low enough that the initial offer price is less than the WTP of a large number of potential customers.

Both of these strategies set prices for products by assuming that customer WTP is fixed. This assumption may be based on a well-established method for estimating WTP, such as conjoint modeling or the contingent valuation method (CVM). However, these methods will fail to provide an accurate estimate of customer WTP if a customer's WTP is not fixed but influenced by the listed price.

We contend that customers are normally unsure about their original WTP for a new product and are likely to modify this value after observing the listed price. This claim leads us to our central contribution to the literature. Specifically, we develop and evaluate new pricing models that show how a customer's awareness of the listed price affects his or her WTP. In addition, we provide companies with a suggestion regarding their price-setting strategies for their new products.

Another key feature of our approach is that we treat a customer's uncertainty regarding WTP as a probability distribution from which the customer draws a random WTP at the time of the purchase. Furthermore, the customer can consider the observed market price as one indicator of the probability distribution of the other customers' WTP.

* Corresponding author. Tel.: +1 206 543 4562; fax: +1 206 543 7472.
*E-mail addresses:* jpark@dongduk.ac.kr (J.H. Park), macl@uw.edu (D.L. MacLachlan), Ed.Love@wwu.edu (E. Love).
[1] Tel.: +82 2 940 4435; fax: +82 2 940 4192.
[2] Tel.: +1 360 650 4614.

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Our proposed models assume that a customer's WTP is semi-endogenous in that the customer's original WTP is formed independently of the price but is influenced and changed by the price at the final purchasing stage. More specifically, in our model, customers do not simply compare the original WTP with the listed price but also adjust their original WTP to accommodate the additional information presented by the observed price. Then, they compare the adjusted WTP with the price in the final purchasing decision. Our ideas are similar to those of Wathieu and Bertini's (2007) study, where the listed price is not simply compared with the WTP but also stimulates the customers to reconsider their WTP. However, our study utilizes a different assumption with regard to whether the WTP is affected by the observed price. Our model assumes that the listed price affects the customers' WTP while they reconsider their decision, whereas in their model, the WTP remains unaffected by the observed price at this point.

We postulate that customers go through one of two adjustment mechanisms that yield different purchasing decisions in which their WTPs are presumed to be modified by the listed price. Whereas in the first adjustment mechanism (i.e., the One-step Anchoring Mechanism (AM1)), the customers adjust their WTP symmetrically in both upward and downward directions; in the second mechanism (i.e., the Two-step Anchoring Mechanism (AM2)), the customers only adjust their WTP in an upward direction. Under the AM2, companies can justifiably set prices higher than they would if the WTP were determined exogenously (i.e., without considering the reaction of the customers to the listed market price).

According to the AM2, if customers see a listed price that is lower than their WTP, then they automatically purchase the product. However, if the listed price is higher than their WTP, then they modify their WTP instead of simply forgoing the purchase, as suggested by the conventional purchasing mechanism. Essentially, we argue that a higher-than-WTP price provides a customer with an opportunity to revalue his or her WTP such that the new WTP reflects a higher level of quality or scarcity, which the customer would have missed at the first evaluation stage because of risk aversion but which the other customers had recognized.[3] Based on this new information, the customer draws a new WTP from the revised WTP probability distribution. This distribution is asymmetrically modified, which means that the ex post distribution is shifted upward, increasing the probability that the new WTP drawn from this distribution will be higher than the listed price.

The remainder of the paper is organized as follows. Section two reviews the relevant literature, section three introduces our theoretical model, section four provides some empirical support for our model, section five describes the managerial implications, and section six provides our conclusions, the practical implications, the limitations of the paper, and our proposals for future research.

## 2. Related literature

In this section, we review prior studies on the uncertainty surrounding customers' willingness to pay, the relevance of reference pricing, and the psychological process of anchoring and adjustment. We compare this paper with the prior research using price as a stimulus to reconsider the WTP. Each area supports our argument that customer WTP is dynamic and influenced by external stimuli, such as the listed price.

Our models assume that the customer WTP is drawn from a probability distribution, which reflects a degree of uncertainty regarding the WTP. Closely related to uncertainty in WTP is the concept of reference pricing. Customers utilize reference prices to form their WTP because these prices help the customers develop the shape and the locations of their WTP distributions. In addition, reference prices are relevant to our understanding of the factors that may cause customers to update their WTP to accommodate the new information. Our review of the psychological process of anchoring and adjustment cites the findings of prior studies in which pricing stimuli had shifted WTP. These studies provide support for our mechanism. Finally, we compare our approach with Wathieu and Bertini's (2007) work on price as a stimulus for reconsidering the WTP.

### 2.1. Uncertainty of willingness to pay (WTP)

In traditional economic theory, a customer's WTP for a product can be interpreted as the money amount by which he or she subjectively evaluates the incremental utility added from consuming the product. By definition, if a listed price is below a customer's WTP, then the consumer purchases the product; otherwise, he or she will either forego the purchase or seek a more affordable alternative, such as a private label brand in the case of consumer packaged goods (Sinha & Batra, 1999).

However, in reality, customers rarely know for certain how much incremental utility they can expect from consuming a product at the time of the purchase. Customers can only determine this utility at the consumption stage, and consumption usually does not coincide with purchase. Customers generally do not know how to value a new product, especially one that they have never purchased or used. Additionally, assuming that customers' price knowledge varies depending on macroeconomic factors (Estelami, Lehmann & Holden, 2001), we can infer that customers are unlikely to have a single, immutable and accurate valuation for a new product, even in the most optimal circumstances. At best, they may hold a probability distribution of the WTP from which they randomly draw their WTP for their purchasing decisions. Cameron and Quiggin (1994) advanced a similar argument regarding consumer behavior when they surveyed their subjects on their WTP for an environmental resource.

### 2.2. Reference pricing

Prior research on reference pricing has advanced our understanding of customer WTP. A substantial body of research has shown that customers compare a store's price of a good to their reference price for that good (c.f., Degeratu, Rangaswamy & Wu, 2000; Della Bitta & Monroe, 1974; Klapper, Ebling, & Temme, 2005; Thaler, 1985; Urbany, Bearden, & Weilbaker, 1988). This reference price is based on a variety of factors, such as previously observed prices and the store's environment. Reference price is closely related to WTP in that a relatively high reference price for a good will generally result in a high WTP. In the context of new products, reference prices are particularly influential in purchasing decisions because customers will be uncertain of the actual value of the good. Reference prices are typically generated by the prices of analogous products or products that solve similar problems, but these prices only provide guidelines to customers who exhibit considerable uncertainty about their WTP.

Previous marketing studies have shown that reference prices influence the customers' evaluations of price attractiveness (Niedrich, Sharma, & Wedell, 2001). Many researchers have suggested that certain stimuli, such as the listed price, can change the customers' WTP by influencing their reference prices. Although some reference pricing models assume that a reference price is the weighted average of the past prices of related goods (Briesch, Krishnamurthi, Mazumdar, & Raj, 1997; Kalyanaram & Winer, 1995; Klapper, et al., 2005), other models show that, because consumers have poor memories of past prices, consumers tend to form reference prices based on the prices they observe at the time of the purchase (Briesch et al., 1997; Hardie, Johnson, & Fader, 1993; Rajendran & Tellis, 1994).

[3] Prices that are both higher and lower than a customer's WTP are indications of the other customers' evaluations. However, we claim that the customer disregards lower prices but responds to higher prices because of risk aversion.