Price change strategies over time – using dramatic major changes versus smaller incremental changes

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ABSTRACT

Dramatic price changes, such as large discounts, are often used by firms seeking to boost sales. An equivalent major price increase may severely inhibit sales, in fact even more so, hence some firms prefer to raise prices gradually. In some scenarios firms seek to change prices in small increments over time while in others they may make a single large change. Basing itself on largely on prospect theory, this article examines the asymmetric and unequal response of consumers to increases and decreases in price changes over time, and examines how product purchase frequency, price uncertainty, consumer adaptation, and the directionality of the change impact the effectiveness of alternative strategies. The article develops and tests hypotheses that conclude (a) dramatic price increase effects are less consequential (in terms of demand), for more frequently purchased products (b) the impacts of increases are greater than the impacts of decreases (c) less dramatic (smaller, gradual and incremental) price changes dampen effects more when the buyers give greater importance to recent purchase experiences (d) higher price uncertainty such as that caused by wider price fluctuations leads to gradual price decrease strategies being more effective than similar strategies in a more certain price environment.

Keywords: Pricing, Inter-temporal pricing, Prospect Theory, Reference Prices, Behavioral pricing

INTRODUCTION

Classical utility economics presents consumers' buying decisions as based on utility maximization subject to a budget or income constraint. Maximizing calculations can be replaced by decisions based on subjective perceptions of price .i.e. how does the 'objective' price compare to a subjective comparison or reference price, and there can also be ranges of acceptable prices for certain products (Brough and Isaac, 2012; Monroe, 1971). Consumers may also make their buying decisions based on heuristics that do not involve prices (Banks, 1950; Keller, 1993). For instance for brand-driven customers, the buying decision is based on the brand of the product, whereas some consumers may simply select the same product they purchased on the last buying occasion. Pricing studies have generally focused on price perceptions and price strategies that consider 'point of time' scenarios (Campbell, 2007; Mazumdar, Raj and Sinha 2005). In this article the focus is on price changes for a product, as made over a period of time.

PRICE FRAMING – PERCEIVED GAINS AND LOSSES

One of the central approaches to understanding price perception and the related buying decisions has been through elaborating and understanding the concept of framing. Framing refers to the manner of presentation of a problem, and this by itself can influence choice decisions (Hamilton and Chernev, 2013; Mazumdar, Raj and Sinha 2005; Tversky and Kahneman, 1986). While utility theory defines and explains the characteristics of optimal consumer behavior, prospect theory, with a focus on the framing process, tries to more closely describe consumer behavior (Thaler, 1985). Prospect theory replaces the utility function from economic theory, and its associated utility maximizing algorithm with an alternative framing process, based on the value function. In prospect theory value is a perception, defined in relation to perceived gains and losses relative to some natural reference point, or standard of comparison, reflecting the belief or assumption that people respond to perceived comparisons rather than real changes in price levels. An example of price framing may take a price of $120, with a discount of $20 as a 'gain' of $20, rather than focusing on the price level itself. In the context of pricing the natural reference point or standard of comparison corresponds to the concept of a 'reference price.' The value function is postulated to be concave for gains and convex for losses, with the origin serving as the reference point. The negative loss region of the function is steeper than the gain region (Kahneman and Tversky 1979, Tvesrky and Kahneman 1986). The shape of the value function conforms to a set of behavioral postulates and some of these are:

- The decision maker is loss averse, i.e., losses loom larger and have a greater mental impact than equivalent dollar gains in the mind of the decision maker. This is reflected in the slope of the value function, which has a slanting S shape, the loss region being steeper than the gain region.
- The shape of the value function is concave in the gain region and convex in the loss region, implying that every additional gain or loss has a diminishing impact or value.
- The concavity of the value function in the gains region, and its convexity for losses, also implies that decision makers are risk averse in the domain of gains and risk seekers in the domain of losses.

MULTIPLE GAINS AND LOSSES AND PRICE STRATEGIES OVER TIME

While developing price change strategies we are concerned with the movement of prices over time. One of the central questions becomes: 'should a major price change be used or should the alternative of a succession of comparatively incremental changes be used'? Here we are really looking at the issue of a single change versus multiple price changes that total the same dollar amount, over a period of time.

One of the implications of the shape of the value function is that contemporaneous multiple monetary gains/losses are perceived as more than a single equivalent monetary gain/loss (Mazumdar and Jun, 1993). For instance, according to prospect theory, a $50 win would be perceived to be less in 'value' perception (mental impact) than ten wins of $5. Conversely, multiple monetary losses are perceived as greater than a single equivalent monetary loss. In effect, the value function's assumed shape implies that 'many are perceived as more,' considering dollar equivalent gains or losses

Mazumdar and Jun 1993 studied the multiple price changes for an unbundled commodity versus a single dollar equivalent price change for the bundle and confirm prospect theory postulates, for this 'point-of-time,' situation. When we are considering price changes over a period of time, however, using the prospect theory-reference price framework we have to take into account reference price changes over time for the purchase of the same product. This is not applicable to the 'point of time' scenario.

In many situations prices are raised slowly, in small increments so that the consumer adapts over time to rising price levels. Manufacturers in such situations are expecting consumer reference prices to adapt upwards as prices are raised. Now, perceived multiple losses can loom less, compared to a single equivalent dollar price increase. A single large price increase could precipitate a decision to not buy the product at all, or drastically reduce consumption of the product. Slower and smaller price increases, even when they eventually reach the same final price level, may not induce such a drastic cutback in quantity demanded, as the consumer adapts, over time, to the price increases. Conversely, a single large price decrease may lead to a substantial increase in demand, whereas smaller successive price decreases, finally reaching the same price level as the single price decrease, may not have as substantial an impact. There appear to be two tendencies working in opposite directions:

1. As the value function is concave in the gains region and convex in the loss region, many segregated small gains/losses tend to be perceived as greater than a single dollar equivalent gain/loss. Price increases and decreases are postulated to be coded as gains and losses, through a comparison with reference prices. Many price increases/decreases, therefore, tend to be perceived as more than a single equivalent increase/decrease, in keeping with the tendency 'many are perceived as more.'
2. Over time, consumer reference prices may tend to move upward/downward, influenced by the price trends experienced by the buyer. To the extent that this takes place, the quantity demanded will be less negatively affected in the case of monotonic price increases, and less positively affected in the case of monotonic price decreases.

This research examines:

a. The effects of price change strategies over time in terms of product quantities demanded. In some ways this parallels the Mazumdar and Jun 1993 bundling study, with the major difference that we are considering price changes over time for individual products.

b. The influence of the number of 'purchase occasions,' at different price levels. In this study, a purchase occasion for a product refers to a shopping excursion in which the consumer considers and deliberates on the purchase of a product. Considering frequently purchased consumer products rapid price increases would imply a smaller number of purchase occasions for each consumer, at every price level; conversely, slower price increases would imply a greater number of purchase occasions at every price level.
c. Uncertainty regarding prices also influences reference price formation (Mazumdar and Jun, 1993; Lichtenstein et al., 1988). Such uncertainty may be caused by erratic fluctuations in past price behavior, a lack of information or recall, and other reasons. This research examines choice in a more certain price context to high uncertainty in prices.
d. Consumers are influenced in their buying decisions by their previous buying experiences. The weight or importance given by customers to their own and recent purchase experiences is also influenced by the strength of external influences such as advertising. This research considers the weight assigned by consumers to recent purchase experiences as another variable in the buying environment that may impact the effectiveness of different inter-temporal price strategies.

THEORETICAL PROPOSITIONS AND ANALYSIS

We postulate, that the greater the number of purchase occasions between price increases, then the greater the number of purchase occasions at a particular price, and the closer the consumer's adaptation to that price change. This follows from adaptation level theory where the subject adapts the standard of reference based on previous experiences. The importance of the purchase decision making experience in reference price formation is supported by Craik and Lockhart's (1972) depth of processing theory which holds that memory improves if processing takes place at a deeper level. The actual process of purchase decision making would appear to be a deeper level of processing than, say, mere observation of store prices or displays.
To summarize, on the basis of adaptation level theory, we postulate:

1. The greater the number of purchase occasions at a particular price, the closer reference price adaptation is to that price. This would also imply that price adaptation is closer for more frequently purchased products, considering the same time periods.
2. The closer the adaptation of reference price to the most recent price change, the lower the impact of segregation, or multiple price changes, when compared to a single price change of the same total dollar amount.

On the basis of the foregoing arguments the following hypotheses are proposed:

Hypothesis 1: The greater the number of purchase occasions between successive price increases, the smaller the decreases in demand, for strategies which increase prices through multiple price increases, compared to a dollar equivalent single price increase.
Hypothesis 2: The greater the number of purchase occasions between successive price decreases, the smaller the increases in demand, for a price strategy of multiple decreases, compared to a strategy of a dollar equivalent single price decrease.

WEIGHT ASSIGNED TO RECENT EXPERIENCES

Reference prices have been treated as adaptation levels, and extensively viewed as weighted averages of previous price exposures. For instance, Winer's (1986) extrapolative model derives reference price as a weighted average of the previous two period's price, Raman and Bass (1987) use a time series model of past prices, Gurumurthy and Little's (1987) adaptive expectations approach treats reference price as an exponentially decaying weighted average of all past prices. The next factor the hypotheses focus on is 'weight assigned to past purchase experiences.' Particularly in the case of price reductions, advertising can make price comparisons of current advertised prices to past prices paid. Such advertising, in effect, seeks to alter the weight we assign to the current as compared to past prices paid. The weight assigned to different purchase experiences can also depend on the type of consumer: price knowledgeable and price conscious consumers may give greater weight to more recent purchase experiences, compared to other cues.

The weight assigned to different purchase occasions can be manipulated in a laboratory setting by giving past data regarding particular purchase occasions more weight or prominence. This can be done by using memory or context cards with bolder type-faces, and larger font size, or by giving reminders of the prevailing price on a particular purchase occasion. Assigning a greater weight to more recent price experiences or purchase occasions implies that such a consumer adapts faster and ‘closer’ to the most recent price changes. Using the principal that 'the closer the adaptation of reference price to the most recent price change, the lower the impact of segregation, or multiple price changes, when compared to a single price change,' the following hypotheses are proposed:

Hypothesis 3: The greater the weight given to more recent purchase experiences by the consumer in reference price formation, compared to the purchase experiences of earlier periods, the lesser the decrease in demand from a strategy of multiple price increases, compared to a single equivalent increase.

Hypothesis 4: The greater the weight given to more recent purchase experiences by the consumer compared to the purchase experiences of earlier periods, the lesser the increase in demand from a strategy of multiple price decreases, compared to a strategy of a single price decrease.

PRICE UNCERTAINTY AND STRATEGY

Research (Lichtenstein et al, 1988; Mazumdar and Jun, 1993) indicates that higher price uncertainty is associated with wider, as well as, higher levels of latitudes of acceptance in the minds of consumers. When consumers are uncertain of prices the latitudes of acceptance are wider (Sorce and Widrick, 1991; Rao and Sieben, 1992), and this uncertainty can be caused by reasons such as infrequent purchases, insufficient pre purchase search, insufficient processing of price information, variability in market prices (Winer, 1986) etc. Further, the level of the central tendency of the range of price acceptability has been found to be higher as well (Urbany and Dickson, 1991; Mazumdar and Jun, 1992; 1993). Mazumdar and Jun find that the widening of the range of price acceptability, because of price uncertainty, is caused primarily by the upward displacement of the upper limit of acceptable prices, rather than a shift in the lower limit of acceptable prices. Higher reference prices, in a high price uncertainty situation, would mean that

in the context of multiple price increases, the perceived demand losses from multiple price increases would be less than in the greater price certainty situation. In multiple price decrease situations, the high uncertainty-high reference price scenario, would mean higher perceived gains, and therefore a greater positive impact on demand, compared to the price certain scenario. Mazumdar and Jun (1993), in the contemporaneous context of the segregated pricing of sub-elements of a commodity bundle, hypothesize:
"Compared to price certain consumers, price uncertain consumers will be: (a) more favorable to multiple price decreases relative to a single price decrease of the same amount and (b) less unfavorable to multiple price increases relative to a single price increase of the same amount."
The results of their experimental study confirm the hypotheses. The hypotheses of Mazumdar and Jun, and the same logic, can be extended to the intertemporal context of single versus multiple price change strategies, over time. Considering strategies of multiple price changes in two situations: (a) high price uncertainty (b) greater price certainty, we hypothesize:

Hypothesis 5: Compared to a price certain situation, in a situation of high price uncertainty, the strategy of multiple (small, gradual) price decreases shall lead to greater increases in quantity demanded.
Hypothesis 6: Compared to a price certain situation, in a situation of high price uncertainty, the strategy of multiple (small, gradual) price increases shall lead to lower decreases in quantity demanded.

METHODOLOGY OF THE STUDY

To test the hypotheses we measured changes in demand as the dependent variable, while manipulating the treatment variables: price changes (single vs. multiple, and price increases vs. decreases), number of purchase occasions at every price, the degree of price uncertainty and the weight assigned to the most recent price change. This was done by using a series of twelve sequential shopping simulations, each representing one visit to the supermarket. The respondents gave their purchase responses with respect to a number of products, responding to the prices indicated on that shopping occasion as well as the 'context or antecedent information,' and also using their memory of their previous purchase behaviors in the simulation exercise. The context or antecedent information preceding a particular purchase occasion was used to create the 'weight' and 'uncertainty' manipulations. Four frequently purchased products were used for the study (as in Winer 1986). The four products used for the study and the treatments are below.

Dependent Variables and Treatments

Product	**Dependent Variable**	**Type of Price Change**	**Treatments 2 x 2 x 2**
Raisin Bran Cereal	DEMCHG 1	Increase	PR x OCC x WT
Coconut Cookies	DEMCHG2	Increase	PR x OCC x CERT
Chocolate	DEMCHG3	Decrease	PR x OCC x WT
Chicken Noodle Soup	DEMCHG4	Decrease	PR x OCC x CERT

Variables and Dummy Variable Values (the dummy variable values are underlined)

PR : refers to price changes (Single 1, Multiple 0 .i.e. three changes totaling the same $ value as the single change)
OCC : refers to purchase occasions at every price (Single 0, Multiple 1)
WT : refers to the weight assigned to the last purchase occasion (Unweighted 0, Weighted 1)
CERT : refers to price certainty with reference to the product (Uncertain 0, Certain 1)

The experiment considered four different products, cookies, cereal, chocolate and soup. It would appear that cereal and soup may be considered 'staple,' whereas chocolate and cookies are more inessential. However, there is substitutability of the product by other products in all cases. Further, it was emphasized that purchases are being made for the respondent and 'other roommates.' This emphasis limited any problems that might have arisen because of a respondent's personal upper threshold, because of which he/she would not consume beyond a point, the product having a zero or negative marginal utility. This also led to quantity response sensitivity in terms of getting a wide range of quantity purchase responses and led to almost no responses where there were 'no purchases.' A concentration of zero purchases as responses would have led to an inappropriateness in the validity of the ANOVA and regression methodologies. In the analysis, the SPSS General Linear Model (GLM) has been used for model fitting which follows the ANOVA procedure. This procedure is used with each of the four dependent variables.

PRETEST OF WEIGHT AND UNCERTAINTY MANIPULATIONS

The weight given by respondents to the price on the previous purchase occasion was manipulated by creating two scenarios (a) Unweighted - the context in which respondents made a purchase decision based on their own memory of their previous purchase experience (b) in the 'Weighted' context the context or anteceding information sheet provided a reminder of the price they had paid on the previous purchase occasion. If the manipulation were effective the latter situation should lead to reference prices closer to the last purchase price. We measured the reference price as the average of the latitudes of acceptance; the manipulation was pretested and found to be acceptable in all conditions (a) single and multiple price decreases and increases (b) single purchase occasion and multiple purchase occasion contexts (c) initial and terminal price contexts. Stringent t tests using the Bonferroni approach were used for the pretest.

The uncertainty manipulation was carried out by providing information in the uncertain context on how 'widely' the prices of the product have varied in the past and how they could fluctuate between two extreme values. If the manipulation were effective we would expect (a) consumers to carry more cash to make this purchase, and (b) a wider range between upper and lower thresholds (Mazumdar and Jun 1993). The upper threshold is the highest price the respondent is ready to pay for the product and the lower threshold is the price at which the subject starts regarding the purchase as a bargain. The pretest was similar to that carried out in Mazumdar and Jun's 1993 study. As required, it was found that both the cash budgeted and the range were found to be significantly greater in the 'uncertain' contexts.

THE SAMPLE

Six different sequences/questionnaires of shopping simulations were created. In each sequence/questionnaire a set of manipulations on each of the products was carried out and purchase responses measured. To ensure that each 'treatment cell' in the multidimensional matrix had a minimum of 30 responses (to conform to large sample requirements) 223 respondents were approached for the study. 216 usable responses were received with 36 usable responses for each questionnaire, safely above the desired minimum of 30. All the subjects were college students, and the responses were collected during regular class hours in the presence of the regular instructor of the class. While no incentives were provided, the survey was administered in the presence of the regular instructor to facilitate a more complete response.

VARIABLES

The variables used, names and dummy values assigned are explained below:

1. DEMCHG: The dependent variable refers to the change in demand, measured as the difference between the demand after the last price change and the demand prior to the first price change in the treatments. The treatments are in the shopping excursion simulations four to ten only, since the simulations one to three are meant only to familiarize the respondent with the prevailing price conditions. DEMCHG1, DEMCHG2, DEMCHG3, and DEMCHG4 refer to the demand changes for the products 1, 2, 3 and 4, that is Raisin Bran Cereal, Coconut Cookies, Chocolate and Chicken Noodle Soup respectively.
2. PR: Refers to single versus multiple price changes. The single price changes are assigned the value 1, and multiple (three) price changes are assigned the value 0.
3. OCC: Refers to the number of purchase occasions that a respondent finds a product at a certain price level, between price changes. A single purchase occasion at a certain price is assigned the value 0, while multiple (three) purchase occasions at a certain price are assigned the value 1.
4. CERT: Refers to the certainty condition. The situation with high price uncertainty is assigned the value 0, while the situation with a more certain price environment is assigned the value 1.
5. WT: The context where the last purchase occasion is weighted by a reminder of the last price paid is assigned the value 1. The situation where the last purchase occasion is unweighted and no price reminder is given, is assigned the value 0.

Hypotheses 1 and 2 focus on single and multiple price changes as related to the number of purchase occasions. The relevant treatments are PR x OCC, and since these treatments are on all products, all the products and dependent variables DEMCHG1, DEMCHG2, DEMCHG3, and DEMCHG4 are considered for the analysis of these hypotheses.

Hypotheses 3 and 4 focus on the demand impacts of single and multiple price changes in relation to the weight assigned to the last purchase occasion. Hence the PR x WT treatments are relevant, so DEMCHG1 and DEMCHG3 are the relevant dependent variables. Hypotheses 5 and 6 focus on the demand impacts of the single and multiple price changes in relation to the certainty of the price environment, hence the PR x CERT treatments are relevant. The relevant dependent variables are DEMCHG2 and DEMCHG4.

PURCHASE OCCASIONS AND STRATEGY

Hypothesis 1 (Refer to Tables 1, 2 and 3 before the References)

There is substantial support for Hypothesis 1, which postulates that multiple price increase strategies shall lead to less reduction in demand, the greater the number of purchase occasions between price increases. This hypothesis is supported by both the experiments where price increases were involved i.e. on the products raisin bran cereal (dependent variable DEMCHG1) and coconut cookies (dependent variable DEMCHG2). In these experiments, the interaction effect of PR*OCC is significant at the 95% level. Further, the homogeneity of means tests (LSD, Scheffe and Bonferroni) all indicated that the demand decrease in the multiple occasion scenario was significantly less than that in the single occasion scenario (using a one-tailed Alpha = .05).

Hypothesis 2 (Refer to Tables 4, 5 and 6 before the References section)

The same treatment interaction (PR*OCC) was examined in the context of price decreases, on the products chocolate (DEMCHG3) and chicken soup (DEMCHG4). For the product chocolate, the interaction effect was significant at the 90% confidence level (p = .066), and the LSD test of homogeneity of means found the demand increase to be significant at the Alpha = .05 level; however the more conservative Scheffe and Bonferroni did not find the demand increase to be significant. In the case of the product, chicken noodle soup, while the mean increase in demand in the multiple purchase occasion was less than in the single purchase occasion situation, as postulated by Hypothesis 2, yet, this increase was not significant in terms of the LSD, Bonferroni and Scheffe contrasts, nor was the interaction (PR*OCC) significant (p = 0.9). Hence, the experiment on chicken soup provided no support to the hypothesis. Thus, it would appear that there is some support for Hypothesis 2, based on the experiment on chocolate, but there is no support based on the experiment on chicken soup. We may conclude, that while Hypothesis 1 which focuses on price increases, has strong support, Hypothesis 2 which focuses on price decreases is not strongly supported.

Why is there insubstantial support in the case of price decreases?

It is possible that these results are an aspect of the asymmetric response to gains and losses postulated by prospect theory's value function, and its loss aversion characteristic. A change in reference prices in the case of gains, because of price reduction, does not necessarily lead to statistically significant increases in consumption. On the other hand, the price increases associated with an upward revision in reference prices in the domain of losses, does lead to more significant decreases in consumption. Mazumdar and Jun (1993), use a scaling methodology and measure the consumer's favorable or unfavorable response to a price change on a scale. A statistically significant 'favorable response' does not imply a statistically significant increase in demand. From a strategic perspective it is demand changes that are important, and in the context of price decreases the support to Hypothesis 2 is weaker then the support to Hypothesis 1 in the context of price increases.

Hypotheses 5 and 6 (Refer to Tables 1, 3, 4 and 6 before the References section)

Certainty And Strategy

Hypotheses 5 and 6 focus on the PR*CERT interaction. They postulate that in a context of high price uncertainty a strategy of multiple price decreases shall lead to greater demand increases as compared to a price certain situation. On the other hand, a strategy of multiple price increases is postulated to lead to lower decreases in quantity demanded, when compared to a price certain situation.

The analysis of chicken soup (dependent variable DEMCHG4) which is the context of price decreases, finds that the uncertain-multiple price change condition leads to a greater positive change in demand, when compared to the certain- multiple price change condition. The one tailed LSD homogeneity of means test, appropriate for the single planned contrast places the means of the two treatments in distinct categories i.e. they are not homogenous.

The analysis of the means relating to DEMCHG2 confirms that in the context of price increases, the uncertain- multiple price change condition has the least (negative) impact on demand, and this impact is also less than the impact of the certain-multiple price change condition. This is confirmed by the homogeneity of means test, the one-tailed LSD at .05%. The Bonferroni and Scheffe tests that are more conservative also confirm this. In both the experiments (cookies - DEMCHG2; chocolate - DEMCHG4) the interaction effects are significant at the 95% confidence level (p values are .012 and .014). Therefore there is strong support for the hypotheses.

Strategic Implications

In terms of strategy, the key implication is that an environment of price uncertainty reduces the negative impact of price increases. It follows that the negative impact of price increases can be lowered by increasing perceptions of price uncertainty. For instance, creating an environment of price uncertainty over a period of successive variations in prices and discounts would appear to be an effective way of minimizing demand decreases over time in response to strategic price increases. An environment of price uncertainty can be created in many ways. Corporations could have different price structures for different channel outlets for consumers; retail outlets could be induced into creating price differentials temporarily, through selective schemes and discounts. For the case of price decreases, uncertainty leads to greater increases in demand when the uncertainty is higher, comparing two contexts where multiple price change strategies are being used. However, since single price decrease strategies are more effective than multiple price decrease strategies, hence in general to increase demand a single price decrease would be used.

Hypotheses 3 and 4 (Refer to Tables 2,3,5 and 6 before the References section)

Weight assigned to the last purchase occasion

Hypotheses 3 and 4 focus on the PR*WT interaction. Further, the hypotheses imply that the multiple price change, weighted condition should have the least negative impact on demand in the context of price increases. Considering DEMCHG1 the interaction effect has a p value of

.09, which is significant at the Alpha = .10 level, but is not significant at the Alpha = .05 level. An examination of the means confirms that the multiple price change, weighted treatment condition has the minimum negative impact. The LSD one directional test of homogeneity at Alpha=.05 places this mean in a distinct category, but the Bonferroni and Scheffe procedures do not confirm a significant difference between the Means for the Unweighted and Weighted conditions for multiple price changes.

If we consider the context of price decreases (DEMCHG3) the interaction effect in the GLM model has a p value that is not significant even at the Alpha = .10 level. Hence, further analysis is redundant. The data indicates weak support for Hypothesis 3 and no support for Hypothesis 4 (the context of price decreases).

Why is support for Hypothesis 4 Weak?

There could be a number of possible reasons behind this:

- Internal reference prices may be determined almost entirely by the last price paid, hence the weighting of the last price paid does not make a real difference.
- The deviation in reference prices caused by a weighting process, may not make a 'real' difference in buying decision making.
- As was discussed earlier in the case of Hypotheses 1 and 2, the asymmetric response to price increases (framed as losses) and price decreases (gains), leads to certain effects. The weighting process may fail to make a real difference to buying decisions. However, this would be more likely to happen in the context of price decreases, since subjects are 'gain insensitive,' so no difference between the 'weighted' and 'no-weight' demand is discernible. One may conclude that any strategy that seeks to focus consumer attention on their recent purchase experiences is more likely to be more relevant to price increases rather than price decrease situations.

FUTURE RESEARCH

In this research, the hypotheses have been examined without modeling or estimating the changes of reference prices themselves. While the modeling of reference prices was not essential to examine the hypotheses, this is an area where further research and elaboration is possible, particularly when prospect theory approaches are integrated into an intertemporal perspective.

Price modeling has often been limited to using past prices only, with expected price being modeled as a function of past prices. To the extent that expected prices have been treated as synonymous with reference prices, this has been a limitation since, current price information is available to consumers who actually compare current sticker prices, and this itself impacts their reference price levels. Mathematically, including the current price as an influencer of expected price would imply regressing current price on itself, and create an anomaly (Jacobson and Obermiller 1990). An alternative to modeling reference prices is to make an explicit measurement of reference prices rather than modeling them. In this research the estimation of reference prices was required only for the pretests where the average of the upper and lower thresholds was used as an estimate of the reference price. This was similar to the method used by Mazumdar and Jun (1992; 1993). Klein and Oglethorpe (1987) discuss a threefold classification of reference prices: aspiration prices, market prices and historical reference prices. A more detailed understanding of buying processes would follow from research studying the contexts

that lead to the emergence of reference prices based on aspiration or consciously established goals, purchase history, and market prices as the alternative decision influencers. The aspiration prices correspond approximately to some sort of a prospect theory type of decision process. These are thought processes such as: the price I would like to pay; the price that I consider a good buy; a price I consider appropriate; the most I am ready to pay, etc. The historical prices correspond to past prices, while market prices imply the external reference prices including the current price of the last product purchased. Future research may seek thought listing or elicitation to gain more detailed insights into the reference price formation process. Further, the measurement of reference prices in the course of the decision process itself, or at the beginning of each shopping simulation would further help to confirm (or reject) the theorizing behind the findings of the study.

Managerial Applications

The earlier research on commodity bundling, which is a static application of prospect theory has managerial implications in the pricing of combination offers such as such as tourist packages, various combinations of discounts, and the pricing of bundled products such as stereo or home theater systems. This research extends the framework to situations that are not at a single point of time, and the seller makes changes to market price over time.

Such situations, are common in monopolistic, monopolistically competitive, and collusive markets, and are also commonly found in the government owned industrial sector. Frequently, the government is a sole provider of a product or service, and in some mixed economies where a planning process is used, the prices of major industrial inputs are administered by government monopolies. Here the government's long-term price strategy seeks a response from an independent private sector, and price perceptions play an important role. Socialist systems have used input-output models of the Leontief type and material product balances that use some form of shadow pricing as a working basis (Lange, 1964). Mixed economies with major private sectors, on the other hand seek to achieve consistency with government plans by influencing private sector demand, consumption, and investment, in a manner consistent with the national plans for particular product groups. Governments often aim to intentionally either conserve or promote the use of a resource. In such contexts, the better understanding of price perceptions in relation to the price changes of government-controlled resources over time is helpful.

Tables and Quantitative Results

Table 1

DEMCHG 1		**DEMCHG 2**	
Explanatory Variable	**p value**	**Explanatory Variable**	**p value**
PR	.000	PR	.000
OCC	.104	OCC	.009
WT	.322	CERT	.006
PR*OCC	.001	PR*OCC	.004
PR*WT	.090	PR*CERT	.012
OCC*WT	.000	OCC*CERT	.007
Model		**Model**	
Model F	12.42	Model F	27.9
Significance	.000	Significance	.000
R^2	.263	R^2	.445

Table 2. -- Analysis of Interactions: Homogeneity of Means DEMCHG1

Dependent Variable	**Variables (Interaction between)**		**Means**	**Bonferroni Homogenous Groups**				**LSD Homogenous Groups**				**Scheffe Homogenous Groups**			
DEMCHG1	**PR**	**OCC**													
	0 (M)	1 (M)	-1.58	I				I				I			
	0 (M)	0 (S)	-2.58		I				I				I		
	1 (S)	0 (S)	-3.05		I	I				I			I	I	
	1 (S)	1 (M)	-3.42			I				I				I	
DEMCHG1	**PR**	**WT**													
	0 (M)	1 (W)	-1.82	I				I				I			
	0 (M)	0 (NW)	-2.34	I					I			I			
	1 (S)	0 (NW)	-3.16		I					I			I		
	1 (S)	1 (W)	-3.30		I					I			I		

Note: If the mark 'I' is placed in the same column for two means then they are regarded as homogenous under that test.

Table 3. -- Analysis of Interactions: Homogeneity of Means DEMCHG2

Dependent Variable	Variables (Interaction between)		Mean	Bonferroni Homogenous Groups				LSD Homogenous Groups				Scheffe Homogenous Groups			
DEMCHG2	**PR**	**OCC**													
	0 (M)	1 (M)	-1.25	I				I				I			
	0 (M)	0 (S)	-2.51		I				I				I		
	1 (S)	0 (S)	-4.30			I				I				I	
	1 (S)	1 (M)	-4.36			I				I				I	
DEMCHG2	**PR**	**CERT**													
	0 (M)	0 (U)	-1.28	I				I				I			
	0 (M)	1 (C)	-2.48		I				I				I		
	1 (S)	0 (U)	-4.30			I				I				I	
	1 (S)	1 (C)	-4.36			I				I				I	

Table 4

DEMCHG 3			**DEMCHG 4**		
Explanatory Variable	**Model A**	**Model B**	**Explanatory Variable**	**Model A**	**Model B**
PR	.000	.000	PR	.000	.000
OCC	.298	.297	OCC	.566	.524
WT	.191	.235	CERT	.708	.707
PR*OCC	.066	.065	PR*OCC	.940	Dropped
PR*WT	.568	Dropped	PR*CERT	.014	.014
OCC*WT	.052	.052	OCC*CERT	.017	.017
Model			**Model**		
Model F	23.97	28.79	Model F	8.570	11.640
Significance	.000	.000	Significance	.000	.000
R^2	.408	.407	R^2	.198	.198

Table 5. -- Analysis of Interactions: Homogeneity of Means DEMCHG3

Dependent Variable	Variables (Interaction between)		Mean	Bonferroni Homogenous Groups				LSD Homogenous Groups				Scheffe Homogenous Groups			
DEMCHG3	**PR**	**OCC**													
	1 (S)	1 (M)	3.64	I				I				I			
	1 (S)	0 (S)	3.47	I				I				I			
	0 (M)	0 (S)	1.48		I				I				I		
	0 (M)	1 (M)	.889		I					I			I		
DEMCHG3	**PR**	**WT**													
	1 (S)	1 (W)	3.71	I				I				I			
	1 (S)	0 (NW)	3.40	I				I				I			
	0 (M)	1 (W)	1.26		I				I				I		
	0 (M)	0 (NW)	1.11		I				I				I		

Table 6. -- Analysis of Interactions: Homogeneity of Means DEMCHG4

Dependent Variables	Variables (Interaction between)		Mean	Bonferroni Homogenous Groups				LSD Homogenous Groups				Scheffe Homogenous Groups			
DEMCHG4	**PR**	**OCC**													
	1 (S)	0 (M)	4.48	I				I				I			
	1 (S)	1 (S)	4.33	I				I				I			
	0 (M)	0 (M)	2.79		I				I				I		
	0 (M)	1 (S)	2.61		I				I				I		
DEMCHG4	**PR**	**CERT**													
	1 (S)	1 (C)	4.69	I				I				I			
	1 (S)	0 (U)	4.11	I				I				I			
	0 (M)	0 (U)	3.09		I				I				I		
	0 (M)	1 (C)	2.31		I					I			I		

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