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*The Influence of Price Reductions on Shoppers'
Reference Price and Reservation Price when
Upgrading to Premium Brands*

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THE INFLUENCE OF PRICE REDUCTIONS ON SHOPPER'S REFERENCE PRICE AND RESERVATION PRICE WHEN UPGRADING TO PREMIUM BRANDS

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Abstract

In order to encourage consumers to upgrade to a more expensive brand of a particular product category price reduction on premium brands was provided as a stimulus. An interactive dynamic instrument was used to record the consumer's instantaneous response to changing price cues and their levels of reference price and reservation price for their preferred premium brand were established. The contextual variables influencing these price levels are considered and discussed. From the research results it is evident that retailers while encouraging existing shoppers to switch to more expensive brands, would require to discount them differently depending on the contextual factors and shopper groups being targeted.

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Introduction

A regular feature of retailers' promotional objectives is to get shoppers to upgrade their purchase to more expensive brands because premium merchandise invariably includes bigger profit margins. Often retailers temporarily discount premium brands so that shoppers may be motivated to purchase them. The price of an item is a key variable in communicating to the customer the value of the product (1). The level of price also determines the extent of income and profitability the firm can generate from the activity associated with the product. Using price as a base for promoting a product is a strategy that is often used by retailers and marketers to facilitate purchase. Literature makes it clear that the shoppers' perceptions of price are central to influencing their purchase behaviour.

However there is an insufficient understanding of what contextual variables and the extent of which they influence the shopper to respond positively to a price reduction. What constitutes an optimal price cut to get the shopper to switch brands can after all be decided only in a contextual situation. Too big a price cut, would deprive the retailer of an opportunity for better margins, whereas too small a price drop would vitiate the purpose of price promotion requiring greater merchandising support to achieve sales objectives. This research paper seeks to establish the consumer's response defined by the discounted price point of the *premium* brand that the customer would find attractive and the price point at which the customer would buy when exposed to a price offer on a premium brand with the intention of encouraging upgrade. The attractive level of the discounted price is the *reference* price point at which the customer perceives fair value for the product. When price alone is being used as a cue for the shopper to upgrade, the discounted price point above which the shopper will not buy, is their *reservation* price.

Background

Marketing literature has identified several causal factors including shopper characteristics and their shopping patterns, that influence price response behavior, among them being:

- Accuracy of recall of price paid for existing brand (2)

- Extent of consumers' involvement and knowledge of products (3)

- Shoppers' shopping pattern, for instance:

  - store and brand loyalty of shopper (4)

  - shopper's frequency of purchase (5)

  - shopper buying from prepared lists (6)

  - shopping in company of others (7)

  - shopper's deal proneness (8, 9)

- Shopper characteristics e.g. income, education, employment status, household size and social group membership (10)

Research Problem

While the literature discusses price response behaviour for different shopper categories and shopping contexts, it is not explicit what contextual factors affect reference price and reservation price and to what extent, when premium brands are discounted to motivate shoppers to upgrade from their less expensive brands.

Research Method

The research methodology includes the design of a computer simulation in a store environment to investigate price sensitivity among different shopper groups for special purchase opportunities,

without explicitly suggesting the price change.

Critical to this research investigation was the employment of a computer program to record shopper responses to changing levels of price cuts to a more expensive brand of a product category that the respondent shopper had selected and was currently using. The intention of the computer program was to establish the reference prices and the reservation prices at which the shoppers were willing to switch from the less expensive brands they were currently using.

The sample consisted of university third year and postgraduate students from across three campuses, all in the western suburbs of Melbourne. These students did regular grocery shopping either for themselves or for their families. The sample was made up of 22 male respondents and 151 female respondents and represented a mix of ethnic extractions representing Anglo-Celtic, Asian, Middle Eastern and European.

Thirteen grocery categories which are commonly bought and included a variety of brands/sizes which belong to clearly demarcated price segments, were investigated. They included tomato sauce, laundry detergent, dish washing liquid, coffee, baked beans, facial tissues, frozen peas, paracetamol, bread, meat pies, two minute noodles, tuna and tooth-paste.

The program logic required that the respondent be exposed to progressive discretely lowered prices of a brand from the next higher price range of any one product (control) category and register the price point at which the respondent would first find the discounted price of the brand attractive, i.e. the respondent's reference price and next the price point at which she/he is willing to buy the brand (respondent's reservation price). Once the respondent has registered a 'will buy' response for an alternate brand from the next higher price strata, the program stops requiring the respondent checking prices and establishes their demographic details and buying patterns.

The research investigation checked each respondent for 28 variables which included 3 responses in relation to the changing prices of the controlled item, 12 shopping pattern characteristics (including two characteristics namely, purchase frequency and deal proneness for the item that the respondent selected or controlled item) and 13 shopper characteristics (demographic and life style). These variables have been identified in the literature review as having a bearing on consumer response to price.

Shoppers' Response related to control items	Respondents' Shopping Patterns	Shoppers' Demographic Characteristics
1. Estimated price 2. Attractive or Reference Price **3. Buy or Reservation Price**	1. Frequent purchasers of an item 2. The consumer who buys an item on special 3. Whether respondent goes shopping from home or work 4. Respondent buys from usual store 5. Time taken for shopping 6. Respondent visits other shops before going to this store 7. Respondent visits other shops after going to this store 8. Shopping more frequently 9. Consumers who shop on the same day 10. Consumers who shop at the same time 11. Respondents who shop in the company of others. 12. Respondents who prepare a shopping list	1. The number of Adults in the household. 2. The number of children in respondent's home**.** 3. Language spoken at home. 4. Respondents who were born in Australia (or country in which they were born and continue to live). 5. Fully Occupied or Employed shoppers 6. The extent of education of the shopper 7. Age of shopper 8. The place of residence of the shopper 9. The location of where respondent works 10. Sex of the respondent 11. Respondents who got The Age newspaper (local broad sheet) at home 12. Respondent who got The Herald Sun newspaper (local tabloid) at home 13. Respondents who got The Australian newspaper (national broad sheet) at home

The data of observed prices was converted into prices **relative** to the regular price of the respondents' current brand. The relative price was obtained by dividing the *response* price by the regular price of respondent's current brand. For example, if the respondent's current brand's (say Rosella Tomato Sauce-300 ml) regular price is $1.09 and the respondent recalls the brand's price as $1.29, the relative estimated price is equal to $1.29 divided by $1.09, i.e.$1.18. Similarly the discounted price level of the premium brand which the respondent found attractive was divided by the regular price of respondent's current brand to give the relative attractive price. In the same way, the discounted price level of the premium brand which the respondent felt compelled to buy was divided by the regular price of respondent's current brand to give the relative buying price.

This study estimated two models that defined the behaviour of reference price (Model 1) and reservation price (Model 2) when the shopper is being propositioned to upgrade to a more expensive brand through the inducement of a price special.

Weber-Fechner's law (11), $R = K \log S + a$, implies that a buyer has lower and upper price thresholds, which form the limits of their acceptable price range, where, R: is the magnitude of response, S: is the magnitude of the stimulus, a and K: are constants.

The Weber-Fechner law suggests the existence of a price range bounded by a reference price and a reservation price. Based on the Weber-Fechner law, the following models were assumed to broadly reflect how the level of the shopper's reference price and reservation price could be influenced by the causal factors when the premium brand was discounted in order to upgrade consumers.

Representing Model 1 (reference price) in equation form we have:

$p - \Delta p_1 = f(p) + f(p_1) + f(X_{SP}) + f(X_{SC}) + B_1$ where:

p: actual original price of the premium brand or magnitude of the stimulus (Weber-Fechner's law)

p_1: perceived original price (estimated price) of current brand

Δp_1: extent of price drop below which the shopper will not find the price cut attractive

$p - \Delta p_1$: reference price or the magnitude of response as per Weber-Fechner's law for the shopper to find the discounted premium brand attractive

X_{SP}: shopping pattern of the shopper

X_{SC}: shopper characteristic

B_1: constant of integration

Similarly the model representing the effect of the causal variables on reservation price (Model 2) depicted in equation form, is as follows:

$p - \Delta p_2 = f(p) + f(p - \Delta p_1) + f(X_{SP}) + f(X_{SC}) + B_2$ where:

Δp_2 : extent of price drop below which the shopper will not give a 'will buy' response.

$p - \Delta p_2$: reservation price or magnitude of response as per Weber-Fechner's law for the shopper to purchase the discounted premium brand

B_2 : constant of integration

The two null hypotheses are as follows:

H_0: *there is no correlation between reference price $(p - \Delta p_1)$ and the perceived original price 'p_1' of the current brand and other causal variables, X_{SP} and X_{SC}.*

H_0': *there is no correlation between reservation price $(p - \Delta p_2)$ and reference price $(p - \Delta p_1)$ and other causal variables, X_{SP} and X_{SC}.*

The actual original price of the premium brand (p) was not considered in the hypothesis because it would appear as part of the constant term in the estimated equation and not as a qualifying variable. The alternative hypotheses are as follows:

H: *there is a correlation between reference price $(p - \Delta p_1)$ and the perceived original price 'p_1' of the current brand and other causal variables, X_{SP} and X_{SC}.*

H': *there is a correlation between reservation price $(p - \Delta p_2)$ and reference price $(p - \Delta p_1)$ and other causal variables, X_{SP} and X_{SC}.*

Data Analysis and Results of the Influence on Reference Price

The multiple regression methods of *forward selection*, *backward elimination* and *stepwise selection* were applied to the cross sectional data collected and those variables that are statistically

7

significant were identified. These variables were then analysed to explain their influence in the equation on the dependent variable.

Using the F test, all the three multi-regression models identified the same six significant variables with p-values < 0.05 [1] from the list of 28 variables. Emerging from the multi-regression techniques were the following statistically significant variables and their attached coefficients together with the interceptor which defined the following estimated equation (Model 1).

1. Estimated price (variable Relestpr), indicating shopper's *recall* of price paid for their current brand, i.e. 'p'- the perceived original price of the current brand

2. Dspecial (dummy variable) suggesting that respondents last purchased this product on a price special and when present (i.e.=1) is indicative of a shopper being "*deal prone*". This variable is a 'shopping pattern' and belongs to the set of X_{sp}.

3. Dnormsup (dummy variable) suggesting that respondents last purchased the product from a store where they normally did their shopping. It is, when present (i.e.=1), indicative of a *store loyal* shopper. This variable is a 'shopping pattern' and belongs to the set of X_{sp}.

4. Dfreqpa (dummy variable) suggesting respondents who frequently purchased this product. This variable when present (i.e. =1), is indicative of a shopper who frequently purchased the item two or more times a week. This variable also reflects a 'shopping pattern' and belongs to the set of X_{sp}.

5. Adults - indicating the number of adult members in the respondent's household. This is a continuous variable and belongs to the set of 'shopper's characteristics' i.e. X_{sc}.

6. Dasian (dummy variable) suggesting if present (i.e.=1), that the respondent's household speaks an Asian language. This is a 'shopper characteristic' and belongs to the set of X_{sc}.

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[1]**No. of adults in household (p-value =0.054) and Deal proneness (p-value = 0.054) were included in Models 1 and 2 respectively as their values only marginally exceeded p >0.05 i.e. the level which is often considered as "not statistically significant."**

The multiple regression techniques used to select the influencing variables for the equation are known to keep multicollinearity to the minimum and hence multicollinearity between the independent variables is not expected to affect the quality of the model.

Table-1: Descriptive statistics of dependent variable-Reference Price (RELATTPR)

Method of estimation = Ordinary Least Squares

Dependent variable: RELATTPR
Current sample: 1 to 145
Number of observations: 145

Mean of dep. var. = 1.03417
Std. dev. of dep. var. = .427998
Sum of squared residuals = 6.03946
Variance of residuals = .043764
Std. error of regression = .209199
R-squared = .771044
Adjusted R-squared = .761089
Ramsey's RESET2 = 47.7549 ** [.000]
Ramsey's RESET3 = 23.8451 ** [.000]
F (zero slopes) = 77.4560 ** [.000]

Variable	Coefficient	Error	t-statistic	p-value
Constant	.214772	.075871	2.83074	.005
Relative Estimated Price (RELESTPR)	.725303	.034788	20.8491	.000
Deal Prone Customer (DSPECIAL)	-.0797421	.038760	-2.05730	.042
Store Loyal Customer (DNORMSUP)	.1279351	.047832	2.67469	.008
Frequent Purchaser (DFREQPA)	.111776	.037713	2.96384	.004
No. of adults in household (ADULTS)	-.026177	.013458	-1.94510	.054
Asian background customer (DASIAN)	.118308	.041758	2.83320	.005

Model 1:

REFERENCE PRICE = 0.215 + 0.725 Relative Estimated Price - 0.07974 Deal Prone Customer +0.128 Shop Loyal Customer + 0.112 Frequent Purchaser - 0.02618 Number of Adults in Household + 0.118 Asian Background Customer

All tests of significance results were an outcome of two tailed 't' test. The R^2 for Model 1 is 0.761, which was high enough to suggest that there was a reasonably good fit between the estimated results and the observed data. Because of the high value of R^2, the movement of reference price was well explained by the six independent variables. Thus the alternative hypothesis was supported, namely,

H: there is a correlation between reference price $(p - \Delta p_1)$ and the perceived original price 'p_1' of the current brand and other causal variables X_{SP} and X_{SC}.

The Ramsey Reset tests applied to Model 1 indicated test statistic values that are significant (p-values are zero). These tests confirmed that there was no omission of a major influencing variable in the estimated model. The test also established that the model was correctly specified and that the overall fit of the estimated equation was significant. The null hypotheses was therefore rejected.

Taking reliance on the high F statistic (F = 77.4560) with p-value = 0 for Model 1 and the significant 't' scores for each of the variables included in the equation (Table 1), we could conclude that rejecting the null hypothesis overall was valid.

The normal distribution of the error term (residual) of the estimated Model 1 as indicated by Figure 1 and the diffused pattern of the scatter plots in Figures 2 and 3 suggest that the heteroskedastic characteristic of the error term in the equation predicting reference price is minimal.

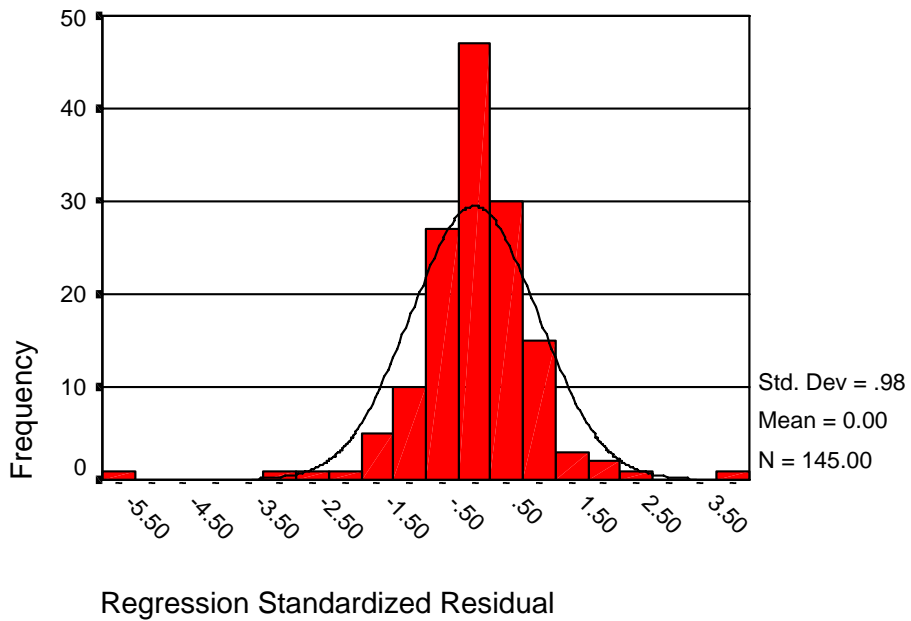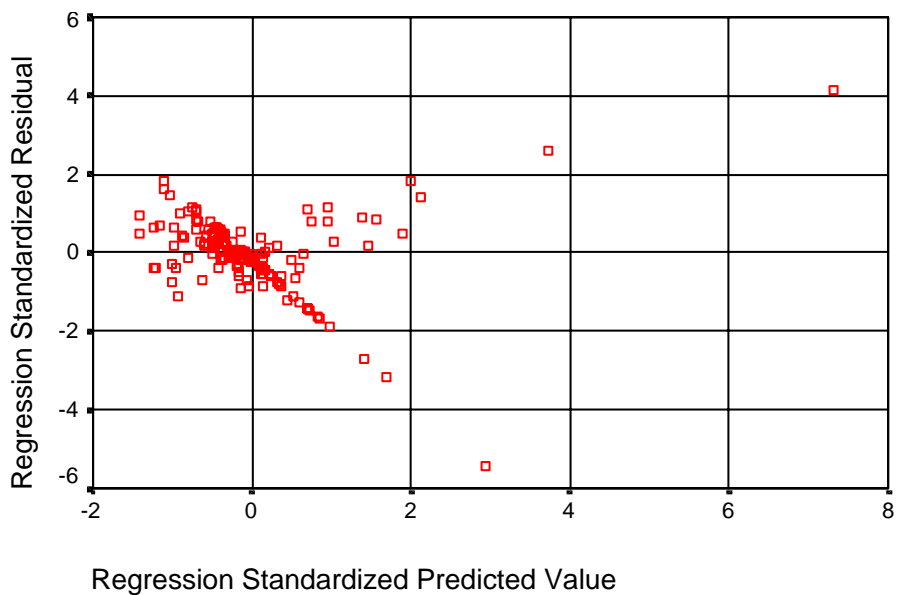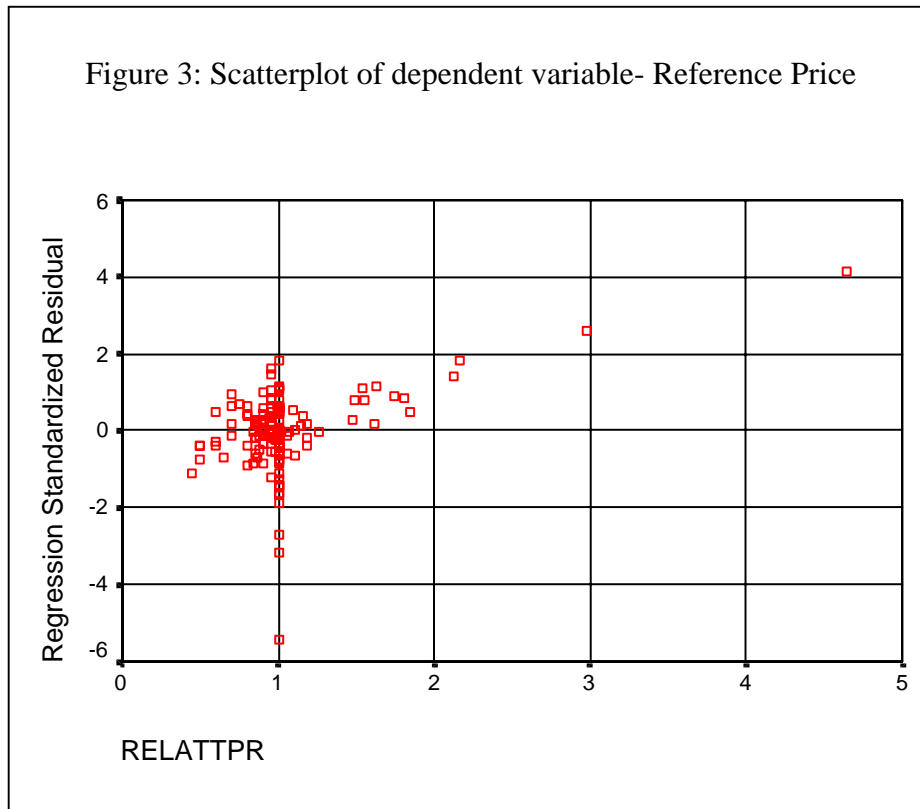Figure 1: Frequency distribution of Regression Standardised Residual for dependent variable-Reference Price

Std. Dev = .98
Mean = 0.00
N = 145.00

Regression Standardized Residual

Figure 2: Scatterplot of dependent variable- Reference Price

Regression Standardized Predicted Value

Figure 3: Scatterplot of dependent variable- Reference Price

Discussion of the Influence on Reference Price (Model 1)

The reference price was influenced by each of the variables included in Model 1. The subdued level of the shopper's reference price comes as a revelation, because the shopper is presumably aware that the propositioned brand is more expensive than their current brand. This outcome suggests that the shopper does not ascribe any superior quality to the higher priced brands. Therefore perception of greater quality for more expensive brands cannot be presumed among grocery shoppers buying less expensive brands.

Model 1 identified store loyalty and frequency of purchase as variables that transpire to bring the shopper's reference price closer to the original price of the premium brand. The reason in moving the reference price higher, one suspects is because the store loyal and/or the frequent purchaser (particularly if they are not mutually exclusive), saw the store as rewarding them with a special purchase opportunity.

12

While Model 1 suggests that store loyal and frequent purchasers positively moved their reference price in the direction of the regular price of the premium brand (by virtue of their positive coefficients), these variables demonstrated different results when each of them were controlled on separately. The characteristics of store loyal and frequent purchase now indicated the reference prices to be lower than the reference price of non-store loyal customers and non- frequent purchasers. Most shoppers are trained to expect price promotions to offer the item significantly below their regular price. There is no reason to believe that store loyal shoppers and frequent purchasers have any different expectations. If at all, their familiarity with the store and brand promotions should only drive them to consider a fair price as low as their reference price regardless of whether the brand on offer is premium. This group is therefore implicitly indifferent to quality. According to Model 1, it would seem that store loyal customers are more willing to take the risk in a familiar environment of adapting a brand they had not used before. If they did not, it could mean that they do not ascribe additional quality or benefits to the premium brand.

Two other factors identified in Model 1, namely, deal proneness and number of adult members in the household, pushed reference price lower and subscribed severally, (when controlled on individually) and collectively, to move the reference price away from the premium brand's regular price. It is understandable to expect deal proneness and households with greater number of adult members to be more price sensitive and therefore have lower reference prices. Deal prone customers do not use quality of the product as a reference term, but are simply conditioned to believe that discounted products are good value nonetheless. These customers actually hunt out price specials. Since deal prone customers are singularly driven by price and as per Krugman (12), these customers purchase with little evaluation of alternative brands and learn about their brands with little involvement. Therefore these type of customers, because of their low level of commitment, are not likely to exhibit a high level of brand loyalty. Deal prone customers'

continued patronage of the brand can only be achieved through sustained offer of competitive inducements.

One more factor influencing the reference price formation is the characteristic of coming from an Asian background. This group being relatively new to the country is relatively less informed and less resourced to do comparative shopping. Their credulity when considering an upgrade, to a large extent contributes to pushing up their reference price closer to the premium brand's original price.

Data Analysis and Results of the Influence on Reservation Price

To identify the relevant significant variables which influence the reservation price i.e. the price at which the respondent indicates a willingness to buy, the cross sectional data was treated in a similar way as was for reference price.

The multiple regression methods of *forward selection*, *backward elimination* and *stepwise selection* were again used to identify the predictor variables attaching themselves to reservation price:

Each of these 3 model selection methods identified exactly the same variables that have an influence on the dependant variables namely, reservation price. The following variables were found to be statistically significant together with their attached coefficients and interceptor in the estimated equation (Model 2) that defined the relationship between reservation price and the causal variables.

1. Reference price (variable Relattpr)

2. Dspecial (dummy variable), if present (i.e.=1) suggests that the shopper is deal prone. This variable reflects a shopping pattern and belongs to the set $X_{sp.}$

3. Dausborn (dummy variable), if present (i.e.=1) suggests that the shopper is born in Australia. This variable indicates shopper characteristic and belongs to the set of $X_{sc.}$

4. Deng (dummy variable), if present (i.e.=1) suggests that the shopper comes from a home where English is their first language. This variable also reflects the shopper's characteristic and belongs to the set of $X_{sc.}$

Since the multiple regression techniques used to select the influencing variables for the equation are known to keep multicollinearity to the minimum, multicollinearity between the independent variables in Model 2 are not expected to affect the estimation quality of the model.

Table 2: Descriptive statistics for dependent variable-Reservation Price (RELBUYPR)

Method of estimation = Ordinary Least Squares

Dependent variable: RELBUYPR
Current sample: 1 to 145
Number of observations: 145

Mean of dep. var. = 1.02150
Std. dev. of dep. var. = .434053
Sum of squared residuals = .411335
Variance of residuals = .293811E-02
Std. error of regression = .054204
R-squared = .984838
Adjusted R-squared = .984405
F (zero slopes) = 2273.45 ** [.000]

Variable	Coefficient	Error	t-statistic	p-value
Constant	-.013824	.014541	-.950676	.343
Reference Price (RELATTPR)	1.00384	.010749	93.389152	.000
Deal prone customer (DSPECIAL)	-.019624	.010080	-1.94687	.054
English spoken at home (DENG)	-21.5627	.995329E-02	-2.15627	.033
Australian born (DAUSBORN)	.022334	.010097	2.21193	.029

15

Model 2:

Reservation Price = -0.01382 +1.004 Reference Price – 0.01962 Deal Prone Customer – 0.02146 English Spoken at Home + 0.02233 Australian Born

R^2 for the equation (Model 2) was around 0.984 (Table 2) , which suggests that there is a good fit between the estimated values and the observed values. Because of the high value of R^2, the movement of reservation price was well explained by the four independent variables. Thus the alternative hypotheses was supported namely,

H': there is a correlation between reservation price (p - Δp_2) and reference price

(p - Δp_1) and other causal variables X_{SP} and X_{SC}.

Taking reliance on the high F statistic (F =2273.45) with p-value = 0 for Model 2 and the significant 't' scores for each of the variables included in the equation (Table 2), we can conclude that rejecting the null hypothesis overall was valid.

We note from Figure 4 that the error term of the estimated Model 2 is normally distributed. Also from Figures 5 and 6 we observe that the pattern of the residuals is diffused, suggesting that the heteroskedastic characteristic of the error term in the model predicting reservation price is minimal.

Figure 4: Frequency Distribution of Regression Standardised
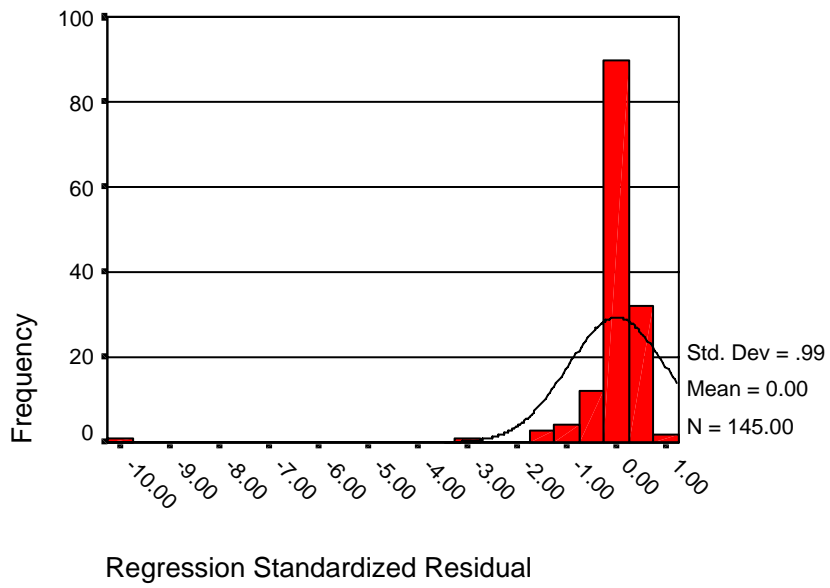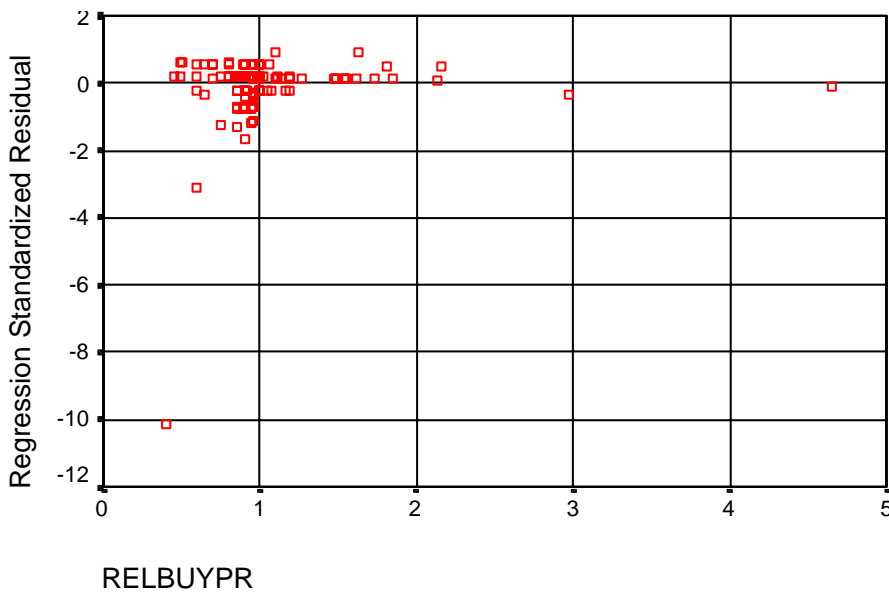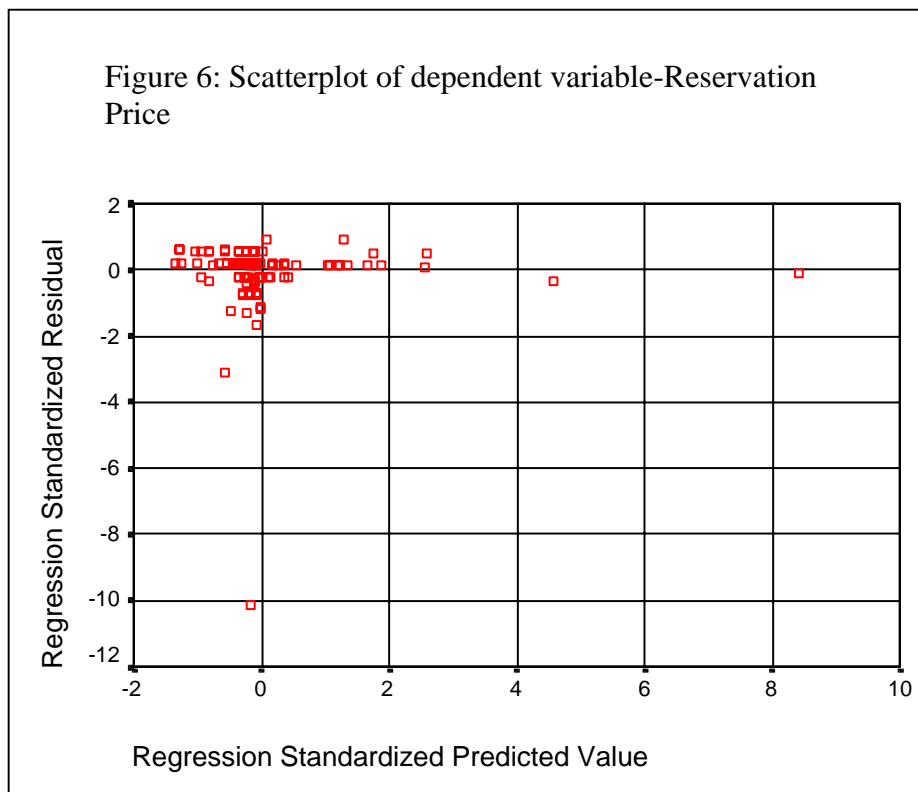Residual for dependent variable-Reservation price

Std. Dev = .99
Mean = 0.00
N = 145.00

Regression Standardized Residual

Figure 5: Scatterplot of dependent variable- Reservation
Price

RELBUYPR

Figure 6: Scatterplot of dependent variable-Reservation Price

Discussion of the Influence on Reservation Price (Model 2)

The reservation price moves away from the premium brand's regular price and searches for the lowest possible level. Deal proneness affected the reservation price in the same way albeit with a different intensity, as it affected the reference price, by pushing the reservation price down. The effect of deal proneness on reservation price was similar in the Model 2 as when this factor was controlled on individually in Model 1.

The reservation price was also influenced by the factors Australian born and English spoken at home. The Australian born factor, by virtue of its positive coefficient, and in conjunction with other variables increased the reservation price. However controlling on the Australian born factor, we got an outcome that the Australian born shoppers, being trained to expect a significant drop in price during price offers, sought a reservation price lower than the price they paid for their current less expensive brand. That the brand being propositioned is ordinarily a premium brand, did not

seem to matter to the Australian born shopper when perceiving fair value. Brand reputation therefore seemed to be disregarded by this group.

English spoken at home subscribed to a downward push to the level of reservation price. Even when this factor was controlled on, a similar indication was evidenced. This group appeared to be more price sensitive and no immediate reason can be ascribed for this characteristic. Literature in this area is also conspicuously absent. This research investigation was carried out in a university campus where significant number of respondents are of recent ethnic extraction. Among these were a proportion who claimed English as their first language. It can only be conjectured that this group, because of their felicity with English, had greater exposure at a cognitive level to price promotion advertisements and therefore had greater expectations of the price offer. It is possible that English speaking household shoppers do not equate the premium brand with quality and are not happy to go any distance beyond the price of their current brand to adopt the premium brand on offer.

Limitations of Study

The research suffers from the quality of the composition of the sample. By virtue of consisting of student shoppers alone, the sample was not sufficiently heterogeneous. The limited heterogeneity in respondents' demographic characteristics could have affected both the nature and the extent of the predictor variables attaching themselves to the reference price and the reservation price especially since there were no financial consequences for the respondents participating in the investigation, which would not be the case in a real world shopping situation. Also it is possible that the student respondents, while doing regular grocery shopping, were not the "principal household grocery shopper." If shopping for themselves these student respondents could be severely constrained financially and currently buy only economy brands. Any attempt to upgrade

this type of shopper to a more premium brand will succeed only if the price drop brings the price of the higher strata brand to the same level as their regular purchase. This investigation however did not separate respondents who shopped for themselves and for their households and cannot ascribe conclusively that because of the high salience of this type of respondent in the sample the reference price in combination with other variables is about equal to the estimated price. This type of student shopper would also, in their concern for the lowest price they can afford, be likely to have a reference price and reservation price that are close.

Conclusion

This research study conclusively provides evidence of contextual variables which impact on the shopper's response to price reductions and therefore on their levels of reference price and reservation price. It is interesting to note that the influencing variables not only influence the reference and reservation prices to different extents, but also that not all the variables pull the price levels in the same direction. While encouraging existing shoppers to switch to more expensive brands, retailers would therefore require to discount brands differently depending on the shopper groups being focused on. They would also need to apply a different level of merchandising support to each group. Retail management could use these findings as guidelines in their attempts to upgrade customers to more expensive merchandise and to use this information to better lever price promotion expenditure. Directing the appropriate level of discounted prices to relevant shoppers of a particular profile, would not only help retailers contain their cost, look forward to better future margins, but also help them make a better estimate of sales outcomes. Future research experiments on shopper response to changing store cues would do well \to consider use of a similar simulation investigation instrument which is able to faithfully capture spontaneous reactions rather than depend on suspected rationalised or recalled answers.

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