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COMPENSATION FEES AND WILLINGNESS TO PAY: A FIELD EXPERIMENT ON ORGANIC APPLES

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Abstract

An increasing number of studies suggest that compensation fees for participating in valuation studies can influence participant's responses. This study investigates the impact that compensation has on individuals' responses in a point-of-purchase setting, when the opportunity costs of participation are relatively small and participants are familiar with the products. We conducted a field experiment using the incentive compatible Becker-Degroot-Marschak (BDM) mechanism to elicit consumers' willingness-to-pay values for organically produced apples. Our results suggest that despite receiving similar information, compensated individuals tended to offer willingness-to-pay values that were significantly larger on average than those values offered by non- compensated individuals.
Key Words: *BDM, compensation fees, incentive compatible, organic, willingness-to-pay*

1. Introduction

Experimental economics techniques such as experimental auctions have become well accepted alternatives to stated response techniques for eliciting consumers' willingness-to-pay (WTP) due to their desirable theoretical properties such as "incentive compatibility". Experimental auctions utilize real exchanges of money to simulate conditions of real markets and increase the external validity of WTP estimates. Many WTP studies, including experimental studies, use some form of compensatory fees (hereafter compensation) to entice participants and provide incentives to give careful responses. Compensation is often a necessity for lab studies, both for recruiting and ensuring that participants have money available for exchanges. Yet, there is a growing body evidence that the compensation in the form of a cash or good endowment can influence participants' responses (Rutstrom, 1998; Louriero, Umberger & Hine, 2003; Nalley, Hudson, & Parkhurst, 2005; Corrigan & Rousu, 2006), particularly if the compensation is perceived as a windfall gain rather than as something earned (Carlsson, He, & Martinsson 2013). Rutstrom (1998), in a series of lab experiments, identified both income and sample selection effects stemming from variations in the level of compensation given to participants.

Wertenbroch and Skiera (2002) suggested that in some contexts researchers may avoid the potential bias from the windfall nature of compensatory fees by conducting point-of-

purchase studies using the "BDM" method developed by Becker, DeGroot, and Marschak (1964) to elicit WTP responses using little or no compensation for participants. They conducted a series of three experiments, two in the field and one in a lab, to compare the BDM method for eliciting WTP with survey methods, concluding that BDM was more effective than price matching in eliciting respondents' contextual value of the products. They also found no statistically significant difference between compensation treatments for WTP values elicited by BDM in a lab setting, suggesting that compensation did not affect participants' response strategies. However, other studies such as Carlsson et al. (2013) have found differences in behavior concerning compensation in lab and the field settings.

The objective of the current study is to analyze the impact that compensating individuals for participation has on their subsequent WTP responses to the BDM mechanism in a field setting. Although the effects of compensation have been studied in detail under some conditions, few studies have tested the impacts of compensation on participant's subsequent WTP responses in the field and the impacts in that setting are not well understood. We conducted a field experiment in which we elicited consumers' WTP for a pound of organic apples in a local grocery store using the incentive compatible BDM method. In order to assess the impact of compensation on participants WTP responses, participants were assigned one of two compensation conditions. Under one condition, participants were informed at the time of recruitment to participate in the study, prior to revealing their WTP, that they would be compensated for participation. Participants in the second condition were informed of compensation after they revealed their WTP. The WTP responses were initially analyzed using unconditional tests of differences between the two groups. In order to assess the impact of compensation on different subjects, the WTP results were further analyzed using a Tobit model which included subject demographics and perceptions variables.

The paper will proceed as follows. First, we address some commonly used methods for eliciting consumers' WTP, potential problems with these methods and how these methods have been used at the point-of-purchase. Next, we discuss our methodology, our implementation of the experiment, and the resulting data. We follow with the presentation of the empirical model and associated results. Finally, we offer concluding remarks and suggestions for future research.

2. Literature Review

A variety of methods exist for eliciting a consumer's WTP for a good. The appropriateness of the technique depends on the questions of interest to the researcher, resource constraints, as well as on the nature of the good (e.g. market or nonmarket). Previous research suggests that measuring WTP using hypothetical valuation mechanisms can suffer significantly from hypothetical bias (List & Gallet, 2001; Little & Berrens, 2004; Murphy, Allen, Stevens, & Weatherhead, 2005). Hypothetical bias in consumers' valuations is more likely to occur when consumers are detached from real market situations and their decisions lack economic consequences. Conducting WTP studies in the field may reduce bias by allowing participants to value products in the context where they normally make such decisions (Wertenbroch & Skiera, 2002). The use of "incentive compatible" mechanisms for eliciting WTP can also reduce hypothetical bias. A mechanism is considered incentive compatible if respondents' weakly dominant strategy is to reveal their 'true' value for the good in question (Lusk & Hudson, 2004).

Among the mechanisms considered theoretically incentive compatible are auction mechanisms such as the Vickrey or nth price auction mechanisms and the closely related BDM method (Lusk & Shorgren, 2007). The BDM mechanism and other experimental auction procedures have seen widespread use in controlled experiments for eliciting values for a variety of goods, but these techniques have only recently seen widespread use in field

settings. Lusk, Fox, Schroeder, Mintert, and Koohmaraie (2001) employed a modified BDM procedure to investigate WTP premiums for steak tenderness. Lusk and Fox (2003) utilized the BDM mechanism in both lab and field settings to investigate the impact that the valuation setting had on bids, finding that the effect of setting was indeed significant. Rousu and Corrigan (2008) conducted a field study using the BDM mechanism that compared alternative "fair trade" labels and estimated the welfare effects of labels that provide inadequate information to consumers. Froehlich, Carlberg, and Ward (2009) implemented the BDM procedure in the field to assess Canadian consumer preference for alternative hypothetical brand names in fresh beef products. Shi, House, and Gao (2013) utilized a BDM procedure in a field setting to estimate consumer's WTP for organic and local blueberries.

Experimental auction techniques are seeing increased use because of their potential to reduce hypothetical bias. However, the use of an incentive compatible elicitation mechanism does not eliminate all potential sources of bias in participant responses. Researchers continue to investigate the conditions under which such mechanisms are empirically demand revealing (Lusk & Shogren, 2007). Plott & Zeiler (2005) focused on how bias in responses can stem from misunderstanding the incentives created by the elicitation mechanism. Theoretic incentive compatibility assumes that participants' responses depend only on the goods auctioned, relevant alternatives, and the resulting changes in wealth. Unobserved deviations in participants' response strategies due to the experimental conditions might bias respondents' valuations (Plott and Zeiler, 2005).

Several studies have found a gap between individuals WTP for a good and the amount they are willingness-to-accept (WTA) to sell the same good, which researchers often attribute to the "endowment effect." Plott and Zeiler (2005) argued that the WTP-WTA gap observed in these studies is often attributable to a lack of proper experimental control and participant "misconceptions." They demonstrated in a laboratory experiment that careful experimental controls including: anonymity, use of incentive compatible mechanisms, and ensuring full understanding of procedure through training and paid practice rounds, could eliminate the WTP-WTA gap observed in some studies. Although the importance of training participants in the procedure is now well-known (Lusk & Shogren, 2007), researchers may have limited control over the environment in point-of-purchase settings, as well as limited time in which to train participants in the auction procedure. Corrigan and Rousu (2008) focused on the issue of incentive-compatibility in field experiments and proposed a method for empirically testing incentive compatibility that exploits the phenomena of "field-price" censoring. They found that after providing training in which subjects participated in multiple paid practice rounds with the auction mechanism, subjects' WTP responses were consistent with demand revealing behavior.

A potential concern for field studies is that even the training implemented by Corrigan and Rousu (2008) requires prolonged interaction with participants. Participants are typically intercepted in the process of shopping (or other activity) and lengthy training implies higher opportunity costs and necessitates larger compensation, both of which may affect the makeup of the consumer sample and create sample selection bias (Rutstrom, 1998). Loureiro et al. (2003) found evidence, in a laboratory experiment, that WTP estimates are sensitive to the size of an initial cash payment, leading them to recommend that initial endowments be near in value to the auctioned good in order to decrease the likelihood of overbidding. However, Nalley et al. (2005) suggest that Loureiro et al. (2003) may have failed to account for the windfall effect of the compensation, and demonstrated that WTP values would be independent of the initial endowment if participants are made to feel as if they had 'earned' the endowment. Carlsson et al. (2013) found in both lab and field setting that participants' behavior was significantly different when faced with a windfall or earned endowment.

Lusk and Shogren (2007) suggest that the endow-and-upgrade methodology, in which researchers provide participants with a good and elicit their WTP to upgrade to a superior

good, may alleviate the bias associated with compensation. The endow–and–upgrade methodology is particularly useful for isolating the consumers value associated with the additional quality attribute (e.g. Lusk et al., 2001). However, Corrigan and Rousu (2006) demonstrated, in a lab setting, that endowing participants with a good can affect their valuation of subsequent goods, potentially biasing responses. They proposed that a likely explanation of the observed "endowment effect" is that participants may wish to repay the researcher for the compensation by increasing their bids. Using the endow-and-upgrade may exchange one potential source of bias for another.

Wertenbroch and Skiera (2002) argued that the transparency of the BDM mechanism makes it possible to elicit meaningful WTP responses with minimal training by forcing consumers to pay out of pocket. "[The] out-of-pocket obligation forces respondents to consider their real readiness to buy and minimizes distortions cause by any windfall character of any extra compensation" (Wertenbroch and Skiera, 2002, p.230). The approach taken by Wertenbroch and Skiera (2002) is not appropriate to every setting, but when the goods being evaluated allow it, utilizing an out-of-pocket approach may a useful tool for avoiding the potential biasing effects of compensation. Our study uses a one-shot BDM procedure which requires minimal time and effort on the part of the participant and relies on binding purchase outcomes to ensure incentive compatible participant behavior.

3. Methodology

We conducted a field study on consumer WTP utilizing the BDM method (Becker et al., 1964) for eliciting consumer WTP. In this method participants are presented a product or products and asked to offer a bid for the product. If the bid exceeds a randomly generated price, the participant is required to purchase the product for the lower, randomly generated price. If the bid is less than the drawn price the participant does not get to buy the product. The mechanism creates an incentive to not overbid, because by bidding more than WTP, participants risk paying more than the product is worth to them. On the other hand, they risk losing a valued product, if they bid lower than their WTP. The BDM mechanism provides participants with incentives to truthfully reveal their WTP for the product.

There are several key advantages of the BDM procedure over alternative auction type mechanisms for application in the field. First, the procedure is relatively easy to implement in a point-of-purchase setting without creating an artificial choice environment, which should increase external validity of estimates. Second, participants do not bid against each other; rather, the bidding outcome and binding price are determined by drawing from a random distribution. Since participants do not bid against each other, it is possible to allow one or several participants in the experiment at a time, while preventing participants' bids from becoming affiliated. This is a particularly attractive feature in the field where researchers have limited ability to control the flow of traffic in the experiment area. Lastly, the procedure maintains the theoretic incentive compatibility of other auction mechanisms (Wertenbroch and Skiera, 2002; Lusk and Hudson, 2004). Although it is convenient for field use, there are also some potential disadvantages of BDM. Some studies such as Noussair et al. (2004) and Lusk and Rousu (2006) have found that BDM yields less accurate results in induced value experiments than similar mechanisms like the Vickrey and nth price auctions.

In our study, we compensated all participants with a $5 gift card for use in the chain of grocery stores of which the store is a member. Compensation was provided to ensure thoughtful completion of the questionnaire and for convenience in conducting transactions. In the case that a participant won the auction, we deducted the binding price from the gift card. The dollar value of compensation was chosen to be large enough to cover the highest expected bid with some left over as compensation for participating. Theoretically, the gift card acts like an increase in income and creates a parallel shift in the consumer's budget

constraint. However, it may also be interpreted by the consumer as a good itself, in which case consumers are faced with a tradeoff between the current good (gift card) and the auction good(s). Based on findings of Loureiro et al. (2003) and Corrigan and Rousu (2006) a gift card might lead consumers to bid above their true value for the product in order to repay the researchers for compensation.

To explore the potential effects of compensation on WTP values, we varied the timing of when we informed participants that they would be compensated. Two thirds of participants were randomly selected to be informed at the time of recruitment, prior to participating in the BDM procedure, that they would be compensated for participation. The other third of participants were randomly selected to be informed of compensation after completion of the BDM procedure, but prior to completing the questionnaire. Thus, they would submit their bids assuming that they would pay out-of-pocket if they won. We will refer to participants as compensated if they were informed of compensation prior to submitting their WTP bids and uncompensated if they were informed of compensation after submitting their bids.

Varying levels of compensation for recruiting participants could induce sample selection bias. Offering no compensation could result in being unable to recruit individuals with high opportunity costs (Rutstrom, 1998). Individuals' opportunity costs are likely to be driven by their personal characteristics and values, which could translate into different bidding patterns between the two groups. Hence, our selective compensation has two potential effects on WTP estimates: a direct effect of compensation and an indirect effect of sample selection. We are not able to identify the existence, direction, or magnitude of the potential selection effects. However, we believe the impacts of sample selection are likely to be small in the current experiment for several reasons. First, all participants were intercepted while shopping in a grocery store and the interaction time was kept to a minimum, thus the opportunity cost of participating was relatively low. Second, apples are a familiar product, are relatively inexpensive, and non-apple consumers were screened out at the time of recruitment to participate in the study. Finally, potential participants were selected at random to be recruited with or without compensation, which should increase the likelihood the participants in the compensated group have similar characteristics to those in the other group.

The field experiment was conducted over a 2-day period in June of 2009 in a grocery store located in a university town in northern Idaho. One monitor was responsible for recruiting participants using a predetermined script. Shoppers were recruited for participation in or around the produce section of the store, and were intercepted prior to selecting any products whenever possible. Participants were initially informed that we were university researchers conducting an in store study and were then asked a screener question: "Do you consume apples?" Shoppers who responded "yes" were asked to participate in a study, which would take 5-10 minutes of their time. Approximately two thirds of the participants, selected at random, were informed at this point that they would be compensated for participating with a five-dollar gift card. The remaining third were informed after completion of the BDM procedure that they would be receiving a five-dollar gift card. The interview process used two different monitors assigned randomly to participants. Scripts and explanations were kept as consistent as possible. The BDM procedure was implemented as follows:

Step 1: We informed consumers that they would have the opportunity to purchase one pound of organically produced apples without spending any more than they wanted to on the purchase. One pound of apples was put on display to show consumers exactly what they would be purchasing.

Step 2: We explained how the BDM mechanism would work and provided participants with an illustrative example.

Step 3: Participants bid on one pound of organic apples, and then a random price was drawn from a bowl of prices to determine the outcome. The random prices were uniformly

distributed from \$0.1 to \$5 in \$0.1 increments. We did not reveal details concerning the distribution of the random prices to avoid anchoring of bids (Wertenbroch and Skiera, 2002), but the bowl was placed in plain sight during the experiment to reassure participants that the price was unrelated to participants' bids.

Step 4: After the outcome of the bidding was determined, we revealed that all participants would be compensated for participation.

Step 5: Participants received their compensation and/or apples on completion of the questionnaire.

Due to an error in ordering the apples, a different variety of apples was used for each day of the experiment. On the first day consumers bid on one pound of organic size 100 Gala apples displayed in a bowl. On the second day, participants bid on one pound of size 80 certified organic Braeburn apples. The Braeburns were larger than the Galas, so we displayed bowls containing two organic Braeburn apples. The price per pound of the apples in the store was the same between the two varieties. One hundred and fifty-seven shoppers participated in the study, but some observations were dropped due to incomplete responses to the questionnaire. A total of 147 usable observations were obtained.

4. Data

In addition to the WTP data from the BDM procedure we collected data on participants' demographic characteristics and preferences by direct response to a questionnaire. Most participants indicated they were the primary shoppers for their household (79%). The majority of participants were white (93%) and female (65%) which was relatively high compared to the state population figures of 89.1% white and 49.9% female (U.S. Census Bureau, 2010). The sample was highly educated and relatively aged with 64% of participants indicating that they held a bachelor's degree or higher and 28% falling in the over 65 category compared to state figures of 25.1% and 12.4% respectively (U.S. Census Bureau, 2010). The income level of respondents was similar to the income profile of the state population, with the majority of participants falling in the \$60,000 and below categories, compared to a census mean income of \$59,460 (U.S. Census Bureau, 2010). Summary statistics for sample demographics are reported in table 1.

Table 1. Summary of Participant Demographic

Variable Name	Description	Mean	Std. Dev.
Gender	Indicator variable for female respondent	0.64	0.48
Age	Midpoints of 6 age in years categories	50.81	18.58
Race	Indicator variable for non-white respondent	0.07	0.25
College	Indicator for completion of Bachelor or higher degree	0.65	0.48
Income	Midpoints of 6 income categories (\$1000)	56.53	35.38
Primary Shopper	Indicator variable for primary shopper	0.80	0.40
Infants	Number of children 0-24 months in household	0.07	0.31

The product attributes addressed in the questionnaire had frequently been found by previous studies to be important in organic purchase decisions (see Yiridoe, Bonti-Ankomah, and Martin, 2005). Some questions targeted consumers' subjective perceptions about the quality of organic apples relative to conventional apples. Concern for healthiness of organic, which is generally about absence of negatives such as pesticide residues and genetic modified organisms, is frequently cited as a primary reason for consumers to purchase organic food. Similarly, concerns over the safety of conventionally and genetically modified

food have been found to motivate purchases of organic food. Awareness of environmental issues has also been found to correlate with organic purchases, but it tends to be secondary to health and safety concerns (Shaw Hughner, McDonagh, Prothero, Shultz, & Stanton, 2007).

Table 2. Summary Statistics of Likert Responses to Consumer Perception Variables

Variable Name	Description	Mean	Std. Dev.
Appearance	Importance of appearance in apple purchase	4.00	0.98
Price	Importance of price in apple purchase	3.86	0.98
Health	Organic apples are healthier than conventional	3.71	0.97
Taste	Organic apples taste better than conventional	3.40	0.96
Safe	Organic apples are safer to consume than conventional	3.89	0.98
Environment	Organic production practices are less environmentally damaging than conventional production practices.	4.14	0.93

Note: For likert responses: 1= stongly disagree, 2 = disagree, 3= undecided, 4= agree, 5= strongly agree

Descriptive statistics for questionnaire responses are presented in table 2. The variables *health, environment, and safe* are direct responses to degree of agreement (0, 5) with statements that organic apples are healthier, less environmentally damaging, and safer for consumption than conventionally produced products. These variables address 'credence' aspects of organic labels that have been identified as primary motivators of organic purchase. The variable ***taste*** is a direct response to degree of agreement (0, 5) with the statements that organic apples taste better than conventionally produced apples. Survey responses indicated that participants in the study generally believed that organic apples were of superior quality to conventionally produced apples. Fifty-nine percent of participants indicated that they agreed or strongly agreed that organic apples are healthier than conventional apples, while 31% were undecided. Sixty-four percent agreed that organic apples are safer to consume than conventionally produced, and 77% agreed that organic production is less damaging to the environment. Only 38% percent agreed that organic tastes better and 42% were undecided. Consumers also identified the degree of importance (1, 5) of product attributes such as ***price*** and ***appearance*** in making apple purchase decisions. Sixty-eight percent indicated that they agreed or strongly agreed that price was important while 71% indicated appearance as important in purchase decisions.

5. Results

Table 3 shows summary statistics of WTP values for each level of compensation and apple variety. The average WTP for the sample was $1.44 per pound which was slightly less than the store price of $1.49 per pound at the time of the experiment. Mean WTP values for the compensated group were slightly higher for both varieties with means of $1.55 per pound for Galas and $ 1.44 per pound for Braeburns, compared with $1.54 per pound and $1.16 per pound for the uncompensated group. We compared median differences between compensation levels within each apple variety separately and for the whole sample using Wilcoxon rank-sum tests. We found no significant differences in median WTP between compensation levels for all apples ($p = 0.286$, $n=147$) or for either Gala ($p = 0.949$, $n=64$) or Braeburn ($p = 0.165$, $n=83$) apple varieties individually. These finding are consistent with the results of Wertenbroch and Skiera (2002) which found no significant differences between

WTP responses elicited by the BDM mechanism with and without compensation in a lab setting.

Table 3. Summary Statistics of WTP ($/Lb) by Compensation Level and Variety

Description	N	Mean ($)	Median ($)	Std. Dev. ($)
WTP for Gala (N= 64)				
Participant was not informed of compensation	22	1.54	1.24	0.86
Participant was informed of compensation	42	1.55	1.50	0.87
Difference between compensation level		0.01	0.26	0.02
WTP for Braeburn (N=83)				
Participant was not informed of compensation	23	1.16	1.05	0.74
Participant was informed of compensation	60	1.44	1.50	0.69
Difference between compensation level		0.28	0.45	-0.05
WTP (full sample)	147	1.44	1.49	0.80

5.1 Empirical Model for WTP

To estimate how various participants' WTP responses were impacted by compensation we used a Tobit model with the WTP bids elicited from the BDM mechanism as the dependent variable. Participants were restricted from bidding negative dollar values, so a Tobit model was utilized to account for WTP bids being censored at zero (Lusk and Shogren, 2007). Censoring at zero is a common feature of experimental auctions studies, Bernard and Bernard (2010) and Shi et al. (2013) are some recent examples in which Tobit is used to address the censoring issue. In our study, the econometric model is specified as follows:

$$WTP_i = \begin{cases} 0 & if\ WTP_i^* \leq 0 \\ WTP_i^* = \alpha x_i + \beta y_i + \gamma z_i + \epsilon_i & if\ WTP_i^* > 0 \end{cases} \quad (1)$$

where WTP_i^* is a latent dependent variable and WTP_i is the observed value of the dependent variable, the bid submitted by participant i in the BDM procedure. The explanatory variables in the model are denoted as vectors $\mathbf{x}_i$, $\mathbf{y}_i$, and $\mathbf{z}_i$. The vector $\mathbf{x}_i$ includes: the consumer perception variables about organic characteristics, price and appearance; demographics characteristics; and an indicator for apple variety (Braeburn =1). An indicator variable for compensation is denoted by $\mathbf{y}_i$, and interactions between all explanatory variables ($\mathbf{x}_i$) and the compensation variable are denoted by $\mathbf{z}_i$. The interaction terms are included to capture any effects that compensation has on the other explanatory variables in determining a participant's WTP for the apples.

There is a possibility that the organic perception variables: health, environment, safe, and taste are endogenous in the process of WTP determination. We followed the approach used by Bernard and Bernard (2009, 2010) to address the issue endogeneity of multiple variables in a Tobit model setting. First stage regressions for each organic perception variable were modeled using questionnaire responses regarding concern for nutrition, local production, special dietary requirements, and other product purchasing habits as instruments. The results of a Hausman endogeneity test indicated that we could not reject the null hypothesis of

exogeneity of the variables at a 0.10 level of significance (Greene, 2003)[1]. Thus, we used the original, non-instrumented, values of the variables in our final model specification.

We have hypothesized expectations for all questionnaire response variables reported in table 2. It is expected that participants' WTP for organic apples will increase along with the levels of health, environment, and safe variables (Yiridoe et al., 2005). Taste is an internal characteristic critical to repeat purchase decisions, and the perception of superior taste has been found to motivate organic purchases (Yiridoe et al., 2005). Hence, we expect that participants who believe that organic apples have superior taste to conventional apples will have higher WTP than those who do not. High prices have been found to deter consumers from purchasing organic products (Yiridoe et al., 2005), accordingly we expect that consumers with higher levels of concern for prices will have a lower WTP for organic apples. Previous studies such as Yue, Alfnes, and Jensen (2009) have found that poor appearance in organic apples decreased the premium that individuals were willing to pay. We did not directly measure of how the apples used in the experiment appeared to consumers, so we do not have prior belief on the impact of appearance.

In addition to estimating the Tobit model specified in equation 1, we also estimate a Truncated Regression model using the same explanatory variables but including only the non-zero WTP observations. The Tobit model assumes that variables which positively influence the probability of observing a non-zero observation also increase the mean value of the dependent variable (Lusk & Shogren, 2007). The Truncated Regression model is a less efficient but consistent estimator of the model parameters for the non-zero observations. If the explanatory variables have different impacts in determining the probability of observing non-zero values and determining the amount WTP, then the Truncated model could better capture the effects of the explanatory variables on the amount of WTP. The Tobit model is the preferred specification as it uses information from the full sample, but the Truncated Regression serves to highlight the impact of the variables, particularly compensation, on mean WTP.

5.2 Empirical Model Results

The results for both the Tobit and Truncated Regression models are presented in table 4. We found that the main effect of compensation was positive and significant in the Tobit model analysis. Several of the interaction terms including variety, price, college, and primary shopper were also statistically significant in determining participants' WTP. These results indicate that compensation had an impact on WTP that varied across some individual demographic characteristics and attitudes, and on average individuals in the compensated group tended to bid higher than individuals in the uncompensated group. The variety variable was significantly negative while its interaction with compensation was significantly positive and of similar magnitude, indicating that uncompensated individuals had lower WTP for the Braeburn apples, while compensated individuals' WTP bids did not differ with variety.

The Tobit model results show that the perception variables: price, health, taste, and environment are significant at a 0.05 level of significance, while safe is significant at a 0.1 level. Of the interactions between compensation and the perception variables, only the price interaction is found to be significant. Contrary to expectations, importance of price (price) positively impacted the WTP bids of uncompensated individuals. The BDM mechanism includes incentives that discourage both underbidding and overbidding. A possible

[1] The instruments used in the test were jointly significant in first-stage regressions, but Cragg-Donald tests indicated that the instruments were jointly weak. Consequently, the test of endogeneity may have reduced power.

explanation of the positive effect is that placing importance on prices translates to an awareness of the prices, and leads participants to bid closer to the price they expect to pay in the market to avoid missing out on a good deal. The price interaction coefficient is negative and of slightly greater magnitude than the price coefficient, indicating that the importance of price has a negative impact on bids if the individual was compensated. Compensation tended to raise bids on average, but this result would indicate that the effect was smaller for individuals with higher concern for prices.

Table 4. Results for Tobit Regression and Truncated Regression Models

	Tobit		**Truncated Regression**	
Variable	Parameter Estimate	Standard Error	Parameter Estimate	Standard Error
Compensation	2.77**	1.21	4.64**	1.44
Variety	-0.40*	0.23	-0.46**	0.23
Perception Variables				
Appearance	0.12	0.11	0.15	0.11
Price	0.28**	0.12	0.43**	0.14
Health	-0.58**	0.22	-0.82**	0.22
Taste	0.41**	0.18	0.44**	0.17
Safe	0.39*	0.20	0.50**	0.21
Environment	0.33**	0.16	0.66**	0.19
Demographic Variables				
Gender	0.12	0.26	-0.04	0.25
Age	-0.01*	0.01	-0.01	0.01
Income	0.00	0.00	0.00	0.00
College	-0.73**	0.32	-0.96**	0.32
Infants	-0.43	0.29	-0.68**	0.30
Primary shopper	0.47	0.31	0.35	0.32
Interactions				
Variety x Compensation	0.48*	0.27	0.40	0.26
Appearance x Compensation	-0.05	0.13	-0.06	0.13
Price x Compensation	-0.29**	0.14	-0.45**	0.16
Health x Compensation	0.37	0.25	0.46*	0.25
Taste x Compensation	-0.19	0.21	-0.25	0.20
Safe x Compensation	-0.28	0.23	-0.25	0.23
Environment x Compensation	-0.23	0.18	-0.62**	0.21
Gender x Compensation	0.19	0.30	0.28	0.29
Age x Compensation	0.00	0.01	0.00	0.01
Income x Compensation	0.00	0.00	0.00	0.00
College x Compensation	0.83**	0.35	1.12**	0.35
Infants x Compensation	0.57	0.43	0.89**	0.41
Primary shopper x Compensation	-1.25**	0.37	-1.08**	0.36
Constant	-1.62	1.06	-3.28**	1.32
Number of Observations	147		137	
Log Likelihood	-142.77		-106.62	

Note: * significant at 10%, ** significant at 5%.

The insignificance of interactions between compensation and health, taste, safe and environment in the Tobit model imply that these variables had statistically equivalent impacts on the bids of both the compensated and uncompensated groups. The perceptions that organic apples taste better (taste), are safer to consume (safe), and are produced in a more environmentally friendly fashion (environment) than are conventional apples, tended to increase bids for both groups. The findings for all of the organic perception variables are consistent with our expectations based on previous studies except for health which negatively impacted bids. As noted by Shaw Hughner et al. (2007) consumer's perceptions of the healthiness of organic is usually defined by safety in consumption and absence of negatives like pesticides. Since the model includes participants' perceptions of the relative safety and environmental friendliness of organic, the health variable is capturing the marginal health attributes of organic such as nutritional content. The findings would suggest that after safety and environmental concern, the marginal health attributes of organic are not valuable to the participants in our sample.

Regarding the impact of demographic variables, age and college were found to be significantly negative. Only two of the interaction effects with demographic variables were found to be significant, primary shopper had a negative impact and college had a positive impact of greater magnitude than its main effect. The results indicate that relatively younger consumers tended to bid more regardless of compensation. Participants with college education tended to bid relatively lower for organic apples if they were in uncompensated group, and tended to bid higher if they were aware of compensation. Among the uncompensated group there was no significant difference in bids between primary shoppers and non-primary shoppers; however, primary shoppers in the compensated group tended to bid lower than non-primary shoppers. A possible interpretation, similar to the result for price, is that primary shoppers are more familiar with the prices that they usually pay, and tend to overbid less when compensated.

While the Tobit Model is the preferred specification for the data, a comparison of the results of the Tobit regression and Truncated Regression models for WTP (table 4) illustrate some additional findings. First, each parameter has the same sign in two models, and the two models share similar patterns of statically significant coefficients. In the Truncated Regression model we find that the presence of infants in the household decreased WTP levels for the uncompensated group, but increased WTP for the compensated group. Different from the Tobit model, the coefficients for the interactions between compensation and the organic perception variables: health and environment were found to be statistically significant. The signs were opposite of the main effects of the variables, indicating that the perception variables had a decreased impact on the amount of WTP organic apples for participants in the compensated group. The result would suggest a diminished role of the products attributes in determining the bids that participants submitted.

6. Conclusions

This study investigated the impact that compensating participants had on WTP responses for organic apples. WTP data was collected from shoppers in a grocery store using the BDM mechanism. An unconditional test of distribution showed no significant differences between WTP bids from the compensated and uncompensated groups. However, the Tobit and Truncated Regression models for WTP bids showed that compensation tended to increase WTP bids and impact of compensation varied with participants' preferences and demographic characteristics. In particular, participants' perceptions about the relative quality of organic tended to have a smaller impact in determining their WTP bids if they were compensated. Participants in the uncompensated group clearly differed in their WTP values between the two varieties, while compensated individuals did not show a preference. Our

findings suggest that compensation may have resulted in WTP bids being disconnected from consumers' preferences about the products attributes, possibly as the result of a desire to reciprocate for the gift card or a failure to fully engage in the experiment. The differences in effects of some variables, particularly, those relating to familiarity with prices, suggest that compensation might reduce careful consideration of bidding outcomes.

Previous studies have suggested that training, including paid practice rounds, is necessary to ensure that an auction mechanism is empirically demand revealing Corrigan and Rousu (2008). These requirements can be particularly onerous for field studies because they elongate interaction with shoppers, and increase research expenses. Our results suggest that making participants purchase the product(s) out-of-pocket, as suggested by Wertenbroch and Skiera (2002), may facilitate participant's acquisition of the optimal bidding strategy. This approach will probably be most successful when an experiment includes relatively few items that are inexpensive and are somewhat familiar to participants, as was the case in this study.

Our findings need to be interpreted with caution since the recruiting process may have resulted in differing sample selection between the two groups. Although we have argued that the selection effects are likely to be small, an improvement in experimental design for future research would be to add a third compensation treatment in which participants are recruited without compensation but are offered compensation prior to bidding. This additional treatment would allow researchers to distinguish between compensation and selection effects.

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