Should Price Increases be Targeted? – Pricing Power and Selective versus Across-the-board Price Increases

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Abstract

Firms in many industries experience protracted periods of pricing power, the ability to successfully enact price increases. In these situations, firms must decide not only whether to raise prices, but to whom. Specifically, in a competitive context, they must determine whether it is more profitable to increase price across-the-board, or to a specific segment of their customer base. While selective price decreases are ubiquitous in practice (e.g., better deals to potential new customers by phone carriers; better deals to current customers by various magazines), to our knowledge selective price increases are relatively rare.

We illustrate the benefits of targeted price increases, and as such we expand the repertoire of firms’ promotional policies. To that end, we explore a scenario where two competing firms must decide whether to increase prices to the entire market or only to a specific segment. Targeted Price Increases (TPI) – being offered an unchanged price (selectively) when others are subject to price increases – if adopted, may be offered to Loyals (those who bought from the firm in the previous period) or Switchers (those who did not). The effects of TPIs are estimated through a laboratory experiment and an associated stochastic model, each allowing for both rational (Loyalty, Switching) and behaviorist (Betrayal, Jealousy) effects. We find that TPIs can indeed yield beneficial results (greater retention for Loyals or greater attraction of Switchers) and greater profits in certain circumstances. Results for TPI are additionally benchmarked against those for targeted price decreases, and found to differ. The range of effects stemming from the experiment can be used in a competitive analysis to yield equilibrium strategies for the two firms. In this case, we find that – depending on the magnitude of the price increase, market shares of the two firms, and price knowledge across consumer segments – a firm may wish to embrace targeted price increases in some situations and to institute across-the-board price increases in others. We show that a firm can sacrifice considerable profit if it settles on a sub-optimal pricing strategy (e.g., wrongly instituting an across-the-board increase), favors the wrong segment (e.g., Switchers instead of Loyals), or ignores ‘behaviorist’ effects (Betrayal or Jealousy).
1 Introduction: Pricing Power and Targeted Price Increases

Firms in many industries experience protracted periods of *pricing power*, the ability to successfully enact price increases. While pricing power has received little direct attention from academic researchers, the business press has consistently emphasized its importance. Industry Week, the Wall Street Journal and Fortune all reported recent upswings in pricing power, while the New York Times placed it among the main qualities sought by savvy investors.\(^1\) When firms have substantial pricing power, they must grapple with the prospect of instituting price increases, and whether such increases should be targeted in some way. In this article we investigate whether, and under what competitive conditions, firms should consider imposing price increases on some segment, as opposed to across-the-board.

Even within popular press accounts of Targeted Price Increases (TPI), opinions differ on their suitability and sustainability. For example, a study of British television mergers concluded that targeted price increases, defined explicitly as “giving less good terms to some customers and better terms to others,” were not feasible, because any incremental revenue would be “outweighed by the disincentive in terms of potential loss of business”. Even the FTC, concerned about abuse of pricing power in certain industries to enact targeted price increases, investigated the phenomenon; yet it reached precisely the opposite conclusion. As part of a major investigation of vacation package pricing policies, the FTC’s analysis indicated it is indeed possible for firms to benefit by imposing a TPI policy. They in fact singled out targeted price increases among important areas for additional empirical research, calling for “detailed industry data”. The Boston Consulting Group evidently agrees that TPI can be a useful tactic, claiming a 1% price increase to specific segments can boost incremental profits fourfold over comparable cuts in overhead and fixed costs. Operations Management Consultants Inc.’s “top recommendation” for increasing profitability is that firms learn to employ TPI policies.

Based on such anecdotal and economic evidence, one might wonder why TPI policies aren’t...
more broadly adopted. Amazon.com offers the classic cautionary tale, having faced allegations that it imposed higher prices on some customers based on their purchase and site visit histories; when consumer and advocacy groups complained vociferously, the practice was abandoned. Few studies have focused on the ‘behaviorist’ or affective ramifications of pricing policies appearing to lack overt equity, despite their being widely touted as unethical. Garbarino and Lee (2003) point out that while TPI-like policies can intrinsically enhance firm profitability, consumers nevertheless react strongly against them. Their experimental results show such policies erode consumer trust, largely because they are considered unfair. Some firms apparently know this, and keep their targeting pricing policies under wraps. For example, a federal lawsuit against Rite-Aid revealed its practice of imposing unadvertised surcharges on certain customers, including those who had not shopped at the store before. Apparently the company believed this practice would be viewed negatively, even though it was (loyal) continuing customers who, relatively speaking, benefited from such price increases.

As these varied examples suggest, there is little consensus on whether TPI is a reasonable or sustainable practice. Compounding such questions about the practice itself are contingent ones regarding which consumers, if any, should be thus targeted. At the heart of the matter is whether consumers will react in a ‘rational’ way to having their prices raised (or seeing it happen to others), with rationality narrowly construed as making the best economic choice amongst available options. Here we take up this question, providing a model which addresses whether (if at all) TPI should be instituted, and further which segment(s) should be thus favored. Our model comprises not only the ‘rational’ effects of “Loyalty” (to one’s current provider) and “Switching” (to another), but ‘behaviorist’ ones born of emotional reactions to how one is treated: “Betrayal” when one’s own firm treats other customers better, and “Jealousy” when another firm treats its own customers better than your firm treats you (Feinberg, Krishna and Zhang 2002).

In this paper, we study environments in which pricing power allows firms to potentially enact price increases. As such, a major goal of this paper is to expand the repertoire of promotional policies available to firms when pricing power can be profitably exercised. Specifically, we attempt to answer the following questions:
Under TPI, will consumers perceive “same price as before” as a price deal to them, just because price to the other segment is raised, i.e., will there be a positive impact of imposing a price increase selectively on the other segment?

- Are TPI effects similar to those of targeted price decrease (TPD) policies?

- How does TPI affect firm profits, that is, how do the various effects resulting stemming from TPI act in concert to alter profit levels?

- What can be said about competitive equilibria? Specifically, when they propose price increases, should firms offer deals to Loyals, to Switchers or to neither segment?

- Will equilibria differ if ‘behaviorist’ (Betrayal, Jealousy) effects are not accounted for?

- How does the degree of market share asymmetry affect a firm’s decision to impose selective or across-the-board increases; and, if the former, which segment should be favored?

- How does level of market knowledge about prices offered to the other segment affect resulting equilibria?

Procedurally, our approach integrates multiple methodologies to better understand the impact of targeted pricing policies. We show that, although the ‘behaviorist’ effects of Jealousy and Betrayal exist in both settings, they cannot be presumed symmetric, and that such differences can affect a firm’s strategic choices. Our analysis further demonstrates that across-the-board price increases are not always the best way to exercise a firm’s pricing power. Indeed, price-increase environments can offer opportunities to profitably implement targeted pricing, and we explore the tactical imperatives of a firm’s being able to avail of them. We will also find that competitive equilibria vary substantially with the proportion of ‘aware and care’ consumers, those who find out about price deals offered to others and are potentially influenced by them.

The remainder of the paper is organized as follows. We first examine prior literature from marketing, economics, psychology and behavioral decision theory which speaks to the issue of targeted price increases. This allows us to develop a Markovian framework to examine the purchase and profit impacts of various targeted pricing policies, and we estimate the model’s parameters based on data collected in a laboratory experiment. These estimated parameter values are then
used within a game theory model built upon the Markovian framework; together, these allow for an analysis of competitive equilibria for a two-firm market. It is this competitive analysis which offers specific responses to each of the questions raised above. We conclude with a discussion of how the model applies to real-world promotional policies, and how it could be further enhanced relative to current retailing practice.

2 Prior Literature

Much prior research on targeted pricing has focused on whether it tends to increase or decrease price competition. Specifically, it has examined welfare implications of customized pricing and whether changes in consumer behavior induced by targeted pricing lead to socially optimal equilibria (Thisse and Vives 1988; Shaffer and Zhang 1995). Markets with high consumer switching costs are especially concerned with implications of targeted pricing: firms in these markets must trade off the relative merits of charging a high price to everyone (greater unit profits with some potential attrition among the customer base) against charging a low price to everyone and thereby attracting new customers (Klemperer 1987, 1995). Targeted promotions provide a means to bypass such a trade-off, since they facilitate charging different prices to these two segments of consumers. Subsequent research has suggested that, when following a policy of targeted pricing, a firm should invariably target Switchers (Chen 1997; Taylor 1998). While Shaffer and Zhang (2000) suggest that targeting Switchers need not be optimal, their results indicate that it is never prudent for all competing firms to target loyal customers, unless the cost of targeting prompts competing firms to resort to randomized promotions (Shaffer and Zhang 2002).

All these papers consider an environment where prices are stable and there are no imperatives to increase price. They also assume that a consumer’s brand preference is dependent only on absolute prices offered to him/her and not on prices offered to other consumers; in short, that relative prices have negligible effects on consumer behavior. However, literature from social psychology and behavioral decision theory suggests that “relative” prices (i.e., price to you vs. price to someone else) may also affect behavior. More specifically, research on relative deprivation, perceived fairness and equity (e.g., Adams 1965; Greenberg 1986; Stark and Taylor 1989) suggests that perceptions of fairness in a broad spectrum of economic interactions do not take place in a vacuum of perfect
objectivity. Rather, they are assessed relative to standard comparison values derived, in large part, from how others are treated.

Consumers' perceptions of fairness, specifically, have been addressed by research in marketing and psychology. For example, even if objective price levels are within the range considered normal, if they are not deemed equitable, then consumers may consider them “unfair” and refuse to accept them (Kahneman, Knetsch and Thaler 1986a,b; Martins and Monroe 1994; Urbany, Madden and Dickson 1989; Campbell 1999). Bolton, Warlop and Alba (2003) study price unfairness directly, finding that consumers often view prices as lying well above what is “fair”, and are overly sensitive to such referents as prior and competitor price levels. Nunes and Park (2003) present a great deal of evidence that perceptions of price levels are strongly frame-dependent. In line with these findings, Feinberg, Krishna and Zhang (2002) formulate a ‘behaviorist’ approach to targeted promotions which allows for consumers being influenced by prices that other consumers are offered, and of which they themselves cannot avail. They show that behaviorist effects of Betrayal and Jealousy result in decidedly different promotion policies than a ‘rationalist’ model which does not allow for such effects. Their paper examines environments of constant prices where firms consider to whom they should offer price decreases. As such, their analysis does not apply when a firm considers price hikes, and can allow some (segment of) customers to remain at their current price level.

In short, based on these prior analyses, nothing can be said about the profit implications of targeted price increases, nor whether they can be more profitable than across-the-board increases. In the next section, we build an Markov model for consumer promotional response to address these issues.

3 Model

Similar to many prior studies in marketing and economics, we analyze a market consisting of two brands, A and B (i.e., sold by Firms A and B, respectively). We adopt a (first-order) Markovian framework, and operationalize market segments based on consumers’ most recent purchase. Thus, “Loyals” are those who purchased from the firm in the last period, while “Switchers” purchased

\(^{2}\)Simulations suggest that qualitative insights from a two-brand analysis broadly generalize to one of three and four (and, presumably, \(n\)) brands, though at a great loss in tractability.
from the other firm in the last period. In this manner, there are two market segments for each firm, Loyals for Firm A (who are Switchers for Firm B) and Switchers for Firm A (who are Loyals for Firm B). Note that this definition of Switchers differs from another fairly common use of “Switcher” (e.g., Lal 1990), where a segment of consumers always buys from Firm A (Loyals for A), another always buys from Firm B (Loyals for B), and a third segment switches between the two firms based on price (Switchers). Also, in our model, there is no absolute Loyalty – all consumers can potentially switch. These terms thus act as labels for the immediately prior purchase, and do not refer to an intrinsic propensity to switch between the two brands.

So that terminology is not open to interpretation, we adhere to the following conventions. Phrases such as “charges a higher price” mean that a firm charges a price compared to its rival, not compared to a base or past price for that same firm. Similarly, “less likely to purchase” compares likelihoods for buying from a specific firm when a condition holds versus when it does not. Thus, “consumers are less likely to buy from their firm if it charges a higher price to them than to Switchers” means that consumers’ probability of buying from their firm is less when it charges a higher price than it does to (potential) Switchers, versus when it does not.

Each firm (A or B) has three options for offering a price special in the current period: only to Switchers (price increase to Loyals only), only to Loyals (price increase to Switchers only), or None at all (price increase to both segments, i.e., an across-the-board increase). Thus, the two firms generate a strategy space with nine possible pricing scenarios. Because we study price-special-induced switching patterns, it is not necessary to address the scenario where a firm offers identical price specials to both segments, i.e., no price increase to either: this would not qualify as offering a ‘special’ to either segment, but would rather indicate a lack of pricing power, and no targeted price increase would be involved. Note also that while we focus on situations where price is raised to one segment and not the other, our results should also hold directionally for situations where price is increased to both segments, but more to one versus the other. Similar frameworks have been used, in various forms, in numerous prior studies (e.g., Raju, Dhar and Morrison 1994; Zhang, Krishna and Dhar 2000).

To simplify references to the nine possible pairwise pricing scenarios, we use the symbols $S$, $L$
and \( N \) to stand for possible actions by each of the firms, so that \( \{S, N\} \), for example, means that Firm A favors Switchers (that is, Firm A imposes no price increase for B’s customers), while Firm B offers no price breaks at all (i.e., Firm B implements a across-the-board price increase).

### 3.1 Consumer Choice in the Absence of Price Specials

When there are no price specials of any sort, we allow for consumers being first-order purchasers. For consecutive purchase occasions (periods \( t−1 \) and \( t \)), \( P[A_t | A_{t−1}] = \alpha \) and \( P[B_t | B_{t−1}] = \beta \); that is, the transition matrix is:

\[
\begin{array}{cc}
A_{t−1} & A_t & B_t \\
\alpha & 1−\alpha & \\
B_{t−1} & 1−\beta & \beta \\
\end{array}
\]

The parameters \( \{\alpha, \beta\} \), which we take to be stationary, reflect intrinsic preferences for the brands in terms of repurchase probabilities. If the choice process is zero-order, \( \beta = 1−\alpha \); if not, i.e., if variety-seeking (Givon 1984) or inertial (Jeuland 1979) tendencies exist, then \( \beta \neq 1−\alpha \). It is important to note that this specification accounts for consumers’ switching costs: in the absence of promotion, reluctance to change from one to the other will be reflected, all else equal, in higher values of \( \alpha \) and \( \beta \).

We account for promotion-induced shifts away from these baseline preference levels, through four effects: Switching \( (s) \), Loyalty \( (l) \), Betrayal \( (b) \) and Jealousy \( (j) \) (Feinberg, Krishna and Zhang 2002), as discussed earlier. Switching occurs when a rival firm offers some inducement to its competitor’s customers, while Loyalty involves doing the same to its own customers. Both are well-known to modelers; Betrayal and Jealousy, however, are considerably less familiar. Betrayal occurs when a firm treats its own customers less well than it treats some other group, while Jealousy occurs when customers perceive that they would be treated better if they were loyal to a firm other than their own. When multiple deals are being offered, effects can combine (as specified in the forthcoming model).\(^3\) The parameters are meant to account for effects over and above baseline levels \( (\alpha \) and \( \beta ) \), in the sense that if consumers have higher Switching costs (reflected in higher \( \alpha \) and \( \beta \)), then the same promotion would have a smaller effect on choice.

\(^3\)Heterogeneity in \( \alpha \) and \( \beta \) is accounted for in the forthcoming empirical analysis using fixed effects, although other specifications are possible. Because we found no evidence of heterogeneity in any of the ‘effects parameters’ \( \{s, l, b, j\} \) across brands, we omit brand subscripts on all model parameters.
We encode the four effects in a manner consistent with prior literature (Kahn and Raju 1991), specifically, that any effect operates as a proportion of the relevant affected set of the market. An example helps clarify the principle. Take the case where Firm A entices the consumers of Firm B by offering them an inducement: for the consumers of Firm B, this will induce Switching effects, whereas for the consumers of Firm A, it will induce Betrayal effects. So, the repurchase probabilities change from their ‘prior’ values of $\alpha$ and $\beta$ to $\alpha(1-b)$ and $\beta(1-s)$. Hence, one can simply replace the labels in Table 1 with corresponding formulas to obtain the entries of Table 2. Note that the expressions in Table 2 are taken from the perspective of a customer of Firm A; a corresponding table exists for Firm B’s customers.

### Table 2: Specified Model

<table>
<thead>
<tr>
<th>Other Firm Favors</th>
<th>No One</th>
<th>You</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your</td>
<td>$\alpha$</td>
<td>$\alpha(1-s)$</td>
<td>$\alpha(1-j)$</td>
</tr>
<tr>
<td>Firm</td>
<td>$\alpha + l(1-\alpha)$</td>
<td>$\alpha(1-s) + (1-\alpha)l$</td>
<td>$\alpha(1-j) + (1-\alpha)l$</td>
</tr>
<tr>
<td>Favors</td>
<td>$\alpha(1-b)$</td>
<td>$\alpha(1-b)(1-s)$</td>
<td>$\alpha(1-b)(1-j)$</td>
</tr>
</tbody>
</table>

Note that, in Table 2, if all hypothesized effects parameters are set to zero, we are left with the standard inertial/variety-seeking specification, $P[A_t | A_{t-1}] = \alpha$, $P[B_t | B_{t-1}] = \beta$. We next present an experiment designed to allow estimation of these effects sizes, \{s, l, b, j\}.

### 4 Experiment

#### 4.1 Purpose

The parameters of the model specified in the prior section (Table 2) can be estimated using field data. Although conducting such tests in a lab setting raises issues of external validity, natural field experiments where a pair of firms in the same product class have adopted multiple targeted policies are at best exceedingly rare, let alone multiple concurrent targeted price increase policies. The laboratory experiment allows us to do this while attempting to replicate market conditions.
and inducements to the best extent possible. One cautionary note exists, however – laboratory experiments cannot evoke the kind of negative emotions that one would expect in the real world when, for example, loyal customers of a firm are ‘betrayed’ and learn this from a third-hand source. As such, our results tend to err on the side of underestimating behaviorist effects and should be viewed in this light.

4.2 Design

Consistent with our model, the experiment has a 3-by-3, between-subjects design. That is, each of the two firms can choose to offer a price deal to Switchers, to Loyals or to Neither. Specifically, the price deal is implemented through a price increase to Loyals (i.e., deal to Switchers who have a constant price), price increase to Switchers (deal to Loyals) or an increase to both segments (deal to neither). In broad outline, the experiment consists of three phases: collecting ‘prior’ relative preference for two firms based on full descriptions of the services they offer; presenting information about various upcoming price increases, and whom they affect; collecting ‘posterior’ relative preference for the two firms. These individual-level prior and posterior relative preference measures will allow model calibration.

A total of 205 undergraduate business school students took part in the experiment to fulfill subject pool requirements. Subjects were asked to make choices involving digital download services similar to Rhapsody, eMusic and Apple’s iTunes. This industry was chosen because it is poised to become the premier distribution medium for new music: all subjects in fact indicated a high level of familiarity with web services and digital music, and appeared to find the study highly engaging. Descriptions of the two competing services were modeled on those being presently marketed, and were deliberately designed to be as balanced as possible, so that few subjects would be a priori strongly opposed to switching, irrespective of pricing policy. All ‘numerical’ differences between the two firms (e.g., number of songs available, number of downloads allowed), as well as percentages for price deals, were set at 20%. To render the descriptions as authentic as possible, details on over a dozen relevant dimensions were presented, among them technical specs (e.g., download speed, 

\footnote{A pilot study showed 20% differences to be substantial enough to influence preference and subsequent choice, but not overwhelming, in the sense of being insurmountable by attractive promotions. All experimental materials are available from the authors.}
simultaneous channels, file types), extra-musical services (e.g., contact lists, chat room capabilities), and contract conditions (e.g., annual length).

After being provided with description of the two firms, subjects expressed their relative preference by splitting 100 points between the two; these served as the individual-specific ‘prior’ preferences for the firms. Following a filler task, subjects were then told to imagine that they had engaged their preferred firm for the full annual contract period, with good results, and also that customers from the rival firm reported similar reactions. Subjects (in all conditions) were then made aware of impending price increases; specifically, that “there will be a 20% increase” in service prices, “from the current value of $150, to $180 for the coming year.” In addition, each subject then came by new, “pertinent information” about the two digital music services for the coming (annual) contract consistent with the condition s/he was in, as described in detail below.

4.3 Segments and Price Deal Patterns

Knowledge of prices had to be handled with great care so that, as in reality, firms would attempt to make consumers aware only of deals that they were offering to these consumers and not of deals that they were offering to other consumers (and not to them). However, as commonly happens, consumers could learn of these deals to other consumers from alternate sources or happenstance. Subjects were made aware of possible price deals through “flyers” offering them 20% off next year’s price, that is, the same price they had already been paying. Thus, if the subject was in the \{L, N\} condition – where they would get a price deal from their own firm (no price increase), whereas the other firm would increase price to both segments – then they received a flyer from their own firm offering continuing customers (only) “last year’s prices this year”, meaning an additional year of the $150 fee level, as opposed to $180. If they were in the \{S, N\} condition – where their firm gave a better price to switchers (no price increase to switchers), whereas the other firm would increase price to both segments – then they “happened to come across” a flyer from their firm offering new customers (only) “last year’s prices this year”, meaning an additional year of the $150 fee level, as opposed to $180. In the \{N, S\} condition, they got a flyer from the other firm offering them (new

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5When Trifts and Häubl (2003) studied scenarios where consumers in an e-store were provided with competitor price information, they found enhanced preference for the vendor providing the information. We therefore considered it important not to confound the ‘price effect’ with the ‘information source effect’, and so allowed competitor price information to be revealed only by that competitor.
customers) a price of $150; and in the \{N, L\} condition, they came across a flyer where the other firm offered their continuing customers a price of $150.

In the conditions where both firms made some type of offer (\{L, S\} and \{S, L\}), a combination of the situations described earlier occurred, with subjects receiving two flyers. However, we counterbalanced which flyer the subject received first (order effects were not significant, and we do not refer to them again). Regardless of the pattern of price increases and deals in the market, subjects were also made aware that by “asking around”, they learned that the deals they came across were the only ones being offered. Our subjects reported no difficulties in accepting or understanding the pricing scheme, perhaps due to its ubiquity. Consumers constantly get e-mails and flyers offering new/continuing consumers better prices. Prasad, Mahajan and Bronnenberg (2003) have in fact used a similar scenario, where some consumers paid a higher and some a lower price in an e-shopping setting.

The experiment concluded with subjects being asked again for relative preference information (i.e., a 100-point split) and these served as the individual-specific ‘posterior’ preferences. Debriefing indicated no skepticism or questioning regarding the cover story.

4.4 Model Estimation

Each subject was asked to record which firm (A or B) was preferred, and how 100 points should be split between them. After presentation of the promotional scenario (for each subject’s condition), they were asked for the same information. Thus, data consist of ‘prior’ and ‘posterior’ preference allocations for each subject. Estimation proceeds as follows. Table 2 presents expressions for each of the nine promotional set-ups. Since we take each subject’s ‘prior’ as their initial preference (\(\alpha\) or \(\beta\), depending on which firm they preferred), we are left with four parameters to estimate, \(\{s, l, b, j\}\). We do so based on minimizing the weighted least squares error between the stated posterior preference allocations and those predicted by the model.\(^6\) These in turn allow for tests of the form \(H_0 : \zeta = 0\) for \(\zeta = \{s, l, b, j\}\) or any subset thereof.

\(^6\)Data on a 100-point scale was collected instead of binary choice data due to its being intrinsically more detailed. It further allowed us to detect (upward or downward) preference changes even when the same brand was ‘chosen’ twice. Note as well that interactions between the various effects are accounted for directly by the specifications of Table 2.
4.4.1 Results

We test to see whether Betrayal, Jealousy, Switching and Loyalty are supported for these data, and compare the sizes of their effects. Table 3 reports the results for three types of model: a “Full” model (i.e., behaviorist, with all four effects estimated); models where Jealousy, Betrayal, Loyalty, and Switching are each set individually to zero; and a “Strong”ly rational model where behaviorist effects (Betrayal and Jealousy) are set to zero, so that only Switching and Loyalty are estimated. The last line of the table reports the results of Chow tests compare each of the models to the “Full” model, to determine which effects lead to additional explanatory power.

Table 3: Estimated Parameters and Tests in TPI Scenario

<table>
<thead>
<tr>
<th>Parameters</th>
<th>'Full'</th>
<th>Switching</th>
<th>Betrayal</th>
<th>Loyalty</th>
<th>Jealousy</th>
<th>'Strong'</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s_I$</td>
<td>0.222</td>
<td>-</td>
<td>0.271</td>
<td>0.127</td>
<td>0.191</td>
<td>0.249</td>
</tr>
<tr>
<td>$b_I$</td>
<td>0.162</td>
<td>0.234</td>
<td>-</td>
<td>0.214</td>
<td>0.214</td>
<td>-</td>
</tr>
<tr>
<td>$l_I$</td>
<td>0.354</td>
<td>0.231</td>
<td>0.403</td>
<td>-</td>
<td>0.270</td>
<td>0.296</td>
</tr>
<tr>
<td>$j_I$</td>
<td>0.153</td>
<td>0.102</td>
<td>0.210</td>
<td>0.048</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Loyalty and Switching Effects: Table 3 indicates that all four effects are very strongly significant. The largest of the four is the Loyalty effect ($l_I = 0.354$; $I$ subscripts are used throughout to denote an Increase-price scenario). This indicates that if a firm’s Loyals get a constant price when that firm’s Switchers face an increased price, the likelihood of repurchase rises from $\alpha$ to $\alpha + 0.354(1 - \alpha)$. In other words, approximately a third (35.4%) of the Loyals who were (stochastically) not going to repurchase the brand will now do so. The second largest of the four effects is Switching ($s_I = 0.222$); this suggests that, in a price increase environment, when another brand offers one a constant price, the likelihood of repurchasing one’s own brand decreases by a factor of 0.222 (i.e., repurchase probability is lowered from $\alpha$ to $0.778\alpha$). Significantly positive values for the Loyalty and Switching effects provide support for our argument: that in a price increase scenario, consumers perceive constant price as a deal to them, and further that there is a positive impact.
of imposing a price increase selectively on the other segment. While these two effects have been tested repeatedly for price-decrease type promotions (and thus lend support for the standard ‘strong rationality’ effects), they have not to our knowledge been validated in the context of price increases.

Each effect need not, of course, operate in isolation. A particularly interesting case occurs if both firms offer a deal to the same particular segment, both trying to entice them: for example, if Firm A promotes to the Switching segment (i.e., to Firm B’s Loyals) and Firm B promotes to its own Loyals (\{S,L\}), or if Firm A promotes to its Loyals and Firm B to its Switchers (\{L,S\}). These effects needn’t be a washout, and in fact the model makes specific predictions for such cases. Our analysis suggests that, in the \{L,S\} case, the repurchase probability for Firm A should change from \(\alpha\) to \(\alpha (1 - 0.222) + (1 - \alpha)0.354\), an increase if \(\alpha < 0.615\). That is, when the repurchase probability for Firm A is small, a deal of the same size offered to its Loyals by both firms will be in its favor.

**Betrayal and Jealousy Effects:** The two behaviorist effects, Betrayal and Jealousy, are also significant and sizeable. The Betrayal effect \((b_I = 0.162)\) indicates that if a firm offers Switchers a constant price, but increases price to its own Loyals, the repurchase rate among Loyals decreases by a factor of 0.162 (i.e., from \(\alpha\) to 0.838\(\alpha\)). In a like manner, if the other firm offers a deal to its Loyals, but not to its potential Switchers, the Jealousy effect \((j_I = 0.153)\) reduces the focal firm’s customers’ repurchase probability from \(\alpha\) to 0.847\(\alpha\).

For simplicity, we have thus far considered Betrayal and Jealousy effects in isolation. But more than one effect may be operational at any given time. For example, if your firm offers its Switchers a deal (evoking Betrayal effects), but the other firm offers its Loyals a deal (evoking Jealousy effects), then the detrimental effects for your firm are huge: its repurchase probability can drop from \(\alpha\) to \(\alpha (1 - 0.222)(1 - 0.153)\), that is, by approximately 34%.

Finally, as might be expected given the strong significance of the various individual effects, the ‘full’ (behaviorist) model provides significantly better fit to the data than the ‘strong’ly rational model, which ignores the (highly significant) Betrayal and Jealousy effects.
4.4.2 Benchmarking against the Targeted Price Decrease (TPD) scenario

To benchmark our results, we ran a closely-matched experiment for the TPD scenario using another 297 undergraduate subjects from a subject pool (different from those in the prior study). This also provides a robustness check for Loyalty, Betrayal, Switching and Jealousy effects in the TPD scenario, as the resulting estimates can be compared, at least ordinally, to those obtained by Feinberg, Krishna and Zhang (2002). All four effects are significant, as they too found; moreover, the effect sizes (parameter values) are roughly concordant and in the same order (cf., their Table 6, pp. 288).

Table 4: Estimated Parameters and Tests in TPD Scenario

<table>
<thead>
<tr>
<th>‘Full’</th>
<th>Switching</th>
<th>Betrayal</th>
<th>Loyalty</th>
<th>Jealousy</th>
<th>‘Strong’</th>
</tr>
</thead>
<tbody>
<tr>
<td>s_D</td>
<td>0.217</td>
<td>0.253</td>
<td>0.158</td>
<td>0.196</td>
<td>0.242</td>
</tr>
<tr>
<td>b_D</td>
<td>0.122</td>
<td>–</td>
<td>0.020</td>
<td>–</td>
<td>0.162</td>
</tr>
<tr>
<td>l_D</td>
<td>0.214</td>
<td>0.121</td>
<td>0.240</td>
<td>–</td>
<td>0.169</td>
</tr>
<tr>
<td>j_D</td>
<td>0.105</td>
<td>0.056</td>
<td>0.149</td>
<td>0.040</td>
<td>–</td>
</tr>
</tbody>
</table>

Parameters: 4 3 3 3 2

| df_num | 3 | 3 | 3 | 3 | 2 |
| df_den | 293 | 293 | 293 | 293 | 293 |
| F      | 44.3 | 12.5 | 28.2 | 9.2 | 19.1 |

p vs. Full: p < .001 p < .001 p < .001 p < .001 p < .001

Table 4, for TPD, is analogous to the TPI results of Table 3, and provides convenient benchmarks. While we compare TPI and TPD effects, we would like to caution the reader that the relative size of these effects clearly depends on the exact framing of the price scenarios. Nonetheless, eyeballing the Full models in the two tables suggests that all effects are somewhat stronger in the Increase condition, though the magnitude of this difference varies by effect. Parametric equality across models can be assessed by restricting the parameters in question to be the same, jointly re-estimating the models, and computing likelihood ratios. Such tests reveal that Loyalty, Betrayal and Jealousy effects are each significantly different between the TPI and TPD environments (p < .01), but that the Switching effects is not (p > 0.2).

One reason for larger effects in the TPI environment may be that all deals in the TPI scenario occur in a loss context (to the segment not offered the deal) given the reference point of status.
quo (no price change), whereas all TPD effects occur in a gain context (to the segment offered the deal). Consequently, any negative effects (Betrayal and Jealousy) might be expected to be stronger in TPI than in TPD. Further enhancing the degree of asymmetry is that, in the TPI scenario, the loss is to you; by contrast, in the TPD scenario, the gain is to others. So Betrayal and Jealousy effects in the TPI vs. TPD scenarios compare a “relative loss to you” with a “relative gain to someone else” and so it is not entirely surprising that the former is found to be larger. Simply put, this suggests, for example, that consumers feel more ‘betrayed’ by their firm when Switchers are offered a constant price (when they themselves are faced with a price increase) vs. when Switchers get a price cut (when they themselves are offered a constant price). Similarly, consumers feel more ‘jealous’ when another firm offers its Loyals a constant price (whereas they themselves face an increase) vs. the situation where the other firm offers its Loyals a price decrease (and they themselves face a constant price).

Next, we consider implications of the effects generated by TPI for a competitive market.

5 Competitive Targeting Implications

As we have seen, evidence is strong for both traditional ‘rationalist’ (Loyalty, Switching) and ‘behaviorist’ (Betrayal, Jealousy) effects. Firms need to understand, however, how strategies which make sense when consumers behave ‘rationally’ may be sub-optimal when ‘behaviorist’ effects are pronounced. To this end, we examine what sort of price-increase strategies are optimal in each case. When there are differences between them, we ask how much profit a firm can potentially forgo if it mistakenly adopts a purely ‘rational’ strategy when ‘behaviorist’ tendencies ought to have been taken into account.

The strategic implications of the Loyalty, Switching, Betrayal and Jealousy effects in the price increase environments can be surmised by developing a competitive game in which two competing firms enact promotional decisions to maximize their steady-state payoffs. A firm can favor its own Loyal customers by raising its price only to Switchers, so that its profit margin from them is $M$ and that from Loyals is $M - K$, where $M > K$. We have denoted this strategy as $L$. Alternatively, a firm can favor Switchers, denoted $S$, by raising its price only to Loyals, thus offering them a relative
discount. In this case, the firm’s profit margin is \( M \) from Loyals and \( M-K \) from Switchers. Finally, a firm may opt to raise its price to all consumers in the market, such that no targeted promotion is instituted. In that case, it obtains the same profit margin \( M \) from all customers. We denote this strategy as \( N \). For clarity in describing promotions, we will eschew “target”ing entirely, and refer to “favor”ing; in the TPI framework, a segment is “favor”ed when its price is \textit{not} raised (i.e., unlike the other segment). In this way, terminology is consistent with TPD, where a “favor”ed firm receives a price reduction (again, unlike the other segment).

Let \( \bar{\Pi}^{hk} \) be firm \( i \)'s steady-state payoffs, given that firm \( i \) chooses promotion strategy \( h \) and the rival firm chooses strategy \( k \), where \( h, k = \{L, S, N\} \). We derive \( \bar{\Pi}^{hk} \) in the Appendix, using the parameter estimates from Table 3. We conduct three sets of equilibrium analyses. First, we derive competitive equilibria for equal-share firms to examine their optimal strategies in the TPI environment. Second, we conduct the analogous analysis with unequal firm market shares to investigate how share asymmetry may moderate firms’ optimal promotion strategies. Third, we alter the proportion of the market aware of prices to the other segment, i.e., of consumers subject to behaviorist (as opposed to only strongly rational) effects, and derive the associated competitive equilibria. In this way, we progressively generalize to markets concordant with actual practice: firms of different sizes, with only some consumers aware of price deals offered to others.

5.1 Equal Market Shares

Competitive equilibria when baseline market shares are equal for both firms are illustrated in Figure 1. In this case, identical baseline market shares are reflected in the fact that consumers are equally likely to switch away from either Firm A or Firm B on the next purchase occasion, conditional on having purchased from the firm \( (\alpha = \beta) \). Figure 1A depicts the strong rationality model and Figure 1B the behaviorist model.

Figure 1A (strong rationality) plainly suggests that, for a large range of values \( (K/M < 22.84\%) \), TPI is more profitable than an across-the-board price increase \( \{N, N\} \). When one further accounts for behaviorist effects (Figure 1B), the range for TPI widens, and TPI is more profitable than an increase to both segments (for \( K/M < 32.47\% \)). This occurs because favoring one’s own loyal customers can help retain and attract additional ones through the sizable Jealousy.
Figure 1: Symmetric Competitive Equilibria

(a) Rational Model—Targeted Price Increase Environment

(b) Behaviorist Model—Targeted Price Increase Environment

The figures are drawn with $\alpha = \beta = 0.5$.

effect (that is, incenting one’s own customers not only activates the ‘rationalist’ Loyalty effect, but the ‘behaviorist’ Jealousy effect on the other firm’s customer base). One can also see from Figure 1B that, in implementing TPI, the favored segment is the Loyals, not the Switchers. Were it to favor Switchers while its rival offered a price break to its own Loyals, a firm would incur the double wrath of strong Betrayal and Jealousy effects.

5.2 Asymmetric Market Shares

One might argue that if a firm has a larger market share, then it cannot afford *not* to increase price to its Loyals; consequently, it would stand to reason that it cannot afford to favor Loyals in a TPI strategy. An immediate counter-argument is that it simply cannot afford to upset its Loyal consumer base: if Loyals become aware of a better price to Switchers, detrimental effects (namely, Betrayal) may ensue. The question becomes how a firm might best strike a balance between these two forces. Our experimental results and competitive analysis offer a clear answer: a larger-share firm should offer more across-the-board price increases compared with a smaller-share firm. Moreover, when offering TPI, the larger-share firm decisively favors its Loyals.

Let us consider an example in which differences in market share can severely impact the equilib-
Figure 2: Asymmetric Competitive Equilibria

<table>
<thead>
<tr>
<th>(S, S)</th>
<th>(N, S)</th>
<th>(N, N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1</td>
<td>14.24</td>
<td>62.37</td>
</tr>
<tr>
<td>100 K/M%</td>
<td>100 K/M%</td>
<td>100 K/M%</td>
</tr>
</tbody>
</table>

(a) Rational Model—Targeted Price Increase Environment

<table>
<thead>
<tr>
<th>(L, L)</th>
<th>(N, L)</th>
<th>(N, N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 1</td>
<td>19.78</td>
<td>73.39</td>
</tr>
<tr>
<td>100 K/M%</td>
<td>100 K/M%</td>
<td>100 K/M%</td>
</tr>
</tbody>
</table>

(b) Behaviorist Model—Targeted Price Increase Environment

Figures are drawn with $\alpha = 0.8$ and $\beta = 0.4$. * indicates $(L, S)$ and ** indicates equilibrium $(L, L)$

Equilibrium pricing strategy. Consider the case where consumers who have purchased from firm A have a probability of switching away from the firm of 0.2 (i.e., $\alpha = 0.8$), but the corresponding Switching probability for firm B is 0.6 (i.e., $\beta = 0.4$). In such a market, firm A has the larger market share in steady-state (absent any targeted price increases), commanding a 75% share. Throughout, Firm A will thus be the “larger-share” brand of the two. When TPI policies are considered, the equilibrium strategies are illustrated for this market in Figure 2.

In considering the joint implications of Figure 2a and 2b, it is helpful to imagine them superimposed: the set of cutoffs $\{1.00, 14.24, 19.78, 62.37, 73.39\}$ determine all demarcation points between various equilibria. Note that, when $K/M < 1\%$, the ‘rational’ and ‘behaviorist’ equilibria are both $\{L, L\}$; and, when $K/M > 73.39\%$, both are $\{N, N\}$. That is: favor Loyals when promotion proportions are very low, and Neither segment when they are very high. But similarities end there: we address these differences at length, since they lie at the heart of the ‘behaviorist’ model.

Figure 2b shows that both firms favor their Loyals, with the larger-share firm (Firm A) doing so for a far narrower promotion proportion range ($K/M < 19.78\%$) compared to the smaller share firm (Firm B) ($K/M < 73.39\%$). This reflects the fact that the larger share firm has to forgo too much profit if it does not increase its price to its large loyal base. In other words, it is more costly for the larger share firm to offer TPI. We also see that the larger market share firm
(Firm A) always favors its Loyal customers whenever it is profitable to employ targeted promotions ($K/M < 19.78\%$). This is because the larger share firm has much to lose, with a large loyal base, from the Betrayal or Jealousy effects. However, such promotions may become too costly to be worthwhile at higher promotion proportions ($K/M > 19.78\%$). The smaller-share firm can afford to favor its Loyals over a much wider range (for $K/M < 73.39\%$), since its base of consumers is, relatively speaking, small. In addition, the smaller-share firm can take advantage of the Jealousy effect, chipping away the loyal base of the larger-share firm. In this way, promotion amount interacts with market share in determining the equilibrium targeted pricing strategy.

Equilibrium TPI strategies incorporating behaviorist effects are also clearly distinct from strategies assuming only strongly-rational responses on the part of consumers. In the asymmetric market share case, we too find (as in the symmetric case) – comparing Figures 2A and 2B – that a strategy of favoring Loyals is optimal for a wider range of parameter values if we account for behaviorist effects (Betrayal, Jealousy) vs. not (i.e., the strongly rational model). Also, while favoring Switchers is amongst the possible equilibrium strategies in the rational model, it is not in the behaviorist model (for the parameter values obtained).

Looking across Figures 1A, 1B, 2A and 2B, one can see that, depending on market share, promotion proportion ($K/M$), and consumer behaviors (the strong rationality or behaviorist model), all manner of equilibria are possible – \{S,S\} ; \{L,L\} ; \{S,L\} ; \{L,S\} ; \{N,N\}. The behaviorist model favors a better price to Loyals versus Switchers in equilibrium, as one would expect given the signs of the behaviorist effects.

As market share for a firm increases (Figure 1B vs. Figure 2B), our results suggest that promotions are supported for a narrower promotion range for the larger-share firm (and wider range for the smaller-share firm), indicative of the fact that less profit is sacrificed by not increasing price to Loyals if the consumer base is small. Further, even for the smaller-share firm, it may be better to favor Loyals (as opposed to Switchers) if it implements targeted price increases. Thus, counter to intuition, even when the larger market share firm is not promoting to its Loyals – and hence there is greater opportunity for the other firm to attract these customers – it may still be better for the other firm to focus on retaining its own Loyals, rather than seeking to attract the larger
share firm’s customers.

5.2.1 Profit Loss by Adopting a Sub-Optimal Targeted Pricing Strategy

The results of our competitive analysis show that firms could sacrifice a good deal of profit by choosing a sub-optimal targeting strategy – either by adopting a strongly-rational model instead of allowing for behaviorist effects, or by implementing an across-the-board price increase instead of a TPI policy. This is especially the case when the competing firms have asymmetric market shares.

For instance (Figure 2b), when $19.78\% < \frac{K}{M} < 62.37\%$, the smaller-share firm should raise its price to all but its own Loyal customers, so that the Loyals are thereby favored with a (relative) discount, whereas the rival firm should raise its price to all consumers, an across-the-board increase. However, in this range, the smaller-share firm may (incorrectly) choose to favor Switchers if it ignores behaviorist effects (Figure 2a): if so, firm profit can decrease by as much as 24%. Similarly, when $62.37\% < \frac{K}{M} < 73.39\%$, if the smaller-share firm enacts the sub-optimal strategy of raising price across-the-board, when in fact it should favor its own loyal customers with a discount, its profit can decrease by as much as 57%. Thus, an inappropriate pricing strategy can result in substantial foregone profit, particularly so for smaller-share firms.

5.3 Awareness of Prices to Other Segment

Analyses thus far have presumed that all consumers are aware of prices to the other segment. In reality, only a proportion of consumers may be aware of such prices. Or, some consumers may be aware of (lower) prices to the other segment, but it simply may not affect the way they behave, i.e., they may not care that the other segment is being favored. We use “aware” to refer to those consumers who have knowledge of pricing to the other segment and care about it, in the sense that their behavior is potentially affected by it. We now consider the case where only a fraction of consumers are thus “aware”, and hence are potentially influenced by Betrayal or Jealousy effects. The rest may only know about or care about deals that they themselves receive, consistent with the strong-rationality model. Banerjee and Bandyopadhyay (2003) used a similar game-theoretic inertial framework to study advertising and price competition in a duopoly. In their model, as in ours, proportions of consumers can exhibit latent inertia favoring repeat purchase. In ours, however,
the degree of repeat purchase propensity is moderated by both ‘rationalist’ and ‘behaviorist’ effects.

Let $\gamma$ represent the fraction of non-“aware” consumers, those who know or care only about the promotions they themselves receive. These are, in the terminology of our model, the “rational” consumers. The remainder ($1 - \gamma$ proportion) represent the “aware” segment, those who are susceptible to Betrayal and Jealousy effects. Figure 3 illustrates the equilibrium strategies for the asymmetric market share case, with $K/M = 5\%$.

Figure 3 shows that when the vast majority of the customers in the market are not of the “aware” type ($\gamma > 92.9\%$), both firms, regardless of their market shares, should favor Switchers. This comes about because, by favoring Switchers, a firm can generate incremental sales without alienating a sizeable proportion of their Loyals, as few of them actually care. However, as more consumers become aware of (and care about) the deals offered to others, the Betrayal effect will play an ever more prominent role, so that any benefit from incremental sales will be counteracted by negative effects on its own Loyals. In addition, the Jealousy effect offers a distinct inducement for a firm to favor its Loyals, since doing so shores up Loyal customers while tempting those of its rival. The larger-share firm will feel the impact of both effects for lower “aware” proportions, as it has a larger Loyal customer base. This explains why, in Figure 3, the larger-share firm starts favoring its own Loyals with a discount in the range $35.69\% < \gamma < 92.9\%$: when $\gamma$ is sufficiently small ($\gamma < 35.69\%$), it is optimal for both firms to favor their own Loyal customers.

This body of results suggests that the extent to which price information is disseminated in a market, as well as the extent to which pricing information is divulged across segments, will both have substantial impact on a firm’s targeting strategy. When many customers in a market are the “aware and care” type, favoring one’s own Loyal customers is not only a pragmatic strategy, but
also a profitable one.

6 Conclusions and Potential Extensions

There is presently neither extant theory nor empirical evidence to guide managers in setting promotions where price increases are part of the feasible ‘strategy space’, that is, when there is pricing power. We showed in this paper that being offered a constant price by a firm, when others are faced with a price increase, can indeed be a viable strategic option. Our analysis cautions firms against presuming that ‘behaviorist’ effects (Betrayal, Jealousy) are negligible. Indeed, firms can forgo a substantial proportion of profit by allowing only for the “strongly rational” and widely studied effects of Switching and Loyalty, choosing a sub-optimal pricing strategy as a result. Perhaps the most salient implication arising from our analyses is this: firms will not necessarily fare best by imposing an across-the-board price increase on all consumers, but by imposing it selectively on the appropriate segment.

The paper began with a list of questions we hoped to answer. In response, we find in summary that:

• Being offered a constant price by a firm, when others are faced with a price increase, can be construed as a price promotion: there can be a positive impact to implementing a price increase selectively on one segment alone.

• Effects are not identical in the TPI and TPD environments. Loyalty, Betrayal and Jealousy effects are significantly larger in the TPI environment. Also, the optimal pricing strategies in the two scenarios are different, in ways difficult to anticipate in the absence of a game-theoretic analysis.

• Firms can achieve greater profits in many cases by imposing price increases selectively instead of uniformly.

• Many different equilibrium pricing strategies can come about, depending on: promotion magnitude; firm market shares; the proportion of “aware and care” consumers; and whether one allows for behaviorist effects over and above the traditional rationalist ones. An unusually wide variety of possible equilibrium types can occur, including deals to Loyals by both firms, deals to neither segment by both firms, or one firm promoting to Loyals and the other to Switchers.
As market share for a firm increases, our results suggest that promotions are supported for a smaller promotion range for the larger-share firm, and a wider range for the smaller-share firm. Further, even for the smaller-share firm, it may be better to favor its Loyals (and not Switchers) if it implements targeted price increases. Thus, counter to intuition, even when the larger market share firm is not promoting to its Loyals – and hence there is greater opportunity for the other firm to attract these customers – it may still be better for the other firm to focus on retaining its own Loyals, rather than seeking to attract the larger-share firm’s customers.

The equilibrium strategy depends critically on proportion of “aware and care” consumers in the market. Presuming that all consumers have full knowledge of various promotional offers can lead to serious errors in targeting.

A strength of the general approach used here is the fusion of several widely-applied methodologies. The stochastic model allows one to encode four very different effects, and specify how they drive repurchase probabilities away from their baseline levels. The Markovian framework is particularly amenable to estimation using readily collected experimental data, and indicated strongly significant values for all four effects parameters (Switching, Loyalty, Betrayal, Jealousy). And, finally, game theory addresses competitive equilibria and how they differ with varying promotion magnitude, market share, proportion aware, and across the rationalist and behaviorist models.

There are, of course, limitations to our approach. We have used a steady-state analysis to derive competitive strategy implications; this assumes either that firms have a relatively low discount rate for future payoffs, or that consumers respond quickly to changes in promotional strategy. Without these assumptions, a highly complex differential games framework would be necessary to derive equilibria, and then only numerically. We also adopted a first-order model, so that consumers’ purchase probabilities are dependent only on what they did in the directly previous period. Such a modeling framework overlooks that, for some consumers at least, the longer they stay with a brand, the less likely they may be to switch. Extending the model to a higher-order framework could incorporate such behavior, though at a cost of much complexity. For reasons of tractability, we also used a two-firm, two-segment (Loyal, Switcher) market, in which firms can promote to Loyals, promote to Switchers, or not promote. In ‘real world’ markets, there are typically more than two relevant firms, and consumers can be segmented in numerous ways.
Loyalty, Switching, Betrayal and Jealousy effects were assumed symmetric for the two firms, by the model and the experiment. In our experimental data, with highly similar firms, relaxing this symmetry produced negligible differences in parameter values (and thus in implications following from them). However, this certainly should not be assumed for all data sets or promotional scenarios.

Finally, all our effects derive from the laboratory, with its attendant caveats. However, contrary to usual warnings about demand artifacts and external validity, we believe that having measured our effects in the lab need not necessarily have exaggerated them. Rather, the opposite is possible: for example, Betrayal effects may be stronger in the real world, since consumers will be far more emotionally attached to actual firms and products, having formed a ‘relationship’ with them over time; and the same may be true of Jealousy or even Loyalty. Certainly, all three effects are stronger for actual people one knows than for hypothetical ones introduced in a lab setting, and so they may be too for firms.

In terms of implementing targeted price increases in practice, some environments may be more conducive than others. If many consumers are aware of prices to other segments, and are upset if these prices are lower than those they are being offered, manufacturers may not wish to practice targeted pricing. The proportion of ‘aware’ consumers can also vary by industry. For example, in business-to-business industries, prices to various customers may be more private than in business-to-consumer industries. Hence, the proportion of ‘aware’ consumers may be intrinsically smaller in the former. Further, web-based business may allow for easier price comparisons, allowing for a larger proportion of ‘aware’ consumers.

Our analysis highlights a finding of potential importance to practicing managers: that it may be prudent to impose price increases selectively, rather than to all one’s potential customers. We also believe it important for managers to realize that the mere act of failing to increase prices to one segment can, depending on how one treats another segment, be viewed as a bona fide price promotion, much as being given a day off from work (when others are not) can be viewed as a paid vacation, as opposed to a scheduled holiday. Given that managers may, in accordance with our findings, choose to enact a ‘non-increase’ type promotion, they should realize that they are
different from standard ‘decrease’ type promotions: effects strengths and resulting competitive equilibria systematically differ. Given that targeted price increases are not currently common, we hope that our findings serve to expand the practice of this type of policy. From the consumer’s perspective, this would allow some consumers to continue with a lower price, while enabling firms to enhance profitability. As such, it appears to be a policy worth pursuing.
Appendix

To obtain the steady-state profit function, we need first to derive a firm’s total sales and sales-on-promotion in steady-state. We illustrate here how to derive each firm’s steady-state profits when firm A favors Switchers with a discount, while Firm B favors neither segment. All other cases are analogous, and omitted for brevity.

Let $Sales_{SN}^A$ and $Sales_{SN}^B$ be brand A’s and B’s total sales in steady state, respectively, when Firm A offers deals to Switchers and Firm B offers no deals. Using the relevant transition probabilities (Table 2) and normalizing the market ‘size’ to 1, we have,

$$Sales_{SN}^A = \frac{1 - \beta (1 - s)}{[1 - \beta (1 - s)] + [1 - \alpha (1 - b)]}, \quad Sales_{SN}^B = 1 - Sales_{SN}^A. \quad (1)$$

This expression represents steady-state sales in each period and comprises both promotional and non-promotional sales.

Because Firm A’s promotions favor Switchers, a fraction of its sales are made on deal. In steady-state, sales-on-promotion are given by

$$PromSales_{SN}^A = [1 - \beta (1 - s)] Sales_{SN}^B. \quad (2)$$

In other words, Firm A’s promotional sales are equal to the fraction of brand B’s buyers who switch to A due to its promotional incentives. Firm B’s promotional sales, $PromSales_{SN}^B$, are zero in this case, as it offers no promotion. Then, given $M$ (the normal margin for a brand) and $K$ (the unit cost of redemption, inclusive of any costs of targeting, handling and administration), a firm’s profit in steady-state can be written in general as

$$\tilde{\Pi}_{hk}^i = M \left[ Sales_{hk}^i \right] - K \left[ PromSales_{hk}^i \right], \quad (3)$$

where $i = A, B$ and $h, k = \{N, S, L\}$. Thus, in the specific case examined here, one obtains

$$\tilde{\Pi}_{SN}^A = M \left[ Sales_{SN}^A \right] - K \left[ PromSales_{SN}^A \right], \quad \tilde{\Pi}_{SN}^B = M \left[ Sales_{SN}^B \right].$$

Once all profit functions are derived, a straightforward way to utilize steady-state analysis in a game-theoretic setting is to construct an infinitely repeated game, in which each of the competing firms chooses its promotional strategy, that is, which segment to favor with a discount: Switchers (S), Loyals (L), or Neither (N). For the purposes of formal analysis, the firms’ payoffs can be taken to be their steady-state profit values, $\tilde{\Pi}_{hk}^i$, assuming that all consumers in the market are susceptible to the influence of both Betrayal and Jealousy effects. If only a portion of the market is of the “aware and care” type, one weights by this proportion, and the remainder of the analysis is unchanged.
References


