



# Price as a Stimulus to Think: The Case for Willful Overpricing

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## **Abstract**

Consumers aware of a new benefit will often experience uncertainty about its personal relevance or usage value. This paper shows that the decision to deliberate further to resolve this uncertainty and reach a polarized judgment of personal relevance critically depends on the posted price. In particular, a price above the consumer's initial willingness to pay might be thought provoking and enhance the perception of relevance with a certain probability. This behavioral mechanism is introduced formally and by way of an experiment with reference to the purchase of organic lettuce and fair-trade coffee. Accounting for the effect of price as a stimulus to think, a monopolistic firm should either over-price ("transgressive pricing") or under-price ("regressive pricing") in comparison to the consumer's willingness to pay. Under certain circumstances, the firm should also empower consumers with means that reduce the effort of deliberation.

*Keywords:* Overpricing, transgressive pricing, willingness to pay, differentiation, new product, consumer empowerment, cost of thinking, categorization, fair-trade, organic food

## 1. Introduction

When a firm introduces a new benefit, consumers are often unsure whether they need it or not. Accounting for this uncertainty, the firm might offer an introductory discount or focus on a small group of more affluent or enthusiastic consumers. The alternative approach suggested in this paper is to induce consumers to think more thoroughly about the potential role of the new benefit in the context of their lives. The central claim is that overpricing –pricing above what they initially want to pay, but not too high- can motivate consumers to deliberate further and reach a more definite, polarized judgment about the personal value of a new benefit. With a certain probability, this more deliberate opinion will intensify desire and willingness to pay, justifying the posted price premium. This paper presents theoretical and experimental evidence of this price-induced behavioral mechanism and considers the circumstances under which a differentiated firm should rely upon it.

Examples of new benefits might include design or aesthetic enhancements to utilitarian goods (e.g., artfully designed computers or kitchen tools), environmental and social responsibility attributes embedded in familiar products (e.g., organic vegetables, fair-trade coffee beans, gas-electric hybrid cars), and ordinary dimensions of added value (e.g., service level, size and weight, convenience, prestige) attached to products in categories in which they are not expected by consumers. Consumers accustomed to approaching a product category with a standard set of expectations will experience uncertainty with respect to the personal relevance of such added benefits. Incorporating such benefits is also usually accompanied by overpricing, even when consumers from all walks of life are targeted. This paper suggests that consumers in these circumstances will interpret price as a cue to entertain deeper thoughts about the unusual benefit dimension and that firms will construe the circumstances as an opportunity to target a possibly smaller but more deliberate and eager pool of consumers.

The theory advanced here derives from a simple model of behavior that incorporates consumer uncertainty about the relevance of a unique product feature. Initial willingness to pay is a function of the feature's expected usage value, while actual demand is also a function of the extent of consumer deliberation prior to purchase. Analysis reveals that consumers' motivation to think is determined by market prices in combination with other factors such as magnitude of the potential benefit, initial degree of uncertainty, and cost of thinking. Experimental evidence is presented that supports the notion that price can stimulate thinking as predicted by the analysis.

The remainder of the paper is organized as follows. Related literature is reviewed in section 2. Formal models of the consumer and differentiated firm are introduced in section 3. An examination of consumer behavior in section 4 demonstrates the existence of a range of “thought-provoking prices” that might cause buying behavior to deviate from initial willingness to pay. Section 5 reports experimental evidence on the existence of such prices. In Section 6 optimal pricing in anticipation of the dual impact of price as incentive to buy and stimulus to think is established, revealing what will be called *regressive* and *transgressive* pricing strategies (pricing below or above initial willingness to pay, respectively). Implications for market entry are also discussed, as consideration of transgressive pricing expands the domain in which entry should prove profitable. Section 7 extends the results by examining the value of consumer empowerment, that is, the profitability of transferring resources that facilitate consumer deliberation. Section 8 concludes.

## **2. Related Literature**

Because it studies pricing from the perspectives of both consumers and firms, this paper draws on literatures in consumer behavior as well as pricing and advertising research.

### **Consumer Behavior**

The consumer behavior literature on information processing and product categorization already posits the general idea that cognitive effort can be context dependent. Consumer behavior models inspired by the concept of bounded rationality assume that consumers select decision strategies and heuristics on the basis of a tradeoff between accuracy and required cognitive effort, contingent on task environment or decision maker’s resources or both (Huber 1980; Johnson and Payne 1985; Payne, Bettman, and Johnson 1993). Research along these lines has had many relevant ramifications including studies of formal measurement of the cost of thinking (Shugan 1980), formation of consideration sets (Hauser and Wernerfelt 1990), and choice in ambiguous or emotionally charged contexts (Johnson 1986; Luce, Bettman, and Payne 1997).

In the present paper, the contextual element that determines cognitive effort is the feature-price combination offered by the differentiated alternative. Research on the likelihood of elaboration in marketing environments (Celsi and Olson 1988; Gotlieb and Swan 1990; Petty and Cacioppo 1986) has hypothesized that price savings can result in higher involvement and greater motivation to process marketing messages. If this particular finding seems to

contradict the idea that overpricing stimulates deliberation, recall that the reference point adopted in the present research is a consumer's initial willingness to pay, not the earlier (possibly unaffordable) price posted by the firm.

The presence of a range of thought-provoking prices is consistent with the finding by Carpenter, Glazer, and Nakamoto (1994) that incongruous (or even apparently meaningless) attributes can yield a positive demand effect so long as the attached price remains within a range, even if higher than expected. An inverse relationship between decision speed and price incongruity found in an experiment by Wathieu, Muthukrishnan, and Bronnenberg (2004) is further evidence of a link between posted price and amount of deliberation. Growing evidence suggests more generally that prices trigger cognitive activity that might influence willingness to pay. Recent work by Shiv, Carmon, and Ariely (2005) demonstrates that the actual post-purchase efficacy of product attributes (e.g., the energy surplus derived from an energy drink) tends to be reduced when a price discount was posted, due to unconscious effects. Bertini and Wathieu (2005) also find consumer attention towards various dimensions of an offer to be contingent on the format of the posted price (e.g., on whether fees are posted separately).

Previous research on product categorization was another source of inspiration for the present work. According to this research, incongruent attribute information prompts arousal and cognitive elaboration directed at making sense of the incongruity (Mandler 1982; Sujan and Bettman 1989). Specifically, research has shown that a product is evaluated more extensively when attributes are moderately incongruent with respect to existing knowledge structures than when its attributes are either congruent or extremely incongruent because the stimulus created by the contrast is optimized (Meyers-Levy and Tybout 1989). This literature, which identifies congruity as a driver of comprehension and classification of unique product features, has found application in various areas in marketing (e.g., Meyers-Levy, Louise, and Curren 1994; Ozanne, Brucks, and Grewal 1992; Stayman, Alden, and Smith 1992). Similarly, but more formally, the present paper finds, with respect to the situation of a consumer trying to clarify the relevance of what a firm has to offer, that a moderately incongruent price differential is more likely to induce deliberation. Detailed analysis reveals that price, benefit intensity, and effort of thinking complete the behavioral economics of thoughtful consideration.

This paper's formal approach supports analysis of the strategic implications of the categorization process from the standpoint of an opportunistic firm, a domain pioneered by Carpenter and Nakamoto (1990) and Ratneshwar and Shocker (1991).

Some previous studies have, because of its alleged objectivity, explicitly dismissed price from the list of attributes that can influence perceptions and product categorization (Johnson 1986). The present work disagrees, suggesting that price not only serves to discriminate between categories (e.g., houses are expensive, lettuce is cheap), but also stimulates re-categorization (e.g., an expensive organic lettuce is more likely to be perceived as health food when a price premium is attached).

## Pricing and Advertising

Price premiums have alternatively been interpreted as (a) a discriminating factor in the self-selection of less price-sensitive consumers (Shaked and Sutton 1982), (b) a credible signal of the value of intangible benefits (Milgrom and Roberts 1986), (c) a mechanism for consumer self expression (Belk 1988) or wealth signaling (Bernheim 1994),

and/or (d) a cue for product quality (Gerstner 1985, Rao and Monroe 1989). This paper claims that price not only extracts or signals value, but also determines the evaluation effort invested by consumers, and that a price premium can stimulate consumers to revisit their perception of benefit relevance.

Also notable is the specific role this paper implies for advertising. In the economics tradition, two well-understood functions of advertising are (1) to convey information about a product (Telser 1964), and (2) to incur an expense that should be interpreted by consumers as a credible signal of product quality, when quality cannot be easily observed or demonstrated (Nelson 1974). Implicit in these interpretations of advertising is a flow of information from firm to consumer. The underlying assumption is that firms know more than consumers about product performance. The present work does not focus on this kind of performance uncertainty. In the section concerned with consumer empowerment, this paper assumes that one possible function of advertising is to reduce the thinking effort consumers must expend to envision the usage value of a new benefit in the context of their lives, beyond initial priors.

### 3. Model

Consider a firm that offers a unique benefit on an unexpected dimension (relative to standard products in the same category) and a representative consumer who is uncertain about the personal relevance of that dimension as it relates to consuming a product in the indicated category. The consumer, upon observing the posted price, either attempts to resolve this uncertainty by thinking more deeply or makes a buying decision without further ado.

The firm is labeled  $i$  and the additional benefit offered along some dimension  $X$  has a known potential usage value of  $x_i$ . The “true” value,  $v_i$ , of the additional benefit for the consumer is conditional on personal relevance, a state variable denoted by  $r \in \{0,1\}$  such that  $v_i = rx_i$ .

The consumer holds a prior belief  $\Pr(r=1) = \theta$  that leads to initial evaluation or willingness to pay  $E(v_i) = \theta x_i$ . This prior belief can be interpreted as a first impression of relevance or, alternatively, as a measure of the perceived congruity between dimension  $X$  and the product category under consideration. This prior belief is assumed to be common knowledge between the firm and the consumer (it can be assessed through market research).

The firm has no means to assess relevance beyond  $\theta$ . The consumer, however, at a cost  $e$  representing the effort of thinking, might determine personal relevance of the new benefit by, for

example, trying the product in familiar contexts, imagining or projecting future usage occasions, and assessing whether the offered benefit is redundant with goods purchased in other markets. Through such thinking the value of the additional benefit is updated to  $x_i$  with probability  $\theta$  or to 0 with probability  $(1 - \theta)$ , reflecting calibration of prior belief. The general contention that thinking results in the polarization of evaluation and affect has received ample documentation in the psychology literature (for a review, see Tesser, Martin, and Mendolia 1995). This formalization of the decision to think is reminiscent of the decision theoretic approach to information valuation (Raiffa 1968).

Thinking by the consumer results in a realistic (but generally overlooked) case of information asymmetry in favor of the consumer: the firm continues to hold prior belief  $\Pr(r = 1) = \theta$ ; the consumer holds the updated belief  $\Pr(r = 1) \in \{0, 1\}$ . (This asymmetry, at equilibrium, will be a source of surplus for the consumer despite the monopolistic power of the differentiated firm.)

On the supply side, market prices are denoted by  $p_i$  (for firm  $i$ 's unique offering) and  $p_{\sim i}$  (for the standard offering), implying a price differential  $\Delta = p_i - p_{\sim i}$  that is strategically set by firm  $i$ . Price  $p_{\sim i}$ , taken as given by firm  $i$  when the optimal price differential is determined, is considered exogenous in this analysis.<sup>1</sup>

Firm  $i$  faces a variable cost  $k$  to manufacture a product that features additional benefit  $x_i$ , so  $k - p_{\sim i}$  will be termed firm  $i$ 's "cost handicap," a hurdle that the price differential should cross to warrant profitability (i.e.,  $\Delta = p_i - p_{\sim i}$  cannot imply a positive profit  $p_i - k \geq 0$  unless  $\Delta \geq k - p_{\sim i}$ ).

The sequence of the game is as follows. Firm  $i$  observes  $p_{\sim i}$  and posts a price differential  $\Delta = p_i - p_{\sim i}$ , whereupon the representative consumer decides whether or not to invest in additional deliberation before deciding whether or not to buy from firm  $i$ . As will be shown in the next section (in the form of a result, not an assumption), the posted price will sometimes be a key determinant in the decision to think that the firm needs to anticipate.

Section 7 analyzes a variation of the model beyond this basic pricing problem whereby firm  $i$  has the ability to initially reduce the cost of thinking (e.g., by offering a free extended product trial or projecting through advertising images that facilitate assessment of personal relevance). Section 8 studies a separate extension of the model whereby firm  $i$  competes on the basis of a low-cost simplification of the standard offering (i.e., a value decrease  $-x_i$ ).

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<sup>1</sup> In a case of monopolistic competition, standard firms might compete on price in a way that remains unaffected by firm  $i$ 's decision (e.g., Hart 1979). In the long run, standard firms' responses could include a price increase (e.g.,



## 4. Consumer Behavior

This section explains how demand behavior in the presence of a posted price might deviate from purchase intentions. The suggested mechanism is then tested empirically in section 5.

Based on prior perception of the relevance of dimension  $X$ , the representative consumer approaches the decision problem with what could be termed a *demand intention*, a rule that determines the range of acceptable price differentials  $\Delta$ , accounting for initial evaluation

$$E(v_i) = \theta x_i:$$

$$D_i(\Delta) = \begin{cases} 1 & \text{if } \Delta \leq \theta x_i \\ 0 & \text{otherwise} \end{cases}$$

Before the material act of choice that might convert this intention into behavior, the consumer has the opportunity to think. Thinking (or deliberation) has three distinct effects that occur in sequence: it expends effort  $e$ , polarizes value to either 0 or  $x_i$ , and might cause demand behavior to depart from intention.

Starting from an initial intention to buy,  $D_i = 1$ , a consumer who thinks is wasting effort  $e$  if thinking merely bolsters initial intention by revealing benefit relevance (which occurs with probability  $\theta$ ). But with probability  $(1 - \theta)$ , thinking reveals the new benefit to have no relevance, leading the consumer to conclude that the price differential  $\Delta$  should be saved. In sum, the net expected gain from thinking for someone who intends to buy is  $(1 - \theta)\Delta - e$ .

Conversely, starting from an intention not to buy,  $D_i = 0$ , the consumer is wasting effort  $e$  with probability  $(1 - \theta)$  but gaining net value  $x_i - \Delta - e$  with probability  $\theta$  when thinking reveals personal relevance. The net expected gain from thinking for someone who initially dismisses firm  $i$ 's offering is thus  $\theta(x_i - \Delta) - e$ . Summarizing this discussion, the decision to think ( $T$ ) obeys the following pattern.

$$T = \begin{cases} 1 & \text{if } \{\Delta \leq \theta x_i, e \leq (1 - \theta)\Delta\} \text{ or } \{\Delta > \theta x_i, e \leq \theta(x_i - \Delta)\} \\ 0 & \text{otherwise} \end{cases}$$

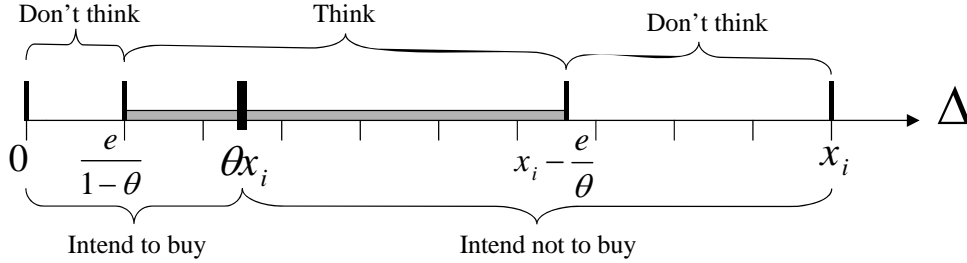
Straightforward algebra yields this alternative formulation.

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if a reduction in the share of the standard product causes an increase in marginal cost) or decrease (e.g., if cost improvements are introduced in response to firm  $i$ 's competition). This paper does not investigate these effects.

$$T = \begin{cases} 1 & \text{if } \Delta \in \left[ \frac{e}{1-\theta}, \theta x_i \right] \cup \left( \theta x_i, x_i - \frac{e}{\theta} \right] \\ 0 & \text{otherwise} \end{cases}$$

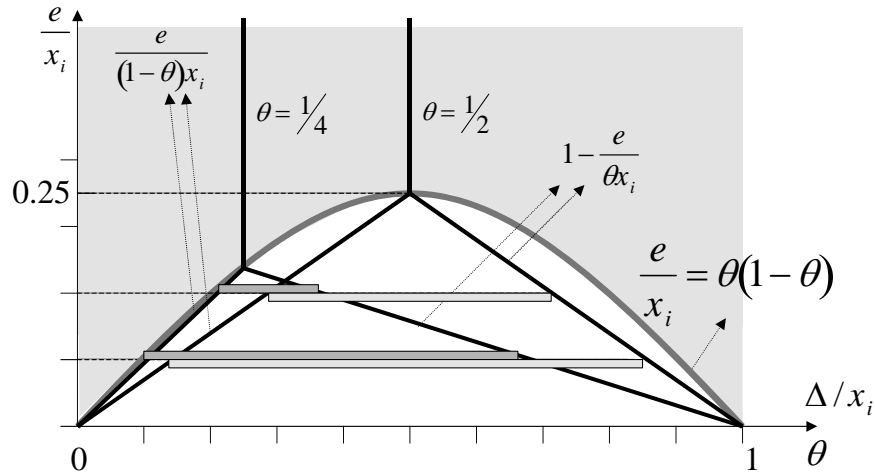
Figure 1 illustrates the interaction between demand intention and the decision to think.



**Figure 1 Interaction between Intention to Buy and Decision to Think**

Intuitively, thinking is useless when the price differential is so small that purchase of the differentiated good is a “no-brainer” or so high that the consumer simply “won’t bother.” When the price differential is in the vicinity of first impression,  $\theta x_i$ , however, it is thought provoking (unless the effort of thinking is discouragingly high). Indeed, both sides of this thought-provoking price range around  $\Delta = \theta x_i$  are non-empty under the same critical condition  $e \leq x_i \theta (1 - \theta)$ . This provision defines the boundaries of the analysis. When  $e \leq x_i \theta (1 - \theta)$  is *not* true there is no difference between demand intention and behavior, as price cannot stimulate thinking. The use of price as a stimulus to think can be conceived only when the cost of deliberating is relatively low, the potential additional benefit is large, and/or the consumer’s prior perception of relevance is neither too high nor too low. The condition can also be written  $e \leq \theta(x_i - \theta x_i)$ , which means that the expected increase in value resulting from thinking must be greater than the cost of thinking.

Figure 2 graphically portrays the construction of thought-provoking price ranges. The condition  $e \leq x_i \theta (1 - \theta)$  in a graph  $\left( \theta, \frac{e}{x_i} \right)$  forms a concave envelope, above which no thinking can occur and under which thought-provoking price intervals increase when  $e$  is lower,  $x_i$  is higher, and  $\theta$  approaches  $\frac{1}{2}$ . Conversely, thought-provoking prices rarefy when  $e$  is higher,  $x_i$  is lower, and  $\theta$  approaches 0 or 1.



**Figure 2 Construction of Thought-Provoking Price Ranges**

Evident in Figure 2 is the effect of initial skepticism (i.e.,  $\theta < 1/2$ ), which not only reduces the range of thought-provoking prices but also skews it increasingly to the right of prior value as  $e$  gets smaller. Intuitively, for a skeptic not intending to buy the likelihood that thinking would result in the waste of  $e$  is high. The decision to think is thus highly sensitive to the cost of doing so. On the other hand, as  $e$  gets smaller initial optimism (i.e.,  $\theta > 1/2$ , not explicitly represented in Figure 2) reduces the range of thought-provoking prices and skews it to the left of prior value. An optimist who intends to buy mostly associates thinking with a likely loss of cost of thinking,  $e$ , which makes an intender's decision to think highly sensitive to a decrease of  $e$ .

Accounting for the decision to think and its likely behavioral outcome as analyzed above, sophisticated firms (or sophisticated consumers for that matter) should expect demand to differ sharply from purchase intentions when  $e \leq x_i \theta(1 - \theta)$ . The most striking difference between demand intention and expected demand is the presence of price insensitivity above and below prior value, as all prices in the range lead to the same polarized demand behavior upon consumer deliberation. This result is captured in Proposition 1 and illustrated in Figure 3.

PROPOSITION 1. (EXPECTED DEMAND)

$$D_E(\Delta) = \begin{cases} D_I(\Delta) & \text{if } e > x_i\theta(1-\theta) \\ 1 & \text{if } \Delta < \frac{e}{1-\theta} \text{ and } e \leq x_i\theta(1-\theta) \\ \theta & \text{if } \frac{e}{1-\theta} \leq \Delta \leq x_i - \frac{e}{\theta} \\ 0 & \text{if } \Delta > x_i - \frac{e}{\theta} \text{ and } e \leq x_i\theta(1-\theta) \end{cases}$$

Proposition 1 captures the common observation that a discrepancy between intention and behavior is less likely for incremental changes in product offering (small  $x_i$ ) and in domains in which prior beliefs are strong (high or low  $\theta$ ). Moreover, Proposition 1 explains why market survey questions couched in terms of probabilistic behavioral prediction (e.g., “How likely would you be to buy at this price?” instead of “Do you intend to buy at this price?”) might dramatically reduce discrepancies between predicted and actual behavior (Morwitz 2000).

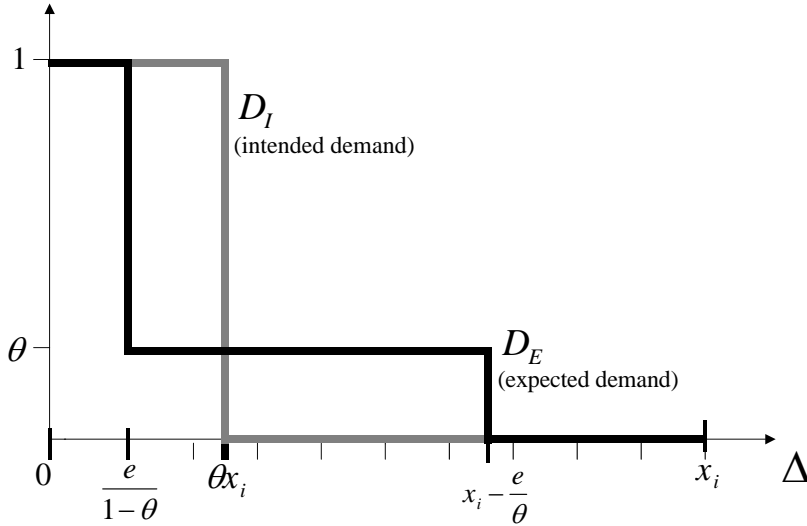


Figure 3 Proposition 1 when  $e \leq x_i\theta(1-\theta)$

Finally, this theory of consumer behavior explains why intentions and behavior differ in the first place: it is costly for consumers to think fully about a prospective benefit, and the price posted at the point of purchase is a necessary ingredient in the decision to invest more thought.

Contrary to common views, the inability of marketers to predict behavior on the basis of purchase intention might have less to do with workings of the unconscious mind that surveyed consumers fail to anticipate (Zaltman 2003) than with the economics of the effort of thinking.

## 5. Experimental Evidence

A simple experiment was conducted to provide support for the analytical argument before moving to a discussion of normative implications. Participants ( $n = 266$ ) were shown a purchase scenario involving one of two product categories: lettuce (10-ounce bag) or coffee (12-ounce bag). Each scenario first listed the prices of four undifferentiated alternatives. Participants were then informed of a new brand described as comparable on standard attributes (freshness and overall quality) but featuring a unique dimension of differentiation: 100 % organic production (lettuce stimulus) and fair-trade harvesting (coffee stimulus). A comprehensive list of the official criteria required to obtain certification (7 or 8, depending on the category) was also included in each scenario. Appendix A reproduces the stimulus and experimental conditions used for the lettuce replicate.

The experiment employed a 3 (price differential between new and existing alternatives: small, intermediate, large)  $\times$  2 (product category: lettuce, coffee) between-subjects design. A pre-test confirmed that the prices selected for both the lettuce (\$2.79, \$4.59, and \$6.39, respectively, compared to \$2.49 - \$2.59 for the undifferentiated alternatives) and coffee (\$10.49, \$14.49, and \$18.49, respectively, compared to \$9.39 - \$9.59 for the undifferentiated alternatives) categories created differentials that were perceived to be small, intermediate, and large, as intended. This experiment tested the general hypothesis that an intermediate price differential is thought-provoking and induces additional deliberation, whereas extreme differentials (small or large) engender no-brainer responses of adoption or rejection.

After reading the scenario, participants were instructed to access a screen that contained the dependent measures; return to the initial screen was disabled. Participants were first asked to list as many of the criteria used to define the unique feature as possible. The number of criteria recalled was used as an indicator of deliberation. Second, participants were asked to report their belief regarding the personal relevance of the offered new attribute using a 1 (“strongly disagree”) to 7 (“strongly agree”) scale. Third, participants were asked to indicate the maximum price they would be willing to pay (*WTP*) for the new brand, irrespective of the posted price. The current analysis predicts that, vis-à-vis the small and large price differential conditions,

participants that saw an intermediate gap would exhibit better criterion recall, more polarized beliefs regarding personal relevance, and higher likelihood that *WTP* would surpass the intermediate price threshold (\$4.59 and \$14.49 for the two categories, respectively). Finally, to rule out the possibility that participants inferred product quality from posted prices (a la Gerstner 1985), participants were asked to rate the overall quality of the new brand on a 1 (“very low quality”) to 7 (“very high quality”) scale.

### *Procedure*

Participants were registered members of a subject pool managed by the research center of a large business school in the United States. The general population of 5,447 members was, on average, 39% male and 31 years of age. Eighty-seven percent of the members had completed undergraduate education or higher. Participants were selected at random and recruited via e-mail. The experiment was carried out online (accessed through a designated URL) and introduced generically as an exercise in understanding consumer decision-making. Participants were informed in advance of the expected duration of the poll (approximately 20 minutes). They were also told that participation involved hypothetical purchase decisions, that there were no right or wrong answers, and that they should consider only their own preferences. Participation was voluntary, with a \$5 payment upon completion.

### *Results and Discussion*

The results, presented in Table 1, corroborate the theory.<sup>2</sup> With respect to the first measure, participants in the intermediate price differential condition exhibited greater criterion recall, providing evidence of more extensive deliberation. Participants in this experimental condition also demonstrated more polarized beliefs about the personal relevance of the unique dimension offered by the new brand (tested by comparing both kurtosis values and frequency of extreme scores across conditions) and greater willingness to pay beyond the threshold set by the intermediate price. Importantly, these effects occurred despite the absence of a significant positive correlation between the posted price and perceived product quality, seemingly ruling out the alternative explanation of quality signaling. Overall, every measure indicated that, consistent with the proposed theory, consumer re-assessment of personal relevance was stimulated when the price differential between the existing products and the new offering was intermediate.

## **Table 1 Experimental Results**

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<sup>2</sup> Table 1 summarizes the results by product category when a parametric test was applied and aggregates the results when a nonparametric test was in order.

PRICE DIFFERENTIAL	<i>Small</i>	<i>Intermediate</i>	<i>Large</i>
<b>Label Criterion Recall</b> <i>Average Count</i>			
Organic Lettuce <sup>*</sup>	1.51	2.15	1.12
Fair-Trade Coffee <sup>**</sup>	1.85	2.53	1.58
<b>Perceived Personal Relevance</b> <i>Kurtosis (Normal = 0)</i>			
Organic Lettuce <sup>♦</sup>	-0.46	-1.39	-0.53
<b>Fair-Trade Coffee<sup>♦♦</sup></b>	-0.42	-0.99	-0.44
<i>Extreme Ratings (% at 1,2, 6 or 7)</i>			
Aggregate <sup>▲</sup>	47.7%	62.8%	41.9%
<b>Willingness to Pay</b> <i>WTP ≥ Intermed. Price (% of Responses)</i>			
Aggregate <sup>▲▲</sup>	5.8%	20.7%	10.5%
<b>Perceived Quality</b> <i>Rating (7-point scale)</i>			
Organic Lettuce <sup>♥</sup>	5.70	5.72	5.35
Fair-trade Coffee <sup>♥♥</sup>	5.63	5.54	5.80

*Statistical tests: A/ planned contrast between the intermediate and small price differential conditions, B/ planned contrast between the intermediate and large price differential conditions, C/ nonparametric test of independence between the small and large price differential conditions, D/ nonparametric test of independence between the intermediate and two remaining price differential conditions. <sup>\*</sup> A/  $t(116) = -2.30, p = .023$ ; B/  $t(116) = -3.85, p < .001$ ; <sup>\*\*</sup> A/  $t(109) = -2.07, p = .041$ ; B/  $t(109) = -2.77, p = .007$ ; <sup>♦</sup> A/  $z = 2.21, p = .013$ ; B/  $z = 2.03, p = .021$ ; <sup>♦♦</sup> A/  $z = 1.32, p = .093$ ; B/  $z = 1.29, p = .099$ ; <sup>▲</sup> C/  $\chi^2(1) = 1.41, ns$ ; D/  $\chi^2(1) = 3.96, p = .045$ ; <sup>▲▲</sup> C/  $\chi^2(1) = 1.24, ns$ ; D/  $\chi^2(1) = 8.58, p = .006$ ; <sup>♥</sup> A/  $t(132) = .07, ns$ ; B/  $t(132) = 1.27, ns$ ; <sup>♥♥</sup> A/  $t(128) = -.35, ns$ ; B/  $t(128) = -1.04, ns$ .*

## 6. Regressive and Transgressive Pricing

This section analyzes firm  $i$ 's pricing decision when confronted with expected demand  $D_E$  in anticipation of the dual impact of price as an incentive to buy and as a stimulus to think. The outcome of this analysis will provide equilibrium conditions under which consumers will be induced to think and polarize their initial assessment along benefit dimension  $X$ . In this pricing problem,  $D_E$  can be thought of as the expected demand of a single target consumer or as the expected demand proportion from a segment of identical consumers characterized by a prior  $\theta$ .

When the cost of thinking is too high,  $e > x_i\theta(1-\theta)$ , there exists no price differential that can induce thinking, therefore  $D_E(\Delta) = D_I(\Delta) = 1$  when  $\Delta \leq \theta x_i$  and 0 otherwise. The profit maximizing price differential is  $\Delta^* = \theta x_i$  and the firm operates profitably only if  $\pi_i^* = p_{-i} + \theta x_i - k \geq 0$ .

If, on the other hand, thinking is a possibility ( $e \leq x_i\theta(1-\theta)$ ), the sophisticated firm might decide to use price as a stimulus to think, knowing that deliberation will increase willingness to pay only for a proportion of individuals and that other individuals will lose interest in the proposed benefit. Note that if the price differential is set at  $\Delta = \theta x_i$  to match the initial evaluation of the benefit, thinking will occur, causing less response (and less revenue) than suggested by demand intentions (only a proportion  $\theta$  of consumers will buy upon thinking, whereas demand intentions suggest that all consumers should be buying at  $\Delta = \theta x_i$ ). Thus, when the firm operates in the range of thought-provoking prices and deliberation can be stimulated it is inefficient to set price at the level dictated by intended willingness to pay. Indeed, as long as price is not increased to more than  $x_i - e/\theta$ , demand is insensitive to price (by Proposition 1).

In anticipation of the impact of price on thinking the firm is left with two possibilities. If the price differential is set just below  $\frac{e}{1-\theta}$ , then all consumers will buy  $x_i$  without further deliberation. This solution is referred to as *regressive pricing* because the price charged by firm  $i$  regresses towards the existing category price  $p_{-i}$ , downward from initial willingness to pay. Regressive pricing presents the consumer with an easy, no-brainer decision. If the price differential is set instead at  $x_i - e/\theta$  (the highest thought-provoking price differential), the consumer does not intend to buy but will deliberate, expending effort  $e$ , which will cause demand to occur with probability  $\theta$ . This higher price differential provides a marginal incentive to think and a substantial incentive to buy if, upon thinking, the consumer draws a positive conclusion of benefit relevance. This second solution is termed *transgressive pricing* because the firm chooses to go beyond the norm set by existing category prices and an initially acceptable premium.<sup>3</sup> Transgressive pricing is willful overpricing.

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<sup>3</sup> The word transgressive has no moral connotation in this context. As the literal opposite of regressive, transgressive captures the notion of going beyond a boundary. Psychologists use the same term to characterize an expansive action beyond the territorial constraints imposed by the past (Kozielecki 1989).



Formally, firm  $i$ 's profit function when  $e \leq x_i\theta(1-\theta)$  is as follows.

$$\begin{cases} \pi_i = p_{-i} + \Delta - k & \text{if } \Delta < e/(1-\theta) \\ \pi_i = (p_{-i} + \Delta - k)\theta & \text{if } e/(1-\theta) \leq \Delta \leq (x_i\theta - e)/\theta \end{cases}$$

Profit maximization entails a choice between regressive and transgressive pricing, as follows.

$$\pi_i^* = \max \left\{ p_{-i} + \frac{e}{1-\theta} - k; \left( p_{-i} + x_i - \frac{e}{\theta} - k \right) \theta \right\}$$

Analysis of this choice leads to Proposition 2 and Corollary 1.

**PROPOSITION 2. (OPTIMAL PRICING)**

*If firm  $i$ 's product has a potential additional benefit  $x_i$  as compared to the standard product priced at  $p_{-i}$ , then optimal pricing is  $p_{-i} + \Delta^*$  with*

$$\Delta^*(x_i, e, \theta, k, p_{-i}) = \begin{cases} \theta x_i & \text{"prior value pricing" if } e > x_i\theta(1-\theta) \\ \frac{e}{1-\theta} & \text{"regressive pricing" if } C < e \leq x_i\theta(1-\theta) \\ x_i - \frac{e}{\theta} & \text{"transgressive pricing" if } e \leq \min\{C, x_i\theta(1-\theta)\} \end{cases}$$

where  $C = \frac{1-\theta}{2-\theta} (\theta x_i + (1-\theta)(k - p_{-i}))$

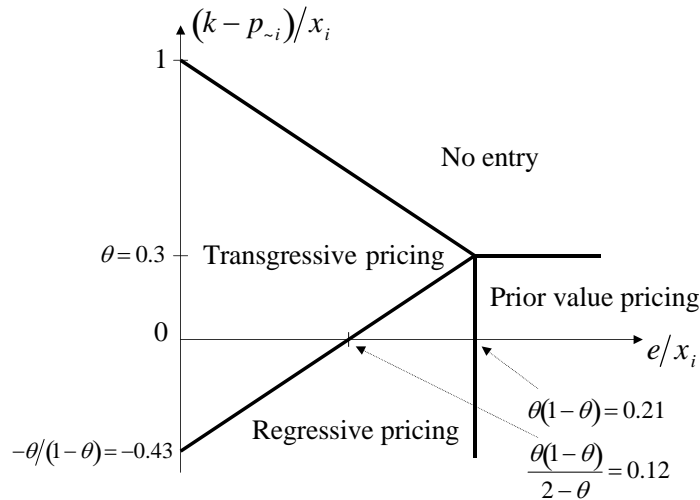
**COROLLARY 1. (ENTRY CONDITIONS)**

*Firm  $i$  will be able to profit from entry under two sets of conditions:*

$$\begin{cases} \begin{cases} e > x_i\theta(1-\theta) \\ k - p_{-i} \leq \theta x_i \end{cases} & \text{(higher cost of thinking, lower cost handicap)} \\ \begin{cases} e \leq x_i\theta(1-\theta) \\ k - p_{-i} \leq x_i - \frac{e}{\theta} \end{cases} & \text{(lower cost of thinking, higher cost handicap)} \end{cases}$$

Corollary 1 shows how accounting for the impact of price on the decision to think can expand domains of entry for firm  $i$  (irrespective of the apparent profitability constraint  $k - p_{-i} \leq \theta x_i$  based on demand intentions) as if the consumer's effort to think could complement

the firm's physical effort to produce added value. Accounting for price as a stimulus to think, firms can enter markets in which there is no intended demand at the cost-clearing price, but in which a sizeable proportion of consumers can be anticipated to exhibit greater willingness to pay upon deliberation. A synthetic perspective on these results emerges from considering Figure 4.



**Figure 4 Proposition 2 and Corollary 1 when  $\theta = 0.3$**

A strategically significant implication of this characterization is that in commoditized product categories subjected to fierce cost-based competition (low  $p_{-i}$ ) differentiating firms would be increasingly likely to choose transgressive pricing. Note also that having posted a price differential  $\Delta = \theta x_i$ , a firm that neglects the endogenous decision to think might be surprised to obtain only a proportion  $\theta$  of the demand it was expecting. Selling less than expected, if this framework is true, suggests over-reliance on demand intentions and a missed opportunity either to sell more cheaply to increase demand (regressive pricing) or to sell at a higher price with no impact on volume demand (transgressive pricing).

## 7. Consumer Empowerment

This section extends the firm's decision problem by assuming that it can empower the consumer with a lower cost of thinking,  $e$ , prior to the beginning of the game. Generally, consumer empowerment (Wathieu et al. 2002) refers to firm activities aimed at enabling consumers to identify and express their demands. The capacity to reduce consumers' cost of thinking is a realistic interpretation of a number of marketing activities such as sampling and product trials, consumer education, advertising, and store design.<sup>4</sup> Some have maintained that marketing prefers that consumers not think too much, but marketers are sometimes seen working hard to increase consumers' awareness of their personal needs. The present framework enables explicit discussion of the decision whether or not to empower consumers with additional resources that reduce the effort of thinking. From the standpoint of the firm looking to augment a standard offering, the benefit of consumer empowerment emerges from the increased opportunity to stimulate deliberation and practice transgressive pricing at a profit.

In a first approach to this, one can examine the effect of a marginal decrease of the cost of thinking *within* each of the three optimal pricing policies. Marginal empowerment has no profit impact when a firm prices at prior value. If the cost of thinking decreases within the range in which the model predicts regressive pricing, then dissuading consumers from deliberating becomes more difficult and the result will be a reduced price differential (optimized at  $\frac{e}{1-\theta}$ ) detrimental to profit, as this price reduction could not cause a volume increase (volume equals 1 under regressive pricing). In contrast, if the cost of thinking decreases within the range associated with transgressive pricing the consumer is more inclined to think and the firm can increase the price differential (optimized at  $x_i - \frac{e}{\theta}$ ) without interfering with the likelihood that consumers will draw a conclusion of personal relevance. The end outcome is a profit increase, expressed formally, as a corollary of Proposition 1, thus.

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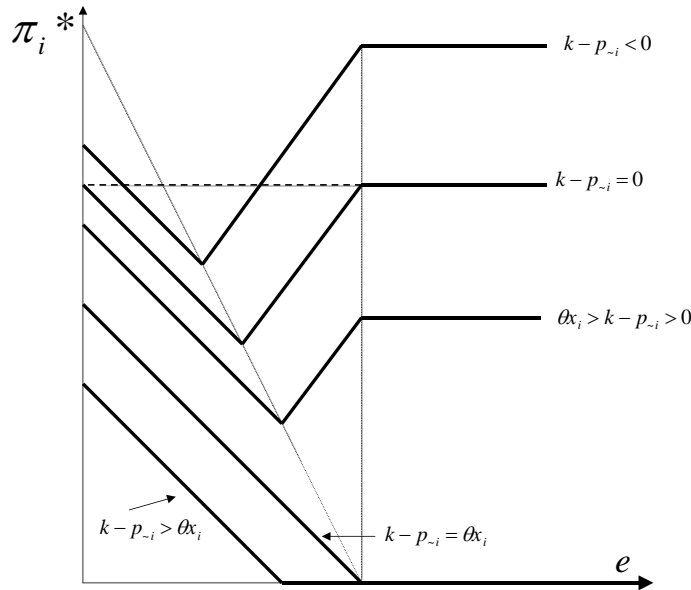
<sup>4</sup> An increasingly common objective in the creation of advertisements is to "project" consumers into usage scenarios that facilitate assessment of personal relevance. New types of retail environments created by leading innovators in a number of consumer markets have similarly been conceived as spaces in which consumers can easily project themselves into the full scope of user experiences (Sherry 1998).

COROLLARY 2. (MARGINAL CONSUMER EMPOWERMENT)

The profit impact of a marginal change in  $e$  depends on the pricing policy dictated by the prevailing cost of thinking as follows:

$$\frac{\delta\pi^*}{\delta e} = \begin{cases} 0 & \text{if } e > x_i\theta(1-\theta) \text{ ("prior value pricing")} \\ \frac{1}{1-\theta} & \text{if } C < e \leq x_i\theta(1-\theta) \text{ ("regressive pricing")} \\ -1 & \text{if } e \leq \min\{C, x_i\theta(1-\theta)\} \text{ ("transgressive pricing")} \end{cases}$$

Thus, any firm for which transgressive pricing is optimal faces a further tradeoff regarding the way it should induce consumers to think: whether to continue to provide a price incentive  $e/\theta$ , or to empower consumers at a cost that might be covered by the opportunity to reduce the price incentive.



**Figure 5 Equilibrium Profit as a Function of the Cost of Thinking**

Figure 5, based on Corollary 2, formally depicts the relationship between equilibrium profit and cost of thinking. Analyzing this diagram raises the more general question: Assuming that the firm could freely determine  $e$ , when (if ever) would complete empowerment (i.e., setting  $e = 0$ ) be optimal? Proposition 3, which addresses this question by establishing the conditions under

which empowerment is preferred, suggests that when production of an augmented product comes with a cost handicap (as is typically the case) complete empowerment (if it is freely available) is desirable.

PROPOSITION 3. (CONDITION FOR EMPOWERMENT)

When  $e \geq 0$  can be determined at no cost to the firm, profit maximization entails setting  $e=0$  if  $x_i \geq k - p_{-i} \geq 0$  and  $e > x_i\theta(1-\theta)$  if  $0 > k - p_{-i}$ .

Proof: From the analysis of two conditions:  $\pi_i^*(e=0) > \pi_i^*(e = x_i\theta(1-\theta))$  and  $\pi_i^*(e=0) > 0$   $\square$

The exception to the principal preference for complete and free empowerment occurs when the differentiating firm operates at a cost *advantage* (i.e., when it is able to produce the augmented product at a cost  $k$  inferior to the market price  $p_{-i}$  charged by standard competitors). Such a firm would prefer to increase the cost of thinking to a level that suppresses the existence of thought-provoking prices and charge prior value  $\theta x_i$ . Indeed, the firm collects from prior value and transgressive pricing (when  $e=0$ ) profits of  $p_{-i} + \theta x_i - k$  and  $(p_{-i} + x_i - k)\theta = \theta p_{-i} + \theta x_i - \theta k$ , respectively, implying a difference equal to  $(1-\theta)(p_{-i} - k)$  that switches sign when the cost handicap turns into a cost advantage. The intuition for this result, which creates a link between the firm's cost condition and desire to make thinking resources available to consumers, is as follows. The expected revenue from transgressive pricing ( $\theta(p_{-i} + x_i)$ , when  $e=0$ ) is necessarily smaller than the revenue from prior value pricing ( $p_{-i} + \theta x_i$ ), but the cost associated with transgressive pricing is less ( $\theta k$  instead of  $k$ ) as production focuses on serving the most motivated consumers. As production cost  $k$  decreases ( $p_{-i}$  increases), the cost-side profit gain associated with transgressive pricing decreases (the revenue-side profit loss associated with transgressive pricing increases), and the *raison d'être* for a strategy that focuses on the more motivated subset of consumers vanishes.

An example of this situation might be a firm that offers a standard good augmented by a simpler service plan that is both easier to deliver and more appealing to consumers. A firm that competes on this basis, rather than optimize between transgressive and regressive pricing, should want to minimize consumers' deliberation prior to purchase, limit advertising, and generally

remove any temptation for consumers to think. Consistent with the discussion in the previous section, managing consumer deliberation through pricing and now through empowerment expands business opportunities for innovations that entail a cost handicap:

PROPOSITION 4. (EMPOWERMENT AND MARKET ENTRY)

*Consumer empowerment is necessary for market entry if  $\frac{k - p_{-i}}{\theta} > x_i > k - p_{-i}$ .*

Proof: From the conditions  $\pi_i^*(e=0) > 0$  and  $\pi_i^*(e = x_i\theta(1-\theta)) < 0$ .  $\square$

A simple interpretation of Proposition 4 is that a low prior regarding the relevance of the offered benefit increases the likelihood that empowerment is a necessary component of competition. Another proposition evident from Figure 5 generalizes Proposition 3 by suggesting that even in cases in which empowerment is not zero-cost, firms with a cost handicap above a certain threshold will favor consumer empowerment.

PROPOSITION 5. (COST HANDICAP AND APPEAL OF CONSUMER EMPOWERMENT)

*For an action of consumer empowerment that brings  $e$  from  $e > x_i\theta(1-\theta)$  down to some  $0 \leq \hat{e} < x_i\theta(1-\theta)$ , there exists a cost handicap  $x_i > \hat{k} - p_{-i} > 0$  such that any firm with a cost handicap  $x_i \geq k - p_{-i} \geq \hat{k} - p_{-i}$  will want to take that action.*

## 8. Summary and Conclusion

If the price associated with a unique additional benefit is low enough consumers will buy without further questioning their prior impressions. An excessively high price, on the other hand, will discourage purchase in a blink because it is apparent that additional deliberation could reveal nothing that would overcome the budgetary downside. This paper's main finding is that there often exists between these no-brainer extremes a range of prices that should induce consumers to think and gain clarity regarding the personal relevance of the offered benefit.

According to this analysis, the amount of consumer deliberation triggered by the posted price is influenced by the effort of thinking, the potential (maximum) usage value of the benefit, and the consumer's prior belief about the personal relevance of that potential.

A sophisticated firm will acknowledge this phenomenon by adjusting its marketing strategy to better manage consumer deliberation. The firm should first consider pricing away from consumers' initial willingness to pay and evaluate whether regressive pricing (closer to the market's mean price) or transgressive pricing (farther from the market's mean price) is optimal. Transgressive pricing (that is, moderate overpricing) is more likely to be optimal when production cost is higher and consumers' cost of thinking lower. The firm should then, under certain conditions, empower consumers by reducing the cost of thinking through various forms of subsidy (e.g., product trial opportunities, education, projective retail spaces, and projective advertising). Consumer empowerment enables the firm to price its product near potential value without letting incentives to think interfere with the process of value extraction. Differentiated firms can use these tactics to take fuller advantage of the uniqueness of their offerings, earn greater profits, and enter markets despite cost disadvantages and consumers' initial reluctance to take into account new dimensions of value.

These prescriptions take the study of price tiers and vertical differentiation beyond the usual discussion of discrimination among consumers of different (usually income-driven) price sensitivity. Instead, a firm's ability to charge a price premium depends on the consumer's cost of thinking,  $e$ , and initial lack of prejudice (medium  $\theta$ ). Instead of *starting* from segmentation in terms of willingness to pay, the firm is here invited to *cause* a polarization of demand beyond the tepid response that the uniqueness of its offering might otherwise generate.

The differentiation strategy assumed in this paper should be classified as "vertical" in the sense that all consumers would prefer the differentiated good if it was offered at price zero. But the effect of a higher price is not to select less price sensitive/higher income consumers, as in existing models of vertical differentiation (Shaked and Sutton 1982), but to trigger a polarization of demand that induces a split between enthusiasts and the indifferent.

With respect to the consumer behavior literature, this paper arguably augments research on product categorization by addressing questions such as what triggers consumers to challenge their prior regarding product similarity or dissimilarity. The formal approach adopted here lends itself, from the point of view of the firm, to extensions into the strategic domain. Potentially

useful concepts arising from this work include transgressive pricing, regressive pricing, and projective advertising or retailing, all of which derive from the view that one function of price and marketing communication is to stimulate thinking and deliberation.

A natural extension of this work (presented in Appendix B) is to analyze product simplification strategies whereby firms differentiate by offering a stripped down but cheaper version of the market standard. This is common in industries in which a small change in service might be associated with substantial cost savings (e.g., airlines, hotels, retail, furniture). Transgressive pricing in these contexts means posting a discount sufficiently deep to dissuade consumers from thinking about the foregone benefit. Regressive pricing, in contrast, implies a shallow discount that should appeal only to consumers who, when stimulated to think, perceive the product simplification to be personally irrelevant and any discount thus pure bonus. Regressive pricing is more likely to occur when the cost advantage derived from stripping down the product is marginal and consumers' cost of thinking relatively low. The empowerment discussion in the context of product simplification emphasizes the profitability derived from *increasing* the cost of thinking (for instance, by preventing trials, allowing less time for consumer decision making, and so forth) in an attempt to forestall the need to engage in deep discounting.

Further research might develop the theory's measurement implications in terms of the discrepancy between intention to buy and actual purchase behavior, where purchase behavior results from an additional effort to think when the final economic incentives have been posted by the firm. Implied by this model is an approach to demand elicitation that incorporates inputs about the cost of thinking. This approach needs to be fleshed out and tested against other techniques of demand prediction (Hauser and Toubia 2005; Liechty, Fong, and DeSarbo 2005; Morwitz 2000; Ofek and Srinivasan 2002; Wertenbroch and Skiera 2002). Additional theoretical extensions might relax assumptions made here about consumer homogeneity, calibration of prior beliefs, full polarization of beliefs upon thinking, and, finally, the dynamics of strategic response among firms. Whereas these assumptions were used to keep the model focused on basic mechanisms in a manner reminiscent of decision analysis, extensions should add realism and shed light on new domains of application. For example, given a market that consists of two segments that cannot be discriminated, one of which has firm beliefs, and the other uncertainties, about personal relevance (as studied in the present paper), a firm could decide or not to price in a



way that induces uncertain consumers to polarize their beliefs prior to a purchase.

## Appendix A: Sample Stimulus (lettuce replicate)

Imagine that on your routine trips to the supermarket you frequently buy lettuce. Currently, four brands compete on the basis of freshness and price ranging from \$2.49 for the cheapest to \$2.54 for the most expensive. The following table lists the brands available (all in 10-ounce bags) and their respective prices.

Brand	Price
Brand A	\$2.49
Brand B	\$2.59
Brand C	\$2.59
Brand D	\$2.54

Now suppose that a new brand of lettuce becomes available. Upon inspection, you realize that this new brand has excellent freshness and overall quality equivalent to that of any of the competing brands. But this brand is the only one to be officially certified as 100% organic.

A 10-ounce bag of this 100% organic lettuce costs [\$2.79] [\$4.59] [\$6.39]. Organic produce, particularly in the case of lettuce, is recognized to be better for health and the environment. The United Fresh Food and Vegetable Association ([www.uffva.org](http://www.uffva.org)) defines organic produce according to seven criteria.

1. Organic produce is grown free of chemicals (e.g., pesticides or growth agents).
2. Soil fertility is maintained through natural biological activity.
3. Method of production is certified by an independent third party.
4. Each step in the production is formally recorded and documented.
5. Only nationally approved materials have been used on land and crops for at least three years before harvest.
6. Preservation, processing, storage, and transportation comply with nationally approved organic standards.
7. All local, state, and federal regulations governing the safety and quality of the food supply have been respected.

Please answer the following questions.

----- NEXT PAGE -----

- A. Please list as many of the seven criteria used by the United Fresh Food and Vegetable Association to define organic produce as you remember. [open-ended]
- B. Please evaluate the following statement: “I find the growth of produce through 100% organic processes to be personally relevant.” [1 = strongly disagree, 7 = strongly agree]
- C. Irrespective of its actual market price, what is the MAXIMUM price you would be willing to pay for a 10-ounce bag of this new brand of lettuce? [state dollar amount]
- D. Please use the following scale to rate the overall quality of this new brand of lettuce. [1 = very low quality, 7 = very high quality]

### Appendix B: Marketing of a Simplified Product

Assume the firm reduces value by up to  $-x_i$  in order to achieve a new cost of production  $k < p_{-i}$  that, if sufficiently low, makes it possible to offer a compensating discount that renders the product simplification both acceptable to consumers and profitable for the firm. Consumer uncertainty in this case revolves around the relevance of a pre-existing feature  $X$  that is being withdrawn. Parameter  $\theta$  represents prior perception of relevance. Thinking about future usage occasions and benefit substitutes can (at an effort cost  $e$ ) polarize assessment to either 0 or 1. A treatment similar to that used in Section 4 engenders interaction between intention to buy and decision to think, as depicted in Figure 5.

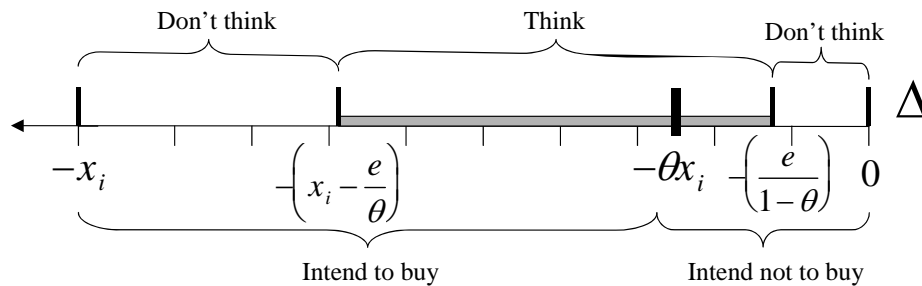


FIGURE 5: Intention to Buy and Decision to Think (Case of a Simplified Product)

Because a profit-maximizing firm seeks to minimize the offered discount while maintaining sufficient likelihood of being chosen, pricing now implies a tradeoff between posting a shallow discount  $\Delta^- = \frac{e}{1-\theta}$  that will stimulate thinking and result in demand with probability  $1-\theta$  and a

deeper savings  $\Delta^- = x_i - e/\theta$  (the smallest capable of inhibiting thinking and causing demand with probability 1). In the case of product simplification, regressive pricing (pricing closer to  $p_{-i}$ ) encourages deliberation whereas transgressive pricing (pricing farther from  $p_{-i}$ ) yields guaranteed, but mindless, success. Correspondingly, shallow discounting should obtain when the cost savings derived from product simplification are small, deeper discounting when the product simplification induces greater cost reductions.

With respect to earlier conclusions regarding consumer empowerment, marginal empowerment in the converse scenario has no profit impact when a firm prices at prior value. If the cost of thinking decreases marginally within the range associated with transgressive pricing, the firm is expected to increase the offered discount at rate  $1/\theta$  (when thinking is less costly, a larger discount is necessary to continue to enforce no thinking) without affecting demand. Thus, a decrease in the cost of thinking under the conditions that imply deep discounting will affect firm profits negatively. Deep discounters should not be expected to empower their customers.

In contrast, if the cost of thinking decreases marginally within the range of regressive pricing the consumer continues to think even if the offered discount is lowered at a rate of  $1/(1-\theta)$ . A firm engaged in regressive pricing thus faces a tradeoff regarding the way it should induce consumers to think: whether to continue to provide a price incentive of  $e/\theta$ , or to empower consumers (depending on the cost involved in the latter activity).

Assuming now that the firm could freely determine  $e$ , when would it be optimal to support a cost of thinking equal to zero? Analysis of  $\pi_i^*(e=0) > \pi_i^*(e = x_i\theta(1-\theta))$  reveals that profit maximization entails setting  $e = 0$  if  $x_i \geq p_{-i} - k \geq 0$  and the conditions of regressive pricing hold (low cost-cutting opportunities associated with the product simplification). The logic of this result is that firms that consider deep discounting always benefit from inhibiting deliberation. Minimizing marketing stimulation (through low-key retail stores, everyday low prices, reduced advertising, and so forth) accompanies product simplification strategies both to complement an overall low cost strategy and to make it harder for consumers to think about what they are losing in the process.

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