



The cross-price effect on willingness-to-pay estimates in open-ended contingent valuation



Lijia Shi, Zhifeng Gao*, Xuqi Chen

Food and Resource Economics Department, University of Florida, 1155 McCarty Hall/P.O. Box 110240, Gainesville, FL 32611-0240, USA

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ABSTRACT

Previous literature has shown that potential buyers use a reference price or product to form their opinion about the value of a new product. Therefore, the pricing decision is an interactive process. We investigate the two generalizations of the cross-price effect (the neighborhood price effect and the asymmetric price effect) on consumer willingness-to-pay (WTP) for multiple similar products in an open-ended contingent valuation context. Results show that the cross-price effect on WTP is prominent, with the neighborhood price effect holding in contingent valuation. No conclusions are reached about the asymmetric price effect.

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Introduction

Economists and policymakers often need to elicit the value of new products or non-market resources for welfare analysis and policy evaluation. In addition, value elicitation helps marketers develop profit-maximizing pricing strategies. Contingent valuation (CV), as one of the most important valuation methods, is usually employed by asking consumers hypothetical questions in surveys to estimate willingness-to-pay (WTP). CV applies to a wide range of issues such as environment preservation (Hanemann, 1994; Alvarez-Farizo, 1999; Carlsson and Martinsson, 2006), health care (O'Brien and Gafni, 1996; Gafni and Birch, 1991), or food products (Hu et al., 2011; Moon et al., 2007; Markosyan et al., 2007).

One problem with CV is the difficulty for consumers to name their own price. Numerous studies have concluded that preferences are reference dependent (Munro and Sugden, 2003) and consumers refer to a reference point when shaping their own valuation of a product (Monroe, 1977). The influence of price information on subsequent bids in repeated trial auctions, termed "bid affiliation", has been confirmed by several studies (e.g., List and Shogren, 1999; Corrigan and Rousu, 2006). Nunes and Boatwright (2004) found significant correlation between incidental prices (i.e., prices of irrelevant products) and WTP for market products using experimental auction procedures. Chernev (2003) suggested that the articulation of reference prices beforehand imposed a

structure that was consistent with the nature of the decision task, and thus could simplify consumer choices.

Most CV research asks participants to bid for a single product/service without considering the impact of providing related price information (reference price). Research about the price effect on WTP mostly focused on own-price effect and was limited in the experimental auction or internet auction context (Nunes and Boatwright, 2004; Wolk and Spann, 2008; Kamins et al., 2004), which are non-hypothetical and only well-suited for market goods. However, consumers are exposed to all kinds of price information through advertisements, previous transactions, word-of-mouth, etc. And the demand for a product is merely independent of the prices of other products, especially its close substitutes. Therefore, the evaluation of one single good without considering its interaction with others has been shown to yield biased estimates (Caulkins et al., 1985; Burt and Brewer, 1971; Gum and Martin, 1975).

The cross-price effect, which describes the impact of the price change of one product on the market share of another, has been discussed extensively in literature (Sethuraman et al., 1999; Sethuraman and Srinivasan, 2002; Sethuraman, 1996). Cross-price effect also plays a vital role in marketing studies, and researchers have found that the dominant impact of price change is on brand switching (Bell et al., 1999; Gupta, 1988; Chiang, 1991). Two of the most important cross-price effects are the neighborhood price effect and the asymmetric price effect. The neighborhood price effect states that products with closer prices/characteristics have a larger cross-price effect than products with prices/characteristics farther apart (Sethuraman et al., 1999). The asymmetric price effect

* Corresponding author. Tel.: +1 352 294 7672; fax: +1 352 846 0988.

E-mail address: zfgao@ufl.edu (Z. Gao).

states that when higher-priced products are discounted, they affect the lower-priced products more so than the reverse (Blattberg and Wisniewski, 1989). That is, the asymmetry of cross-price effect favors the higher-priced products (Sethuraman et al., 1999).

Most of the previous studies on cross-price effect used real transaction data, such as store-level data (Sethuraman et al., 1999; Sethuraman and Srinivasan, 2002), survey-based purchase history information (Brown, 1986), and real transaction in field experiments (Arnot et al., 2006). However, real transaction data and market share information for new products/non-market resources are usually unavailable. The objective of this study is to determine the cross-price effect on WTP in the CV approach because this effect remains unverified in hypothetical contexts. We hypothesize that the cross-price effect on WTP estimates between products within the same price/quality tier should be stronger than the effect between products in different tiers. In addition, we explore whether the cross-price effect in CV favors the higher-priced product or the asymmetry reverses. We asked consumers to state their WTP for six types of orange juice products in a survey-based CV context. An advantage of using orange juice is that orange juice is one of the most popular fruit juice products worldwide. Therefore, we avoid using a product that is unrelated with people's daily life to ensure better reliability of our findings (Morwitz et al., 2007). In addition, the six types of orange juice products included products with which consumers were most familiar (i.e., regular marketable goods), as well as products that were relatively new (i.e., closer to innovative products or non-marketable goods). This helps to determine whether the impact of reference prices varies with the familiarity of a product. We designed six sets of reference price information for three types of orange juice to aid consumer decision making, as well as to explore the cross-price effect on WTP estimates.

Our study contributes to the literature by investigating the cross-price effect on WTP estimates in a hypothetical value elicitation context. Additionally, we examined two generalizations of the cross-price effect (the neighborhood price effect and the asymmetric price effect) in terms of their generalizability to consumer subjective valuation of a product in a hypothetical environment. Understanding price competition and market structure is critical for a successful entrance into the market for new products. Even non-market goods, such as recreation sites, are usually correlated with each other. Therefore, CV procedures should also consider the interdependence between the product of interest and its substitutes. We expect our study to provide some enlightenment to researchers concerning the future design of CV, as well as to retailers or policymakers with respect to their value-based pricing strategies for new products or non-market goods.

Literature review

There are mainly three types of CV methods: open-ended, sequential bids, and close-ended. Although the open-ended format is questioned by many economists (Cummings et al., 1986; Dwyer et al., 1977), open-ended approaches are more practical, especially in mail surveys, and thus are widely used (Brookshire, 1983; Hanemann, 1994; Cummings et al., 1986). Kealy and Turner (1993) found that there was no difference between WTP estimates from close-ended and open-ended CVs in the context of private goods.

As preferences are reference-dependent (Munro and Sugden, 2003), consumers construct their assessment of a product contingent on choice contexts instead of having a fixed value (Tversky and Simonson, 1993; Payne et al., 1992; Bettman et al., 1998). Chernev (2003) found that consumers preferred "price selection" (i.e., "select your price") to "price generation" (i.e., "name your price") because of the difficulty associated with the "name your

price" value elicitation strategy in the absence of a reference price. Generally, potential buyers use a reference product to form their opinion about the value of a new product (Monroe and Della Bitta, 1978). Therefore, providing reference prices in CV not only assists participants in making decisions, but also enables researchers to measure how consumers value unpriced items with the market prices of existing products.

The reference price effect has been shown empirically to affect purchase quantity (Krishnamurthi et al., 1992), as well as purchase timing (Bell and Bucklin, 1999). Thaler (1985) incorporated the reference price into the value elicitation model. In the value elicitation context, Drichoutis et al. (2008) provided concrete evidence as to how reference prices affected bids in a second price Vickrey auction. Corrigan and Rousu (2006) found that posted prices in experimental auctions had a statistically and economically significant impact on subsequent bids. List and Shogren (1999) suggested that affiliated private values existed in repeated second price auctions for new goods. Muller and Ruffieux (2011) showed that bidders revised their bids after learning about field prices, and the extent of the revision was determined by the distance between the field price and the bidders' previous price expectation. All of these articles only considered the own-price effect.

Considering that the cross-price effect has been extensively studied in literature using market based data, we expect that the cross-price effect also exists in the value elicitation context. The pattern of the cross-price effects has been widely discussed. For example, Arnot et al. (2006) determined the impact of the fair trade coffee price on the probability of purchasing conventional coffee. Brown (1986) indicated significant substitute relationships between various types of juice using survey-based data about purchase history information. Gaynor et al. (2006) found that consumers switched to outpatient care in response to the increase of drug price. Sethuraman (1995) investigated how national brands and private-labels affect each other through price discounts. All of these studies, despite using different products as vehicles, confirmed the cross-price effects. An interesting study by Hall et al. (2010) concluded that there was interaction between own-price effect and cross-price effect.

The important generalizations of cross-price effect include the neighborhood price effect and the asymmetric price effect. Sethuraman et al. (1999) concluded that the neighborhood price effect existed based on either cross-price elasticity or absolute cross-price effect.¹ They also found that a brand was affected the most by its immediately higher-priced brand, followed by its immediately lower-priced brand. Compared with the relatively few discussions of the neighborhood price effect, the asymmetric price effect has been extensively discussed. Blattberg and Wisniewski (1989) found that through price competition, higher quality/price brands stole market share from other brands in its own price/quality tier as well as brands in the lower tier, but brands in lower price/quality tier did not take a significant share from the tier above. Allenby and Rossi (1991) investigated the promotion of national brands and store brands, and concluded that the former yielded more effect. Sethuraman and Srinivasan (2002) and Sethuraman et al. (1999) found that the asymmetric effect only held with cross-price elasticity and disappeared or reversed with absolute cross-price effect. The neighborhood price effect was also stronger than the asymmetric price effect. Bronnenberg and Wathieu (1996) found that the direction of the asymmetric effect depends on whether the quality gap between the brands was sufficiently large, compared with the price gap.

¹ Absolute cross-price effect is the absolute change in market share of a brand per percentage change in the price of the competing brand. Cross-price elasticity is the percentage change in market share when the price of the competing brand changes by one percent.

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