

The Impact of Varying Amounts of More and Less Salient Product Information upon Consumer Willingness to Pay

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Abstract

The purpose of this paper is to empirically examine the impact of varying amounts of more and less salient product information on the amount of money consumers are willing to pay to buy a particular brand. In particular, we integrate Random Utility Theory (RUT) with the notion of missing information and hypothesise that if one fails to include all salient attributes in a choice study, estimates of willingness to pay may be biased. By integrating the framework of RUT with the concept of missing information and consumer choice, our research recognises correlations between attributes varied in choice experiments and the random utility component. The results of our choice experiments demonstrate that the amount of information presented impacts the amount consumers are willing to pay to choose particular brands. While researchers may never fully understand the choices consumer make, this research demonstrates that one can make systematic and incremental gains in understanding consumer choices associated with the amount and salience of information provided to consumers on which to base their choices.

Keywords: missing information, consumer willingness to pay, choice experiments

Introduction

The effects of missing information on consumer decisions is a topic of long standing interest as situations in which attribute information is missing abound in real life. For example, it is rarely possible for producers to provide all information about a product on a package and advertisers rarely can provide complete information about products in advertisements (Simmons and Lynch, 1991). Missing information refers to information about functional product attributes whose relative values are not revealed or known to consumers. To illustrate the concept of missing information, it is useful to consider Lancaster's multi-attribute utility theory. Multi-attribute utility theory allows products to be described by a number of attributes that describe products or brands (Lancaster, 1966). By considering the attributes that describe a product, consumers make overall evaluations/decisions based on judgements of individual attributes. However, attribute information is often "missing" or unavailable to consumers. Situations in which attribute information is missing are widespread in reality. Therefore, the missing information paradigm is a topic of practical interest and is the central co-ordinating theme of this research.

The Significance of Missing Information

Product or attribute information can be classified in two ways: 1) functional attributes, and 2) all other attributes (eg, perceptual characteristics). Ignoring the perceptual characteristics consumers may consider when making decisions; functional product attributes describe actual products and performances. Typically, the functional product attributes and their values provide the relative information on which consumers base their decisions. Functional product

attribute information often is displayed in advertisements and product packaging, but due to constraints like time, money and space, product information is often missing/incomplete to consumers. Studies of missing information suggest that missing product information impacts a consumer's evaluation of a product (e.g. Huber and McCann, 1982; Simmons and Lynch, 1991; Johnson and Levin, 1985; Ford and Smith, 1987); hence, a complete understanding of the effects of missing information on consumer choices is an important and significant area of research.

Two streams of literature focus on missing information. First, a number of studies focused on inference-formation processes in response to unknown attribute information. This literature suggests that consumers make inferences about unknown product attributes when faced with missing information or uncertainty (Huber and McCann, 1982; Johnson and Levin, 1985; Johnson, 1987; Ford and Smith, 1987). A second research stream proposes that consumers use decision rules or heuristics to aid decisions when faced with missing information (Simmons and Lynch, 1991; Burke, 1990). Specifically, this second stream proposes that individuals use alternative-based (same-brand) or attribute-based (other-brand) decision rules that depend on the amount of information presented that are used to reduce cognitive burdens associated with decision making.

Experimental results arising from both research streams typically find that the effects of missing information involve two components: "(a) reduced effects of described-attribute levels on product evaluations and (b) lowered evaluations of a target set of products." (Simmons and Lynch, 1991, p. 477) Moreover, a consistent finding in both research streams is that missing information matters; hence, there is a need to recognise missing information in brand/price studies whether the mere presence of missing information impacts consumer evaluations (Johnson, 1987) or inferences impact evaluations.

The missing information literature acknowledges that consumer inferences may be formed by using available attribute information to infer value(s) of missing attributes (e.g. Broniarczyk and Alba, 1994; Johnson, 1987; Johnson and Levin, 1985; Huber and McCann, 1982; Ford and Smith, 1987). However, previous literature does not address the ways in which omitted attributes and the inferences that are made about them impact the estimated value(s) of available or non-missing attributes.

Random Utility Theory

A key contribution of this paper is to use the framework of Random Utility Theory (hereafter, RUT) to demonstrate that the amount of information presented to consumers impacts their implied willingness to pay (hereafter, WTP) for a particular brand. RUT provides a conceptual framework to examine missing information and can be used to study both complete and incomplete information. RUT is a behavioural framework that explains how consumers make choices/decisions from the viewpoint of a researcher trying to understand cognitive processes that cannot be directly observed (Thurstone, 1927). As the systematic component of utility or preference can be expressed as a function of product characteristics, it is consistent with Lancaster's multi-attribute utility theory, where utility is derived from the characteristics of a product (Lancaster, 1966). RUT specifies the following theoretical relationship:

$$U_{ij} = V_{ij} + \epsilon_{ij}$$

where U_{ij} is the utility of the i^{th} alternative for the j^{th} individual, and this utility can be decomposed into an observable component V_{ij} and an unobservable component ϵ_{ij} .

The unobserved portion of utility ϵ_{ij} is stochastic (hence the term ‘random component’). Thus, if consumers make inferences as suggested by the missing information literature and if these inferences are not accounted for in estimated models, estimates of the effects of non-missing attributes will be biased and the degree of bias will depend on the extent and nature of the correlations between inferences and random components. While the missing information literature in relation to consumer cognitive processes and inference formation is insightful, research in this paradigm has failed to account for the statistical impact of omitted variables.

Price effects may vary systematically with the saliency and amount of information presented. That is, when only brand names and prices are present, as often obtained in many pricing experiments that use choice experiments, consumers must rely on brand names or prices or both to infer missing/omitted information. By adding salient information, consumers should make fewer inferences that are correlated with the unobservable component and hence the estimated effects for brand names and associated prices should systematically vary as one varies the amount and salience of information made available.

It makes logical and conceptual sense that missing attribute information will be correlated with the random component of utility. Previous missing information studies did not account for this relationship; hence, it is difficult to determine whether results represent true attribute estimates. Our research recognises that consumers may make inferences when faced with information uncertainty and these inferences may impact random components. Specifically, our research aims to understand whether missing information impacts the amount a consumer is willing to pay to obtain a specific brand.

Research Hypothesis

Given varying amounts of more and less salient product information, we expect that the implied WTP for each brand will change in magnitude across information conditions. More specifically, we expect that WTP estimates for each brand should appear to differ due to correlations of inferences about omitted attributes and random components. Conversely, if missing information has no effect on random components, estimated WTP for each brand should not change in response to varying attribute information.

Research Approach

To examine the research hypothesis, four information conditions were designed. We used brand-name, price and eight product attributes previously studied by Severin (2000) for the home-delivery pizza product category to create the following four information conditions:

1. brand-name and price
2. brand-name, price and four less-salient attributes
3. brand-name, price and four more-salient attributes
4. brand-name, price eight attributes (i.e., more-salient and less-salient attributes or “complete information”)

Subjects

The sample consisted of respondents who visit the website www.shopfree.com.au. Subjects were randomly assigned one of the four conditions and each received 16 condition-specific choice scenarios allocated in a random order. For consistency, respondents who did not fully complete surveys were filtered out of the final analysis, leaving a final sample size across all four conditions of 194 respondents.

Design

The choice experiment was based on a fractional factorial design (also called an orthogonal main effects plan or “OMEF”) that was generated using new construction methods developed by Street and Burgess (2004). The new design approach allows one to construct optimally efficient designs, which in turn allow us to control for differences due to differences in design efficiencies. The new design approach produces designs that are 100% efficient for estimating main effects (Louviere, Street and Burgess, 2003).

Estimation

The choice experiment requires respondents to indicate which brand they would choose from four options available (Dominos, Eagle Boys, Pizza Haven and Pizza Hut). The conditional logit choice model was used to analyse the resulting choice data.

Results

The implied WTP of each brand is calculated by dividing the estimated brand effect (the 'brand specific constant') by the estimated price parameter. A brand specific constant captures the unmeasured desirability of a choice option (i.e. a brand) with one brand effect normalised to zero. The brand normalised is arbitrary, and in our results it is Pizza Hut. WTP estimates are in Table One.

Table One: the implied willingness to pay estimates for Dominos, Eagle Boys and Pizza Haven relative to Pizza Hut

Condition	WTP for Dominos	WTP for Eagle Boys	WTP for Pizza Haven	WTP Pizza Hut (base)
1	0.3315	0.9427	1.1779	0.0000
2	0.1117	0.3784	2.0646	0.0000
3	-0.0163	-0.4104	0.9773	0.0000
4	0.0377	0.3331	0.7776	0.0000

The interpretation of WTP estimates can be demonstrated by the following example; a WTP estimate equal to 1.18 for Pizza Haven implies that consumers are willing to pay \$1.18 more for a Pizza Haven pizza than a Pizza Hut pizza. Likewise, negative WTP estimates indicate that consumers are willing to pay less those amounts compared to the base brand.

Visual inspection of figures one, two and three demonstrate that the WTP of each brand is not constant when comparing different information conditions. That is, implied WTP for each brand is highest for the least information, and generally decreases with more information. The

latter results suggest that the amount of information that is revealed/missing to consumers impacts the amount of money they are willing to pay to choose particular brands.

Figure 1: WTP for Dominos relative to Pizza Hut

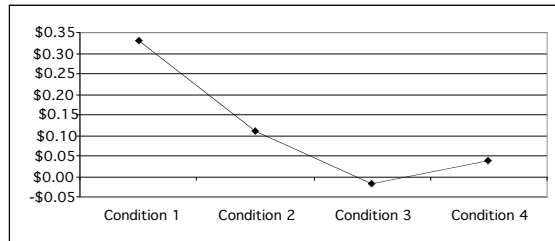


Figure 2: WTP for Eagle Boys relative to Pizza Hut

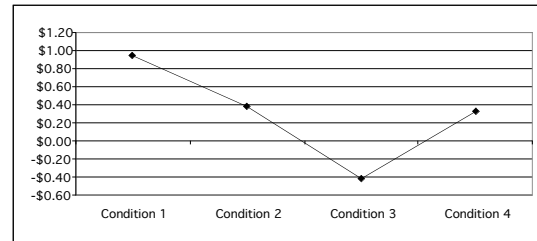
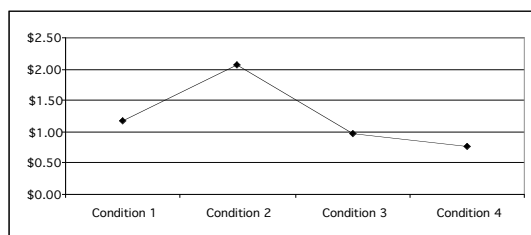


Figure 3: WTP for Pizza Haven relative to Pizza Hut



If missing information has no effect on the unobservable component, the estimated WTP for each brand should not change in response to varying attribute information. However, it is clear that for home-delivered pizza products the implied WTP varies across the four information conditions. Differences in magnitudes of WTP estimates across conditions are due to differences in response variability (a scaling effect).

The scaling effect could be due to inference making, which would produce an omitted variables effect, or differences in task complexity or some other process. Whatever the underlying process, our results show that typical brand-price experiments that fail to include other attributes that describe products may not provide realistic estimates of true price sensitivities.

Implications of research

The amount of information consumers received about home-delivered pizzas impacted their WTP to choose a particular brand. Our research demonstrates that when conducting a study in which only brand/price are varied (e.g. condition 1) compared to studies that include all attribute information (e.g. condition 4), one obtains different WTP estimates across conditions for different brands. Our results imply that researchers should include all salient attributes in experiments to avoid experimental subjects being uncertain about attribute levels of missing/un-revealed attributes. Furthermore, the results of choice experiments that do not take into account the impact of missing information may not be representative of true consumer perceptions. It should be noted, however, that we studied only ten attributes, and more than ten attributes might lead to different results, which should be considered in future research.

A key implication for marketing practice is that analysts should be cautious about designing and interpreting brand/price choice experiments, and should select attributes for analysis carefully. Our results suggest that if insights about brand and price are needed for policy decisions, analysts should try to include as many other salient attributes as possible in brand choice experiments. The field could benefit from additional academic research aimed at further understanding the role of the amount and salience of attribute information on

consumer choices. Systematic, programmatic research should lead to create an accurate understanding of the assumptions about consumer behaviour and the subsequent analysis of consumer choices.

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