“Is reference price a fair price or an expected price?”

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Is reference price a fair price or an expected price?

Abstract

There is general agreement that reference price moderates consumer price response. This study primarily explores the meaning of reference price to consumers. Reference prices under alternate definitions are elicited from respondents for multiple shopping scenarios in an experimental setting. The influence of past and competitive prices on reference price formation is also analyzed using linear regression. The meaning consumers attach to reference price is inferred by analyzing choices based on each definition using logistic regression. The results suggest that consumers may better understand reference price as a fair price rather than as an expected price while making a purchase decision.

Keywords: reference price, price perception, experiment.

Introduction

Several theories such as Adaptation Level theory (Helson, 1964), Prospect theory (Kahnemann & Tversky, 1979), Mental Accounting (Thaler, 1985), or Price-Tier theory (Blattberg & Wisnieswski, 1989) suggest the existence of reference prices. A reference price is a price standard used by consumers to evaluate market prices. The role of reference prices has been analyzed by many researchers (e.g., Biswas & Blair, 1991; Liechtenstein & Bearden, 1989; Putler, 1992; Urbany & Dickson, 1991). Several ways to operationalize them have also been suggested in the literature (Klein and Ogelthorpe, 1987; Winer, 1988). There is now general agreement and sufficient empirical consensus that reference prices exist and that they moderate consumer response to price (Kalyanram & Winer, 1995).

However, there is no similar accord on what reference price may *mean* to consumers at the time of the purchase decision. Is the reference price what the consumer *expects* to find or is it one s/he deems *fair* or equitable? A price judged *unfair* has clearer implications for likely consumer response (i.e., non-purchase) than a price that is merely *unexpected* (e.g., Huppert et al., 1978; Boyd & Bhat, 1998; Campbell, 1999). We are also somewhat unclear about *how* consumers *form* reference prices (Yadav & Seiders, 1998). If firms can identify the major variables in the reference price formation process, they may have a means to influence reference prices and affect consumer response to prices. Another issue that has not been sufficiently explored is how consumers *use* reference prices. Do they have a single reference price or several? Do they make a single price comparison or multiple comparisons? If consumers make multiple comparisons, firms may have multiple ways to influence choice. Thus, there is a strong need to understand how consumers interpret, form and use reference prices.

We propose, in this study, that a "fair" price interpretation may have as much merit as the "expected" price interpretation since it is intuitively appealing, theoretically grounded and has clearer behavioral implication. Moreover, unlike earlier empirical studies which inferred reference prices, we elicit (and directly measure) reference prices under the two meanings, i.e., as "fair" price and "expected" price, and compare their ability to predict outcomes of choice scenarios presented to respondents.

Most theories imply that reference prices are formed over time and across brands. Hence they suggest that both past prices and current, competitive prices may underlie the reference price formation process. While early studies operationalized reference price exclusively as a function of past prices, some later studies attempt to incorporate both streams of prices in modeling reference price (Mayhew & Winer, 1992; Rajendran & Tellis, 1994; Mazumdar & Papatla, 2000). In this study, we examine the role of both types of prices in the reference price formation process.

In sum, we examine two likely consumer interpretations of reference price, obtain direct measures on them and evaluate their power to explain choices made by respondents. We also evaluate the relative impact of past and competitive prices on reference price formation. Our approach is primarily experimental. However, we use an informal survey of shoppers and post-treatment responses of subjects to partially validate the findings.

First, we present key definitions and operationalizations used in this paper. Next, we delineate our hypotheses. That is followed by a section describing the method. We then present our results and conclude with a discussion.

1. Definitions and measures

This paper uses several reference price terms that have been used differently in different papers. To clarify subsequent discussion we define each of these terms below.

Reference price ("**REFPRI**") is the price standard used by consumers to judge prices. This

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term has been interpreted frequently in past empirical studies as an "expected" price and measured as a function of past prices.

Expected price is the price a consumer expects to find for a good on a shopping occasion. We operationalize it as the "predicted" price for the brand in question in the shopping environment described.

Fair price is the price of a good a consumer finds appropriate, just or equitable. We operationalize it as an appropriate price, i.e., the brand's price such that it is neither deemed high nor low.

Reference price components are constituents of reference prices that may exist. Past research indicates that reference price has two components: a contextual and a temporal component (sometimes labelled as "external" and "internal" reference prices respectively).

Contextual component ("**CONT**") is the reference price component that is derived by a consumer from the shopping context. Many studies suggest the context has an important influence on the reference price (e.g., Janiszewski & Lichtenstein, 1999; Adaval & Monroe, 2002). This component has been measured as shelf price or as a function of competitive prices (Mayhew & Winer, 1992; Rajendran & Tellis, 1994; Mazumdar & Papatla, 1995, 2000). We operationalize it in this study as the average price of competing brands available in the store.

Temporal component ("**TIME**") is the reference price component that is derived from past purchases of the consumer. Usually, it is measured as a function of past purchase prices paid by the consumer. We operationalize it in this study as the average of the consumer's recent purchase prices.

2. Theory and hypotheses

As far as we are aware, no previous empirical study examines the issue of how reference price is interpreted by consumers or what it means to them. In these studies reference price has been assumed to be an "expected" price and inferred from observed prices. However, experimental studies dealing with reference prices suggest that reference prices are sensitive to extreme prices and observed price sequence (Della Bitta & Monroe, 1974), competitive prices (Jacobson & Obermiller, 1990), external reference prices (Lichtenstein & Bearden, 1989) and can be estimated from market prices (Urbany & Dickson, 1991).

The present study looks at the issue of what reference price may *mean* to consumers (i.e., expected price or fair price). It looks at the relative contribution of the two streams of observed prices, i.e., past prices of the brand and the current prices of other brands, in the reference price formation process and at the time of purchase. We propose two sets of hypotheses. Our *primary* hypotheses pertain to the meaning of reference price to consumers, and to the way the consumers form and use reference prices. Our *secondary* hypotheses relate to the influence on reference prices of the other contextual variables used in the study such as quality, store type and store promotion.

2.1. Primary hypotheses. *2.1.1. Reference price meaning.* Empirical studies have, implicitly or explicitly, defined reference price as an expected price, based primarily on Adaptation Level theory (Helson, 1964). However, other theories suggest that an alternative definition of reference price has merit.

Among various interpretations of reference price is the notion that it is a fair (i.e., "just", "reasonable", "appropriate", or "equitable") price (Nagle and Holden, 1995, p. 302; Winer, 1988). Many theories (Social Judgement theory, Prospect theory, Mental Accounting and Price-Tier theory in particular) suggest that reference prices are dependent on the context and may be construed as appropriate or fair prices. Social Judgement theory suggests that the latitude of acceptance (i.e., the range of acceptable prices) will determine if a new price is "assimilated" (i.e., accepted) or "contrasted" (i.e., rejected). Prospect theory and Mental Accounting suggest that the evaluation of a price as appropriate depends on the "frame" (i.e., orientation or point of view) provided by the context. Price-Tier theory suggests that the judgement of an item's price as high or low depends on prices that are appropriate for the brand "tier" the item competes in (i.e., national brands, private labels or generics). Further, there is a vast and growing literature on what constitutes a fair price, including the *fairness* of pricing, that clearly suggests consumers' willingness to buy, and level of satisfaction, are influenced by notions of price fairness (Maxwell, 2002; Xia et al., 2004).

Thus, there are theoretical grounds to argue that reference price may be interpreted as a fair price by consumers and not necessarily as an expected price as empirical studies have done. Maxwell (2002), for example, states that when the actual price is the same as the reference price, consumers are expected to judge the price to be fair. Moreover, prima facie, fair price does not appear to be the same as expected price. So we would expect that consumers would be able to differentiate between the two (i.e., between a price they predict and a price they deem appropriate). However, if consumers do not appear to make the distinction between "expected" and "fair" price, the issue of reference price meaning may not be very important to marketers. Therefore, our first hypothesis relates to the difference between the two definitions:

H1: Consumers perceive "fair" price as different from "expected" price. So, the elicited reference prices under the two definitions will be different.

2.1.2. Reference price formation. Reference price formation is the process by which reference prices are developed by consumers. We examine this issue indirectly in this study. We focus on the various influences and their relative impact on elicited reference prices. In addition to the two streams of observed prices (captured by the reference price components), we anticipate that quality levels, type of store and store promotion conditions will influence reference prices.

Since "how the current price compares to prices previously encountered for the product" is one of the ways consumers determine fairness in pricing (Nagle and Holden, 1995, p. 91), historical prices may also influence the reference price formation process when it is defined as "fair" price. However, there is a strong case for the role of the context. Thaler (1985) defines reference price as a "fair" price and visualizes it as primarily being useful in evaluating a transaction, i.e., judging the merits of a deal. Further, he argues that fair prices are very dependent on cost and the purchase context. For frequently purchased goods, this purchase context includes competitive store prices. Even Nagle and Holden (1995, pp. 91-92) suggest that fair price perceptions are influenced by "prices paid for similar products or in similar purchase situations" and that customers "expect to pay less in some purchase locations than others". Other authors have endorsed this view as well (Maxwell, 2002; Xia et al., 2004):

H2: "Fair" price is relatively more influenced by contextual prices (i.e., current, competitive prices) than by past prices.

Likewise, current prices of other brands may help in predicting a brand's price (as suggested by Jacobson & Obermiller, 1989). When a consumer makes a comparison of a brand price against prices of other brands in the store, it implies that the consumer "extracts" a summary comparison price measure from the competitive prices which may be likened to an "expected" price for the brand. This type of price expectation is compatible with what Mazumdar & Monroe (1990) call incidental learning. Incidental learning takes place in low involvement situations where consumers over time develop some awareness of relative prices of brands. When coupled with information on prices of competitive brands, this weak knowledge of relative prices may help to predict the price of a brand. Price information not consciously remembered may still influence reference prices (Monroe & Lee, 1999).

Nevertheless, consumers are more likely to emphasize past purchase prices in the formation of "predicted" or "expected" prices. Mazumdar & Monroe (1990) refer to this method of developing price expectations as intentional learning. Intentional learning is purposive and leads directly to knowledge of past prices of specific brands making it possible to predict prices of brands. Past *purchase* prices, of frequently purchased goods in particular, are more likely to be remembered and used to predict prices of brands in this manner. As mentioned before, most empirical studies have defined reference price as "expected" price and have measured it as a function of past prices. Our next hypothesis reflects this view of price expectations:

H3: "Expected" price depends relatively more on past purchase prices than on current competitive prices.

2.1.3. Impact of reference price definition on consumer choice. Consumer choice is the decision by the consumer to buy or not a particular brand in a given purchase situation. We examine some choice situations in this study to identify the major influences on consumer choice. In addition to reference price (elicited from consumers), quality levels, store types and store promotional conditions are expected to influence the decision.

Consumer choices appear to depend upon acquisitional "utility" or "value" and transactional "utility" or "value" (Thaler, 1985; Monroe, 1990, p. 74). Acquisition value or utility is the extent to which the current price of the brand is below the corresponding reservation price. It is akin to consumer surplus, and is an indicator of whether a purchase will be made or, whether a brand even belongs in a consumer's consideration set.

Transactional utility or value is the extent to which the actual price is below a price standard (i.e., reference price). It measures the attractiveness of the offer. In other words, transactional utility is concerned with the evaluation of the "deal" and therefore addresses the issue of which brand a consumer should buy. Thaler (1985) states that the price standard is a fair price derived from cost considerations. Intuitively, it does seem more probable that consumers would compare a brand's price to a price they consider fair or reasonable than to one they expect or deem likely. For frequently purchased goods in relatively stable environments, the difference between fair and expected prices may be narrow. Nevertheless, consumers do appear to be increasingly concerned with fair prices and good value. It is, therefore, likely that their choice behavior is more influenced by fair prices than by expected prices:

H4: Reference price defined as "fair" price predicts consumer choice better than when it is defined as "expected" price.

2.1.4. Relative impact of contextual comparison. That multiple reference prices may exist simultaneously has been recognized in the literature for a long time. Monroe (1973) points out that extreme prices in a range as well as the average

price may serve to anchor judgments, which has been examined by other researchers (e.g., Biswas & Blair, 1991; Lynch, Chakravarty & Mitra, 1991). More generally, Kahnemann (1992) suggests that most decisions involve multiple reference points and that reference points influence both decision outcomes and evaluation of fairness.

Empirical studies have also examined the existence and relative importance of reference prices based on past purchase prices, i.e., the temporal component, and competitive prices, i.e., the contextual component (Mayhew & Winer, 1992; Rajendran & Tellis, 1994; Mazumdar & Papatla, 1995, 2000). **Contextual comparison [CONT-Price]** is the difference between the contextual component and the current price of the brand. **Temporal comparison [TIME-Price]** is the difference between the temporal component and the current price of the brand. These studies suggest, at least for the frequently purchased branded goods, that the contextual comparison is the stronger and more consistent influence on consumer choices. Moreover, de Chernatony & Knox (1992) state that consumers have restricted abilities to recall brand prices, suggesting that temporal comparisons may be difficult. They also say that once a reference price is available, consumers appear to have a much better feel for brand prices, i.e., they are better able to judge them. Contextual prices may be more available and, hence, more influential in brand choice:

H5: The comparison of current price with contextual prices (contextual comparison) is more influential in brand choice than comparison with past prices (temporal comparison).

2.2. Secondary hypotheses. Research suggests that three other variables, quality, store and store promotion, play an important role in price perception and brand choice (Grewal et al., 1998). These variables may also influence the formation of reference prices. We next discuss how these variables may affect the meaning consumers attach to their price standard.

2.2.1. Quality. Empirical studies have modeled reference price as brand specific (Winer, 1986; Lattin & Bucklin, 1989; Mayhew & Winer, 1992; Rajendran & Tellis, 1994), wholly or in part due to differences in historical prices. While a brand connotes many things to consumers, a key aspect that it communicates is the quality of the brand. As price-quality studies attest (Rao & Monroe, 1989), there is generally a positive price-perceived quality relationship. We would therefore expect consumers to develop a higher reference price for the "brand" with the higher quality rating:

H6: The average reference price reported by subjects for brand A would be higher than that reported for brand B, i.e., "quality" will have a positive impact on reference price.

2.2.2. Store. Price perception is influenced by store perception (e.g., Dodds, 1991; Rao & Monroe, 1989). A price that is deemed high for one store may seem normal for another. Personal care products tend to cost more at drug stores than they do at discount stores – a random check of prices, for the shampoo category, of the same brand/sizes across drug and discount stores in the area, over a two week period, confirmed this observation. We expect that subjects are aware of, and sensitive to, this price difference.

H7: The average reference price reported by subjects for the "drug" store would be higher than that reported for the "discount" store, i.e., "store" will have a positive impact on reference price.

2.2.3. Store promotion. The impact of store promotion on brand choice and price perception is well documented (e.g., Blattberg & Wisniewski, 1989; Lattin & Bucklin, 1989; Gupta, 1988). Many consumers appear to rely on store promotions as signals of "deals" or price cuts (Inman et al., 1990). We expect, therefore, that subjects would adjust their reference prices to reflect the store promotional status of the brand:

H8: The average reference price reported by subjects for the "store promotion" condition would be lower than that reported for the "no store promotion" condition, i.e., "promotion" will have a negative impact on reference price.

2.2.4. Differential impact of context variables. We argue that fair price is more influenced by the context (H2). Since quality, store and store promotion condition represent the purchase context, we expect these variables to be more influential in reference price formation when reference price is defined as fair price rather than as expected price.

Similarly, we contend in H4 above that fair price predicts choice better than expected price. Hence, quality, store and store promotion may also be more influential in brand choice when the reference price is defined as fair price:

H9: Quality, store and promotion will have relatively greater impact on reference price formation when it is defined as fair price rather than as expected price.
H10: Quality, store and promotion will have a relatively greater impact on brand choice when reference price is defined as fair price rather than as expected price.

3. Empirical tests

An informal survey of shopping behavior in stores was conducted before the main experiment. Both the pilot study and the experiment are briefly described below.

3.1. Pilot study: informal survey. Twenty-two students were assigned (on a voluntary basis) to observe two shoppers each and report on actual shopping behavior in supermarkets. They were instructed to unobtrusively watch the entire process until the shopper had selected and placed an item in the shopping cart. The shopper was then interviewed briefly to ascertain the major reason(s) for purchase of the particular item, whether s/he felt price was an important consideration and, among those that felt price was important, the nature of price comparisons, if made.

Forty four specific purchases were observed by students in supermarkets (Table 1, see Appendix). About a third (14) of the respondents said that price was the major reason for purchase. When asked specifically if price was important, half (22) of the respondents said "yes" and four more said price was "somewhat important". When the twenty-six respondents who believed price was at least somewhat important were queried on the nature of price comparison(s) made, an overwhelming majority (18) mentioned that they compared the price of a brand only with current prices of competitive brands while only a small number (4) indicated that they compared it only with past prices of the brand. Two respondents said they use both kinds of comparisons and two more said they did not use either comparison.

The responses of shoppers suggest that the assumption in some recent empirical studies that consumers make price comparisons over time and across brands is legitimate. Moreover, consistent with some empirical studies (Jacobson & Obermiller, 1990; Mayhew & Winer, 1992; Rajendran & Tellis, 1994) consumers seem to consider current, competitive prices more than past prices.

Another interesting finding of the survey relates to how consumers choose among a set of "comparable" brands. Many consumers talk of only buying within sets of brands. This competitive set is defined by quality levels for some products and by price levels for others. When prices are similar, many consumers choose higher quality (perceived), i.e., name brands. When quality is perceived to be similar, many consumers choose the lowest priced brand.

Both of these choice strategies are reflective of value orientation among consumers. Value is a function of perceived quality and price; what one 'gets' for what one 'gives' (Zeithaml, 1988). Hence, there is indirect support for the contention that consumers use a reference price associated with value, i.e., "fair" price, in making brand choices.

3.2. Main study: experiment. *3.2.1. Method.* Eighty-five undergraduate business students were assigned randomly to one of two reference price definition 'conditions': "fair" price or "expected" price. Fair price for the brand was explained in the instrument as "a price above which it would be too high and below which it would be a good deal". Expected price, likewise, was explained as "your estimate of the likely price of the brand". Reference price definition was the only between subjects factor. All other variables were within subjects manipulations.

Each respondent faced a full set of thirty two stimuli developed as follows:

- 2 'brands' of shampoo ('high'/'medium' levels of quality) X;
- 2 'store' types ('discount'/'drug') X;
- 2 'store promotion' conditions ('yes'/'no') X;
- 2 levels of 'average past purchase price' ('high'/'low') X;
- 2 levels of 'average price of other brands in store' ('high'/'low').

Shampoo was chosen as the product category since student familiarity with the category was desirable. Each of the non-price variables used in the study, i.e., brand/quality level, store and store promotion condition, has been used extensively in the literature on models of reference price. The two summary price variables are included to reflect the two streams of observed price information believed to influence reference price formation.

The quality levels of brands were based on a *Consumer reports*' 'quality index' of 90 for the high quality brand and 72 for the medium quality brand, which were clearly explained to subjects. Real brand names were not used. The brands were identified symbolically by different shapes for the bottles as well as the letter 'A' or 'B' placed on them. Both store types as well as store promotion conditions, likewise, were clearly explained in the instructions and communicated pictorially in the stimuli. Again, real store names were not used. Rather, stores were pictorially communicated through stylized variations of the letter "W" (so as to resemble the first letters in Walmart and Walgreen's) and stated as discount and drug store respectively. Store promotion condition was communicated by a picture of a box containing a shelf tag with "SPECIAL" printed on it. In the "no store promotion" condition there was no shelf tag. Again, the written instructions clearly communicated what the pictures meant.

The available price information was also clarified in the instructions and was provided in clearly labelled boxes in the stimuli. The average past purchase prices for the high quality brand were $3.40 and $3.10 in the 'high' and 'low' past purchase price conditions respectively. The average past purchase prices for the medium quality brand were $2.40 and $1.90 for the 'high' and 'low' past purchase price conditions

respectively. These corresponded approximately to the prices of some popular shampoos in the area. The 'average price of other brands in the store' was either \$0.30 higher or \$0.30 lower than the corresponding average past purchase price. For example, for the medium quality brand in the 'high' past purchase price condition, the corresponding pair of 'high' and 'low' average price of other brands in store would be \$2.70 and \$2.10 respectively.

The order of presentation of stimuli to respondents was randomized. The respondents were told to treat each stimulus/scenario as a separate shopping situation and to respond accordingly with their estimates of 'fair' price or 'expected' price, as the case may be. They were told that it was an individual exercise and that it was very important to understand the symbols describing the shopping situation. They were further told not to refer back to previous responses and to place their booklet face down when they were finished with them.

In order to examine the impact of reference price definition on brand choice, we also presented two choice situations to each subject, one for each of the two brands. Each of these situations referred to the scenario that the subject had just responded to and furnished the 'actual' price of the brand and asked if the subject would buy the brand in that situation. These questions were randomly inserted among the stimuli. The 'actual' prices used for the brands were the average of their respective past prices, i.e., \$3.25 for the high quality brand and \$2.15 for the medium quality brand.

After the respondents had completed their task, they were asked to comment on the task-relevancy of the information provided in the stimuli. In particular, they were asked to single out the most relevant and least relevant information. The results are summarized in Table 5 (see Appendix).

3.2.2. Analysis. We use multiple regression to analyze the impact of reference price definition on elicited reference prices. We also include the other independent variables (quality, store, promotion, and the two reference price components) as covariates in the model as shown in equation (1). Table 2 summarizes the results (see Appendix).

The regression model run was:

$$REFPRI = \beta_0 + \beta_1 TYPE + \beta_2 TIME + \beta_3 CONT + \beta_4 BRAND + \beta_5 STORE + \beta_6 PROMO + \varepsilon. \quad (1)$$

We examine the differential impact of independent variables on reference price formation by running separate regression models for each reference price definition (i.e., for each TYPE; fair price or expected price). Table 3 summarizes the results and compares the coefficients (see Appendix). We use regression (SAS GLM) rather than ANOVA because two of the independent variables (the contextual and temporal components) in the models are intervally scaled.

We use adjusted R^2 as a measure of model fit. We provide raw coefficients, standardized coefficients, *t*-values for individual coefficients and indicate if coefficients (or differences among them) are significant.

We use logistic regression (SAS LOGISTIC) to analyze the impact of reference price definition and the relative influence of other independent variables on brand choice (Table 4, see Appendix). We run separate regressions for each definition. McFadden (1974) first developed the multinomial logit for discrete choice models. There has been a number of applications of the technique in marketing, particularly since the seminal paper by Guadagni & Little (1983). In the present instance, we use the binary logit model rather than the multinomial logit model since respondents face only two alternatives in each choice situation, i.e., to buy or not the brand in question.

The probability that a consumer will choose to buy a brand on a particular occasion is modelled as a function of the utility s/he derives from the purchase. The utility derived from the purchase V_{ijkt} (where the subscripts *i*, *j*, *k* and *t* stand for consumer, brand, store and time respectively) is assumed to be linear in parameters as seen from the equations (2) and (3) that follow.

Consumers may utilize observed price information in two ways to evaluate the price of a brand (Rajendran and Tellis, 1994). First, they may compare the temporal and contextual components separately with the current price of the brand, i.e., they may make two types of price comparisons, temporal and contextual (2). Second, they may combine both components into a single reference price and then compare this with the brand's current price, i.e., they may make one overall price comparison (3). We have attempted to examine both types of situations in our analysis:

$$V_{ijkt} = \beta_1 (CONT_{jkt} - PRICE_{jkt}) + \beta_2 (TIME_{it} - PRICE_{jkt}) + \beta_3 BRAND_{it} + \beta_4 STORE_{it} + \beta_5 PROMO_{jkt} + \varepsilon_{ijkt}. \quad (2)$$

$$V_{ijkt} = \alpha_1 (REFPRI_{ijkt} - PRICE_{jkt}) + \alpha_2 BRAND_{it} + \alpha_3 STORE_{it} + \alpha_4 PROMO_{jkt} + \varepsilon_{ijkt}. \quad (3)$$

If the error term associated with the utility is assumed to follow a Gumbel distribution, we may represent the probability in the familiar logit form:

$$P(C = 1) = 1/[1 + e^{-Vijkt}]. \quad (4)$$

We use adjusted U^2 (i.e., representing 1-2 log-likelihood ratio) as a measure of model fit (Ben-Akiva and Lerman, 1985, p. 91). We also look at correct positive (sensitivity), correct negative (specificity) and correct overall predictions to

compare models. Again, we provide raw coefficients, standardized coefficients, 'chi^2' values for the coefficients and indicate if the coefficients (or the differences among them) are significant.

We expect that the coefficients for TYPE, BRAND, STORE and PROMO will be significant in equation (1), i.e., H1, H6, H7, and H8 will be supported. We expect the coefficient for PROMO to be negative (H8). In the case of TYPE (i.e., reference price definition), we do not have a directional hypothesis (H1). We expect the other coefficients to be positive (H6, H7).

When analyzing reference price formation, we expect the coefficient for the contextual component (CONT) to be significantly higher when reference price is defined as fair price rather than as expected price (H2). Conversely, we expect the coefficient for the temporal component (TIME) to be significantly higher when reference price is defined as expected price rather than as fair price. We expect that the coefficients for quality, store type and store promotion (BRAND, STORE and PROMO) will be larger in absolute terms when reference price is defined as fair price rather than as expected price (H9). Irrespective of whether equation (2) or (3) is used, we expect that defining reference price as fair price predicts choice better than when it is defined as expected price (H4). In other words, we expect higher U^2, sensitivity, specificity and correct overall predictions when reference price is defined as fair price. We also expect that the coefficient for the contextual comparison (CONT-PRICE) will be larger than the coefficient for the temporal comparison (TIME-PRICE), since the contextual comparison is envisaged to be more influential in brand choice (H5). Finally, we expect that the coefficients for quality, store and store promotion will be significantly larger when reference price is defined as fair price than when it is defined as expected price (H10).

4. Results

We first present our analysis of the impact of reference price definition and other covariates on the elicited reference prices. Next we examine the relative impact of the temporal and contextual components and the other covariates on the reference price formation. We follow with an analysis of the relative impact of reference price definition and the other covariates on brand choice. Finally, we briefly analyze comments on the relevance of information provided to respondents.

4.1. Impact of reference price definition on elicited reference prices. Table 2 (see Appendix) summarizes the results. All of the independent variables in the model are significant at $p < 0.05$ or better. Moreover, all of the coefficients carry the expected signs. This finding, together with the observed adjusted R^2 of 0.84, suggests that the model is reasonable. The small but significant impact of reference price definition clearly supports H1, i.e., that the elicited reference prices would be significantly different. The significant coefficients for quality, store and store promotion support hypotheses H6, H7 and H8, i.e., that quality and store type will have positive impact and promotion will have negative impact on elicited reference prices.

The relative sizes of the standardized coefficients suggest that the contextual component (average price of other brands) is the most important of the independent variables included in the model, followed by quality and the temporal component. Store promotion impacts reference price formation moderately.

4.2. Impact of components on reference price formation. We ran separate regressions for each reference price definition primarily to examine how the relative impact of the two sets of price information (i.e., the two reference price components) differed. The results are presented in Table 3 (see Appendix).

We find that irrespective of definition, expected or fair price, reference price is more influenced by contextual prices than by past prices. The finding supports H2, i.e., that contextual prices are more influential than temporal prices in fair price formation. However, it rejects H3, i.e., that temporal prices are more influential than contextual prices in expected price formation.

Moreover, the influence of contextual prices is greater when reference price is defined as expected price than when it is defined as fair price. Likewise, the impact of past prices seems to be greater when the definition is as fair price rather than as expected price. Hence, notions of fair price may have to do more with acquisition utility than transactional utility, contrary to Thaler's (1985) views. He envisions reference price (defined as fair price) to influence only transactional utility, i.e., the merits of the deal. Acquisition utility has to do with intrinsic worth. Perhaps fair price reflects, in part, a consumer's evaluation of the intrinsic worth of an offer.

Moreover, as several authors have pointed out, the notion of fairness includes more dimensions beyond price information and economic aspects (Maxwell, 2002; Xia et al., 2004). Among other variables in the model, quality and store promotion were significant but store was not. However, the differences between means were not significant for any of them. This finding rejects H9, i.e., that non-price contextual variables will have greater impact on reference price formation when reference price is defined as fair price. Perhaps, the impact of contextual variables like quality, store and store promotion on reference

price formation is not sensitive to reference price definition. A perusal of the standardized coefficients reveals that the rank order of relative impact of independent variables is invariant between the definitions; with contextual component, quality and temporal component dominating.

4.3. Impact of reference price definition on brand choice. We analyzed the impact of reference price definition on brand choice by examining the single overall price comparison model as well as the two price comparisons model. For the single comparison we use the difference between the elicited reference price ("expected" or "fair" price, as the case may be) and the furnished price of the brand as the independent variable in the model. For the two comparisons case, we enter the difference between each of the reference price components and the furnished price separately in the model. The dependent variable is whether or not the brand was bought on that occasion. Quality, store and store promotional condition are also included as explanatory variables in the model.

Table 4 (see Appendix) presents the results of our analysis. We find that, whether a single comparison is used or two comparisons are used, reference price defined as fair price explains consumer choice much better than when it is defined as expected price. Thus, H4 is strongly supported by the data. It also appears that a single overall price comparison may better represent the process than two comparisons.

We also find good support for H5, i.e., that the contextual comparison is more important than temporal comparison in brand choice. Irrespective of the reference price definition, the coefficient for the contextual comparison is larger than that for the temporal comparison. This appears to support findings from past empirical studies and our survey that most of the price conscious shoppers make comparisons with competitive prices. Further, only the contextual comparison is significant when both comparisons are included in the model, and it is significant only when the definition is fair price. Moreover, while coefficients for both comparisons are larger when the definition of reference price is fair price, the difference in the size of the coefficients is statistically significant at $p < 0.05$ only for the contextual comparison.

As far as the other variables are concerned, we notice that the differences in means for quality, store and store promotion are mostly significant and in the correct direction (i.e., more positive) as we go from "expected" price to "fair" price definitions. We expect that, other things being equal, higher quality, better store image and the presence of store promotion would positively impact brand choice. Our data provide some support for this notion, implied in H10, i.e., that the non-price context variables would be more influential on brand choice when reference price is defined as fair price.

4.4. Comments on relevance of information provided. Table 5 (see Appendix) summarizes the comments of respondents about the relevance of information provided to them for the task (i.e., in estimating the "expected" price or the "fair" price for each shopping situation). Under either reference price condition, the most relevant piece of information was reported to be the average of other brand prices. This observation supports the findings above that contextual prices are most influential in the reference price formation process. Again, mirroring the regression results, the relative importance of contextual prices over past prices appears to be higher when the reference price is construed as "predicted" or "expected" price than when it is interpreted as "fair" price.

Discussion and conclusion

This study provides evidence that consumers may better understand reference price as a fair price rather than as an expected price. It supports some theories underlying reference price which suggest an equitable price standard. It also suggests that the assumption made in some earlier studies that the reference price was an expected price may not be accurate.

This study highlights some important issues. First, the roles of past and contextual prices in the reference price formation process and at the time of purchase appear to be different. At the time of purchase, contextual prices appear to dominate while at the time of reference price formation, both types of prices are more in balance. The former is to be expected, given the salience of contextual prices at the time of purchase, and is indeed supported by prior empirical studies with frequently purchased branded goods (Mayhew & Winer, 1992; Rajendran & Tellis, 1994; Mazumdar & Papatla, 2000). The latter merely confirms our belief in the importance of the two streams of observed prices, and the need to include both in modelling reference price or choice.

Second, past prices appear to have more to do with judging "fairness" of current prices than we had envisaged. This finding suggests that past studies that *modeled* reference price as a function of past prices were not far off the mark, though they were probably inaccurate in defining reference price as an expected price. They may have been obtaining a reference price which meant "fair" price to the consumer and not "expected" price as they had imagined. Moreover, this finding also suggests that acquisition utility is not merely consumer surplus, i.e., the difference between the reservation price and the actual price. It may involve an evaluation based on a comparison of a brand's current price with a reference price component derived from its past

prices. Further, this study suggests that this reference price component may (at least in part) represent intrinsic worth to the consumer.

This study has examined the meaning consumers attach to reference prices and explored how they are formed. The findings of this experimental study provide food for thought and baseline results for future studies. Its most important contribution is to question the assumption of some previous studies that reference price is an expected price or that the reference price effect is merely "sticker shock". This study suggests that consumers evaluate prices based on "fairness" and that, in part, they derive their idea of a fair price from observed prices. Future studies may need to meaningfully operationalize reference price to incorporate what "fairness" means to consumers. As some authors have suggested, perception of fairness involves notions of economic and social acceptability, equity theory and distributive justice, observations as well as inferences (Maxwell, 2002; Xia et al., 2004).

The various pricing strategies available to managers have been well documented (Tellis, 1986). Managers may need to better appreciate that they may be able to influence consumer price response by varying prices relative to the past and to the competition. More importantly, they may need to understand that the perception of fairness in pricing is critical. They may address this issue through highlighting the value of the offering, better framing the offer, and being mindful of practices deemed unfair by consumers and already documented in marketing literature (e.g., Kahnemann, 1992; Ortmeyer, 1993, pp. 400-401).

For example, consumers deem a price increase as fair if it is due to cost pressures. They deem price increases related to increased demand as unfair. So, managers may need to frame price increases in the context of rising costs. Again, consumers deem as unfair price increases for "necessities" (an increase would be framed as a loss) than they are to "luxuries" (the increase would be framed as a reduction in gain). It would make sense for managers to load the price increases on to optional components which may be considered "luxuries" than on the basic product itself. The practice of high list prices also appears to be a sound practice. It helps to provide some discount to every segment (which will be coded as a gain) and avoids the necessity of charging a premium from some segments (coded as a loss and deemed unfair). They may also wish to better segment customers and tailor their offers to them in ways that reduce the perception of similarity among the offerings meant for different segments (Xia et al., 2004). In sum, business pricing strategies can be more effective by promoting reference prices that account for consumers' notions of fairness.

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Appendix

Table 1. Informal survey results (44 specific purchases observed)

A.	Major reason for purchase/choice	Brand/Quality	16
		Price	14
		Others (includes no specific reason)	14
B.	Is price important?	Yes	22
		Somewhat	4
		No	18
C.	What is price to be compared with? (Among those believing price to be, at least, somewhat important)	With past prices	4
		With current competitive prices	18
		Both	2
		Neither	2

Notes/Conclusions:

1. Price is an important choice variable.
2. There is some legitimacy to our belief that consumers make two types of price comparisons.
3. Consumers appear to rely more on competitive prices to evaluate brand prices, i.e., the contextual comparison is more important to them.

Table 2. Impact of reference price definition on elicited reference prices

Variables	Coefficient [*t*-values]
Reference price definition (TYPE) (fair vs. expected)	0.042* {0.064} [3.65]
Temporal component (TIME) (avg. past price)	0.391* {0.301} [11.68]
Contextual component (CONT) (avg. competitive price)	0.575* {0.498} [29.75]
Quality level (BRAND) (high vs. medium)	0.229* {0.349} [7.13]
Store type (STORE) (drug vs. discount)	0.020** {0.030} [1.71]
Store promotion (PROMO) (present vs. absent)	-0.113* {0.172} [-9.74]
Adjusted R^2	0.843
No. of observations	2,720

Note: * Significant at $p < 0.01$ or better; ** significant at $p < 0.05$ (one-tailed); {standardized coefficient}.

Table 3. Relative impact of components on reference price formation

Independent variables	Reference price definition	
	Expected price	Fair price
Temporal component (TIME)	0.348* {0.268} [7.61]	0.435* {0.336} [9.01]
	(significant at $p < 0.01$)	
Contextual component (CONT)	0.633* {0.547} [24.25]	0.513* {0.445} [18.10]
	(significant at $p < 0.001$)	
Quality level (BRAND)	0.208* {0.318} [4.72]	0.252* {0.384} [5.41]

Table 3 (cont.). Relative impact of components on reference price formation

	(not significant)	
Store type (STORE)	0.014 {0.021} [0.90]	0.026 {0.040} [1.52]
	(not significant)	
Store promotion (PROMO)	-0.114* {-0.174} [-7.23]	-0.112* {-0.170} [-6.59]
	(not significant)	
Adjusted R^2	0.85	0.84
No. of observations	1408	1312

Note: * Significant at p < 0.001 or better; [*t*-values]; (*t*-test of difference between means); {standardized coefficient}.

Table 4. Relative impact of reference price definition on brand choice

Alternative models/definitions of reference price	As a single comparison		As two comparisons	
Independent variables	Expected price	Fair price	Expected price	Fair price
Overall comparison (REFPRI-PRICE) [chi 2] (one-tailed test)	3.098* {0.624} [14.2] (p < 0.01)	9.213* {2.146} [12.2]	-	-
Temporal comparison (TIME-PRICE) [chi^2] (one-tailed test)	-		1.223 {0.139} [0.6] (not significant)	1.841 {0.209} [0.7]
Contextual comparison (CONT-PRICE) [chi^2] (one-tailed test)	-		1.623 {0.350} [3.58] (p < 0.01)	6.246* {1.354} [10.5]
BRAND [chi^2] (one-tailed test)	-0.715 {-0.198} [1.76] (p < 0.05)	0.504 {0.140} [0.36]	-0.134 {-0.037} [0.07] (p < 0.01)	2.044* {0.568} [4.93]
STORE [chi^2] (one-tailed test)	0.109 {0.029} [0.04] (not significant)	0.83 {0.228} [0.75]	-0.081 {-0.022} [0.03] (p < 0.05)	1.147 {0.318} [1.53]
PROMO [chi^2] (one-tailed test)	-0.876 {-0.239} [2.54] (p < 0.01)	1.959* {0.530} [4.63]	-1.256* {-0.343} [5.69] (p < 0.01)	0.751 {0.203} [0.78]
Sensitivity Specificity Correct (overall)	64.9% 82.0% 74.7%	72.0% 86.5% 80.6%	51.4% 74.0% 64.4%	68.0% 83.8% 77.4%
Adjusted U^2	0.23	0.55	0.17	0.53

Note: * Significant at p < 0.05 or better; (*t*-test of difference between means); {standardized coefficient}.

Table 5. Analysis of comments about relevance of information provided

Type of information provided	Response = "expected" price		Response = "fair" price	
	Most relevant	Least relevant	Most relevant	Least relevant
Average of other brand prices	14	2	11	2
Average of past purchase prices	6	10	11	10
Brand/quality	7	2	8	2
Store promotion	3	7	2	5
Type of store	4	13	5	16
No response	10	10	4	6
Total number of subjects	44	44	41	41

Note: The numbers in the table indicate the number of subjects mentioning a particular type of information as being most relevant or least relevant to the task.