DIFFERENCES IN CONSUMER PREFERENCES WHEN FACING BRANDED VS. NON-BRANDED CHOICES*

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ABSTRACT

Because brands can signal reputation and serve as proxies for trust, consumer preferences for credence attributes may differ for branded and non-branded products. We test this hypothesis using data from a choice experiment conducted with U.S. pork consumers. The results indicate that consumers are usually willing to pay more for a certification attribute in a non-branded as compared to branded product. Additionally, greater variation in consumer willingness-to-pay for credence attributes is observed in the non-branded case. This latter characteristic of the results may represent the increased uncertainty some consumers internalize concerning quality consistency when brand information is not provided. These results have interesting implications for producers, processors, retailers, and policy makers.

Keywords: Branding, Consumer Preferences, Credence Attributes

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1. INTRODUCTION

Branding is a time honored tool that has successfully been used by producers and/or other supply chain members to increase consumer awareness, loyalty, and, ultimately, willingness to pay for their product. The goal of such marketing strategies is to convince consumers that the brand name is a substitute, or proxy, for quality. A number of studies show the positive association between the brand name and perceptions of quality (e.g. Rao and Monroe, 1981; Dodds et al., 1991), which eventually leads to increased consumer confidence (e.g. Laroche et al., 1996). Interestingly, after brand awareness is established, consumers tend not to explore the additional informational attributes and purchase the known brand even if it is lower in quality (Hoyer and Brown, 1990). This is likely because the search cost associated with updating product information across a set of competitors is greater than the benefit that the consumer expects to receive as a result.

The extent to which the brand is convincing in its effort is known as the customer-based brand equity in the marketing literature and is defined as the "differential effect of brand knowledge on consumer response to the marketing of the brand" (Keller, 1993: 8). In other words, brand equity is a difference between the marketing effects accrued to the branded and non-branded products (e.g. Farquhar 1989; Aaker, 1991; Ailawadi et al., 2003). Further, Raggio and Leone (2007) argue that brand equity is distinct from the brand value, the former being consumer-related and the latter being firm-related concepts and define brand equity as the perception that the brand meets a promise of benefits to consumers. Based on these definitions, if

consumers react more favorably to the marketing mix of the brand, it is said to have positive brand equity (Keller, 1993).

Alternatively, one might imagine that, while consumers generally prefer variety, once they have had a positive consumption experience, then they behave in a risk-averse manner and continue to consume a product with which they had a positive previous experience versus a substitute about which they have less information. Brand, therefore, possesses the credibility to signal better quality and decrease the perceived risk (Erdem and Swait, 1998). The result is a tendency on the part of consumers to remain loyal to the familiar brand rather than choosing the uncertain alternative (Erdem and Keane, 1996). This phenomenon is also referred as an "inertia value" of the brand (Keller and Lehman, 2006). Therefore, branding may represent a mechanism to address this risk-averse behavior by providing a guarantee that the product consumed today will be essentially identical to the one the consumer sampled at some previous time. Furthermore, a positive experience with a brand may reduce the expected pay off of updating information about competing substitutes and thereby create persistence in purchase.

This paper attempts to reveal and compare representative consumer willingness-to-pay (WTP) for selected credence attributes of branded and non-branded pork chops. Credence attributes are one of the three categories of attributes that product may carry (Darby and Karni, 1973). The other two categories are "search" and "experience" attributes (Nelson, 1970). For example, in case of pork chops price will be a search attribute and taste will be an experience attribute. These two categories can be evaluated by consumers prior or during the use of a product. On the other hand, credence attributes are unidentifiable by consumers and they can only rely on information provided to them. It is, therefore, trivial to assume that the more trustworthy the source of this information is the higher will be the valuation of credence

attribute(s) by consumers. In case of pork chops, the example of a credence attribute may be information about the producer provided on a label of the product.

Credence attributes used in this research are certifications of antibiotic-free production, environmentally friendly production and livestock well-being in the production process. These attributes are derived from the externalities of livestock production as it is associated with generating externalities related to the health (health-hazardous antibiotic-resistant pathogens developed from growth-promoting antibiotics used in livestock production), environment (waste from production affecting water and air quality) and animal welfare (Lusk et al., 2007). These negative externalities may be regulated by restricting or banning certain production practices or, alternatively, markets may regulate the supply of socially optimal quality products. The latter would be a result of concerned consumers' WTP some premium for the credence attributes.

As stated above, credence attributes are such that the consumer cannot verify whether the product they purchased possesses the attribute even after consumption. Because this, there is an incentive for firms to "cheat" by making claims that cannot be verified (e.g. Erdem and Swait, 1998). This means that in absence of some sort of credible signal, many consumers will distrust claims of credence attributes. Why do firms brand? In part, it conveys trust and reputation (Shapiro, 1983). Thus, brands might serve to enhance the credibility and perceived verifiability of credence claims - making them more valuable to consumers.

It is worth noting that the *brand effect* of introduction of credence attributes is *a priori* unknown. Namely, two different effects may alter a product's brand equity. The first effect is what we refer to as *credence substitution* – introduction of a credence attribute that certifies the additional quality characteristics of the product may substitute for the brand equity, because both

signify overall quality of the product, and is likely to decrease the brand equity. The second effect is what we refer to as *credibility premium* – introduction of a credence attribute may complement with the brand equity as it is likely to instill trust in the product, and is likely to build on brand equity. Therefore, a *net brand effect* may be positive (negative) if the credibility premium effect is larger (smaller) than the credence substitution effect (see Figure 1). Having the brand effect and its components defined, one would expect a positive net brand effect, for example, in relatively weak brands and/or if the brand is newly introduced to the market. In such a situation, the additional verification of product quality from a credible third party will likely complement the product brand equity. Alternatively, the negative net brand effect is expected to be observed in the case of strong brands with already well established brand equity, or if brand already carries a relatively large number of credence attributes (e.g. Scammon, 1997). In this case, brand name itself represents a credible source of information and, therefore, credence substitution between brand equity and the credence attributes is likely to be observed to a larger extent. Both discussed effects are what Keller and Lehmann (2006) refer to as "biased perceptions" - the extent to which the perception towards the product attributes changes due to the brand effect.

Additionally, not only does branding increase the average perceived quality, it is likely to reduce the variability in quality. It is, therefore, expected that the variability in WTP for a credence attribute is lower for branded than non-branded products.

During the last several decades a large number of consumer studies have been conducted revealing and measuring consumer preferences for different products and/or product attributes. The earlier studies mainly concentrate on consumer demand for nutritional and health issues (e.g. Adrian and Daniel, 1974; Capps and Schmitz, 1991). The later studies attempt to reveal

consumer preferences for factors such as country of origin labeling, food safety, producer traceability, etc. (e.g. Loureiro and Umberger, 2003). During the current decade studies about the demand for organic products have also been frequent (e.g. Huffman, 2003; Dhar and Foltz, 2005). Along with the studies discussed above, there is a growing interest in analyzing such product specific factors as environmental friendly production, ethical treatment of animals, etc. (e.g. Nilsson et al., 2006; Ubilava et al., 2009).

The objective of this research is to examine the degree to which the introduction of credence attributes affects customer-based brand equity. We examine this in the context of pork chops in the domestic market of the U.S. by comparing consumer WTP estimates of branded and non-branded products with and without credence attributes. The credence attributes examined are third party certifications of environmentally friendly production, antibiotic-free production, and animal welfare during the livestock production process. The brands considered in this research are Hormel, Tyson and Store brands.

We find that the introduction of the credence attributes reduces the gap (in relative terms) between consumers' valuations of branded and non-branded products. This result is consistent with brand theory considering that the value of the brand name is derived from the extent of its differentiation from other competitors (Srinivasan and Till, 2002). Hence, by introducing the similar credence attributes the degree of the differentiation between different brands, or branded and non-branded product, declines and they look similar to prospective purchasers. We also find that even though consumers are willing to pay for credence attributes, they tend to value those with direct personal benefits more than those that benefit society more generally. This result is consistent with the assumptions of consumer free-riding and selfish preferences (Lusk et al., 2007).

Results and findings of this paper may be of interest to product suppliers and policy makers, as well as researchers in the fields of branding and consumer behavior. It is worth noting that the results of this research should not be directly generalized for all product categories and every credence attribute, as one may find different type of relationship between brands as well as attribute-related effects on brand equities within each product category. However, this does not question the validity of the conceptual model of attribute-related brand effects developed above, as it maintains the flexibility of confirming different outcomes depending on the initial market conditions.

2. METHODOLOGY AND THEORETICAL MODEL

Brand equity has been widely studied and conceptualized in the relevant literature (eg. Aaker, 1991; Broniarczyk and Alba, 1994; Feldwick, 1996; Chaudhri and Holbrook, 2001). Despite the general agreement on definition of brand equity among researchers, there is some disparity in approaches to measure brand equity (Ailawadi et al., 2003). Keller (2002) summarizes three different categories on which the measuring of brand equity is based in the literature: "consumer/customer brand knowledge", "product/market performance" and "shareholder value". The first category entails measuring brand equity using the information about the awareness, associations and attitudes toward the brand among the consumers. The second category uses conjoint analysis-related approaches to measure the proxies of brand equities such as price premium, relative price, residuals in a hedonic regression, etc. The third category evaluates brand equity based on some financial market estimates of the brand (see Keller, 2002 and Ailawadi et

al., 2003 for more in-depth review of these three categories and their advantages and disadvantages).

In this paper we concentrate on the "product/market performance" type of analysis. The theoretical background of this research is based on the Lancasterian view of utility. Lancaster's approach to consumer theory was a break from the traditional approach that utility is derived from goods and, instead, supposed that the properties or characteristics of the goods are the sources of consumer utility (Lancaster, 1966). Therefore, the consumer, with specific preferences for each of the product characteristics and a budget constraint, will choose the bundle of attributes (product in total) that maximizes his/her utility.

Keller (1993) distinguishes product-related and non-product related attributes of the product, with the former being necessary ingredients to perform product basic functions, and the latter being external aspects, such as price, packaging, consumer characteristics, etc. Considering price as an attribute is important, because consumers generally associate higher price with higher product quality (e.g. Olson, 1977; Blattberg and Wisniewski, 1989). Brand name, in terms of brand equity, may also be considered in the attribute domain of the product, carrying information about product quality (e.g. Krishnan et al., 1989).

Product-related attributes on one side and non-product related attributes on the other side make the prediction of the decision making process particularly complex for the researcher. However, a pattern of choice that is shared by the majority of the consumers may be observable in data from actual purchases or choice experiments.

This research relies on the assumption that every individual (decision maker) has the goal of achieving maximum utility subject to his or her resource allocations or budget constraint. Note

that in current application we assume that together with the own well-being, the well-being of others (humans or animals) also enters the utility function of the individual decision maker. The Random Utility Maximization (RUM) represents a potential tool for analyzing consumer preferences based on objective and/or subjective factors taken into account as well as assuming some degree of heterogeneity among individuals.

To develop the main idea of the RUM, we need to introduce the notation in terms of a decision maker, n, facing a choice among $j=1, \ldots, J$ alternatives. The decision maker could attain a certain level of utility from each alternative. Each derived utility can be denoted as U_{nj}. The assumed rational decision maker will choose the utility maximizing alternative. Thus, alternative i will be chosen over alternative j by consumer n if and only if $U_{ni} > U_{nj}$, for all $j \neq i$.

The above mentioned utility (U_{ni}), for research purposes, can be additively decomposed into the systematic component of the utility associated with i^{th} alternative for n^{th} individual (V_{ni}) and a stochastic component (ϵ_{ni}) which captures the non-systematic (or idiosyncratic) factors that affect utility but are not included in V_{ni}.

$$U_{ni} = V_{ni} + \epsilon_{ni} \tag{1}$$

In this study, we examine fixed effects and random effects specifications by implementing conditional logit and mixed logit models. Conditional logit treats individuals as homogeneous in their consumption decisions. Therefore, the chosen specification for the systematic component of the utility is the following:

$$V_{ni} = \beta' x_{ni} \tag{2}$$

where β is the vector of the coefficients for each attribute discussed in Table 1. The probability, hence, that the n^{th} individual chooses i^{th} alternative among j alternatives ($j = 1,\ldots,J$) in the choice set t, is represented as follows:

$$P_{nti} = exp(\mu V_{nti})(\sum_j exp(\mu V_{ntj}))^{-1} \quad (3)$$

where μ is a scale parameter, which is unidentified when estimating a single model. Therefore, it is usually assumed to be equal to 1, and omitted from the model. However, the scale parameter, more specifically a relative scale parameter, becomes important when comparing several models to each other, which we intend to do in this research.

In the mixed logit model, sometimes also referred as the random parameter logit model, the homogeneity assumption is relaxed and parameters are individual-specific:

$$V_{ni} = \beta_n' x_{ni} \quad (4)$$

Following Revelt and Train (1998), this can also be rewritten as:

$$V_{ni} = (\bar{\gamma} + \eta_n)' x_{ni} \quad (5)$$

where $\bar{\gamma}$ is the parameter of population mean, and η_n is the vector representing the stochastic deviations of the individual's preferences from the population mean. So, if we assume that the coefficients vary over decision makers in the population with density $f(\beta)$, then the probability that the n^{th} individual chooses the i^{th} alternative over the other $j = 1,\ldots,J$ alternatives facing the choice set t, can be represented as:

$$P_{nti} = \int exp(\mu V_{nti})(\sum_j exp(\mu V_{ntj}))^{-1} f(\beta) d\beta \quad (6)$$

Both, conditional and mixed logit models are estimated using the maximum likelihood procedure. In case of mixed logit model parameters of attributes and their interactions terms are

assumed to be normally distributed, and the simulated log-likelihood (*SLL*) function is being maximized (for details see Train, 2003).

3. DATA

The research approach in this study uses a choice experiment to obtain the stated preferences of individual U.S. consumers for such pork attributes as *free of antibiotics* (ANT), *environmentally certified* (ENV), and *livestock well-being* (WEL). The main reason for using this approach is that these attributes are non-market, and a number of papers (e.g. Louviere et al., 2000; Adamowicz, 2004; Carlsson et al., 2007) have demonstrated the efficiency of this method over other possible methods of data collection.

The choice experiment approach implies providing the respondent with a set of alternatives with different attributes, among which the subject chooses (see Figure 2 for an example). In this way, a choice experiment closely mimics the real purchase situation wherein the customer examines different varieties of the product and then chooses one of them or none at all. A total amount of 64 choice sets used in the questionnaires were divided into 4 sub-samples, so that each respondent was provided with 16 choice sets.

This research examines three two-level credence attributes, and a four-level price attribute. The interpretations of the attributes are contained in Figure 2. The three credence attributes enter the choice experiment in a binary mode, which yields the number of different combinations of the attributes (in this case 64) presented in each scenario. The range of the price is between $3 and $4, which is approximately $1 higher compared to a range of the pork prices in the market at the time the study was conducted. Allowing prices in the experiment to range

above the market average is supported by the idea that price carries the information about the quality of the product and is meant to encompass the additional attributes, not commonly available in the market, that were introduced into the hypothetical products in the choice set.

Surveys were mailed to a random sample of 9600 representative households in the United States in January 2004. In 7200 of these surveys, choice sets included a brand attribute (as it is presented in Figure 2), in the remaining 2400 surveys no brand attribute was included in the choice sets. The mailing list of potential respondents was obtained from a reputable private company and was generated by drawing names and addresses from the telephone white pages while maintaining the proportion of the mailing sample in a particular geographic locale with the proportion of actual residents in the locale as determined by U.S. census data. The response rate was 10.4 percent, and after eliminating incomplete surveys, there were 197 non-brand and 642 brand surveys available for analysis.

In addition to the choice experiment outcomes, some demographic information was also obtained. Descriptive statistics of selected demographic information are presented in Table 1. Most of the measures obtained from the research sample correspond well to U.S. 2000 Census data (for example, parameters of average household size and presence of children (defined as under 18) in the household are 2.6 and 32.4 percent in the research sample, and 2.6 and 36.0 according to the U.S. Census data), while others deviate slightly (for example, median household income is 56,000 USD in the sample, and 42,000 according to the U.S. Census data). Nevertheless, these results imply that overall we have a reasonably representative sample of the population.

4. EMPIRICAL MODEL AND ESTIMATION

The deterministic component of the empirical model for conditional logit estimation consistent with the RUM concepts above is as follows:

$$V_{ni} = \alpha_i + \beta_p p_{ni} + \beta' x_{ni} \quad (7)$$

where α_i is an alternative specific constant, containing also the information about consumer WTP for a brand attribute where applicable (in non-branded choice sets the alternative specific constants are constrained to be equal); β_p is a price parameter, β is a vector or parameters of other product specific attributes and their interaction terms; p_{ni} is a price variable of the product, x_{ni} is a vector of product-specific characteristics (ENV, WEL, and ANT as defined in Table 1) and interaction terms between product specific characteristics of the i^{th} alternative.

In the mixed logit model alternative-specific parameters, product-specific parameters and parameters of the interaction terms are considered to be random. However, we treat the price parameters as fixed. Froma consumer behavior perspective, this is supported by the fact that variance in the utility of price is assumed to be small, whereas the variance in the utility of quality is expected to be large (e.g. Nelson, 1970). From an empirical perspective, keeping price parameters fixed ensures that all of the respondents have the same negative price coefficient (e.g. Lusk et al., 2003), and eases the computational process of the asymptotic variances of derived WTP values (e.g. Revelt and Train, 1999). We also assume that the random parameters are normally distributed. So, the deterministic component of the mixed logit model in this research is represented as:

$$V_{ni} = (\alpha_i + \eta_{\alpha,n}) + \beta_p p_{ni} + (\bar{\gamma} + \eta_{x,n})' x_{ni} \quad (8)$$

where η is the vector of random effects with zero mean and standard deviation equal to σ, the latter reflecting the divergence of individual's preferences from the mean population preferences. Other parameters and variables are similar to the ones defined for the Equation 7.

In this research we estimate two models, one with alternatives including the brand attributes and one with non-brand alternatives only. The goal is to compare the parameters of the non-branded option in these two models with each other. Therefore, parameter constancy across the two regimes is of interest to determine if the expressed preferences for the credence attributes are jointly statistically different from each other. For this, we adopt a preference regularity hypothesis (Swait and Louviere, 1993; Louviere et al., 2000), $H_0: \beta_1=\beta_2|\mu$, where β_1 and β_2 are vectors of parameters for prices, attributes and their interaction terms of the non-branded options in each set, and μ is a relative scale parameter. According to Louviere et al. (2000) the regularity test statistic is $-2[LL_A-(LL_B+LL_N)]$, which is chi-square distributed with $K\times(L-1)$ degrees of freedom, where K is the number of restrictions and L is the number of datasets; LL_A is the log-likelihood value at the convergence from the artificial nested logit model estimated following Hensher and Bradley (1993) and Adamowicz et al. (1998), and LL_B and LL_N are the log-likelihood values of the separate conditional logit models of branded and non-branded data, respectively, at the convergence. The obtained test statistic exceeds the adequate chi-square statistic at $\alpha = 0.05$ level. We therefore reject the preference regularity which, in the context of this research, means that the presence of brand names does affect consumer preferences for the credence attributes.

Consumer preferences are interpreted in terms of willingness-to-pay estimates. These are calculated from the estimated parameters of conditional or mixed logit models as follows:

$$WTP_a = -\theta_a/\beta_p \quad (9)$$

where θ_a is an estimate of the a^{th} attribute (or its standard deviation where applicable), and β_p is an estimate of the price, from the logit estimations. Note, that in a given formulation of the WTP estimate, we have a ratio of two parameters. Therefore, the presence of the scale parameter would not affect the interpretation of the estimated consumer preferences, because the scale parameter is cancelled in the WTP ratio. Standard errors for the WTP estimates are obtained using the delta method.

Further, we consider estimated WTP-s for the non-branded product as objective measures of consumer valuation of a product and its attributes. Hence, the proposed measure of the brand equity is a difference between the estimated WTP values of branded and non-branded products:

$$BE^K = WTP^K - WTP^N \quad (10)$$

where BE^K is K^{th} brand's equity, and WTP^K and WTP^N are cumulative WTP values of K^{th} brand and non-branded product, respectively.

Finally, we measure the net brand effect of additional credence attribute for the K^{th} brand by taking the difference between BE^K-s, each calculated with and without the credence attribute, respectively:

$$\Delta BE^K = BE^K_j - BE^K_0 \quad (11)$$

where BE^K_0 and BE^K_j are calculated brand equities before and after introduction of the credence attribute, respectively.

5. RESULTS AND FINDINGS

The results of the conditional and mixed logit estimations are provided in Tables 2 and 3. Most of the estimates in both models are statistically significant at α=0.01 level. The estimated parameters from the mixed logit model are generally higher compared to their conditional logit model counterparts. One reason for this must be a scale parameter, μ, which is the inverse of the error variance of the model. Because the mixed logit model relaxes the homogeneity assumption of the conditional logit model, it fits the data better. As a result, the error variance decreases, and the scale parameter increases and scales up the estimated parameters in the model. However, as we noted above, this will not cause any problems in our further discussions, because the interpretation of results will be mainly focused on the WTP estimates.

In general, consumers reveal positive preferences for all three attributes of the interest. Estimated parameters of the brand-attribute interaction terms are all less than their no-brand counterparts, implying that branding and credence attributes are substitutes, or, alternatively, introduction of the informational attributes to the product cannibalizes consumers' perceived benefits from brands. However, all the statistically significant parameters on attribute interaction terms are positive, suggesting a complementary relationship between the informational attributes. Estimated standard deviations in the mixed logit model without brand effects (see Table 3) are statistically significant, implying heterogeneity in preferences for product attributes. However, this heterogeneity disappears when brands are introduced in the model. We therefore argue that heterogeneous consumers may be grouped into homogeneous sub-clusters based on their preferences for different pork chop brands. We calculate WTP estimates according to the Equation 9, and report them in Table 4. The results of mixed logit models are used to obtain

WTP estimates, because it is a more general specification that accounts for the possible preference heterogeneity and provides an easily interpretable measure of the size of various treatment effects. We calculate brand equity-related estimates from these WTP estimates according to Equations 10 and 11, and report them in Table 5. Analysis of these results leads us to three main findings that may contribute to the relevant literature.

Finding 1: Credence attributes have negative net brand effect. Difference in relative prices between branded and non-branded products shrinks as credence attributes are introduced to the products. When none of the attributes of interest are present, consumer WTP for a branded product is 25 to 40 percent larger compared to their WTP for a non-branded product. However, when all three attributes are introduced, the cumulative WTP for a branded product is only about 14 percent larger than the WTP for non-branded products. Also, in absolute terms, we mostly observe the reduction of brand equities as additional attributes are introduced to the products. Finally, if we consider the attribute-less brand equity measures as the initial condition, it is easy to notice that, in general, relatively weaker brands benefit more (or lose less) in terms of brand equity, as new credence attributes are introduced to the product. We surmise that this is the result of trust in the brand. That is, a consumer considering a branded product has an implicit credence that the pork chop is of high quality in other dimensions as well because they recognize the value of good behavior on the part of the brander in the repeated game context. Whereas, when several credence attributes are introduced to the product, consumers' overall preferences for the non-branded product increases at a higher rate than for the branded product, and the difference between the cumulative WTP values for these two products is declining. One can argue, that in a limit, WTP for branded and non-branded products may be equal, once a "sufficient" number of informational attributes is present, but in practice this may not be attainable due to production

constraints – the marginal cost of introducing the attribute will exceed the premium that consumer is willing to pay for that attribute and the size of the label may preclude imparting enough information to achieve this convergence.

Finding 2: Results of a choice experiment with unspecified brand names in the market of branded products are biased. Based on the results, we observe differences in estimated consumer preferences for product attributes whether or not brand-specific alternatives are present in choice experiments. Considering that in a real life situation consumers usually face a choice between a number of branded and non-branded products, we assume that the estimates of the non-branded choice sets are biased due to the experimentally-based relative emphasis on the non-branded product. Namely, the alternative-specific constant and parameters on interaction terms are biased upward, and parameters on attributes are biased downward, implying that in absence of the brand-specific information respondents tend to make their purchase decision primarily based on basic product characteristics rather than each credence attribute. However, a bundle of credence attributes does impact their preferences in favor of the product alternative. Also, the heterogeneity parameters are biased upward, because of the increased uncertainty due to the lack of information about product brands. The latter implies, that when "brand effects" are not considered, one may conclude that some consumers will not be willing to pay a positive premium for the product attributes. However, with brand alternatives introduced in the experiment, there is little evidence, if any, to argue that consumers will not be willing to pay premiums for the credence attributes of interest.

If a consumer faces the non-branded choice, the estimated WTP for a pork chop, given that none of the certification attributes are present, is $3.04. However, when a consumer has a choice of non-brand product along with the brand products, the WTP for a non-branded

alternative decreases to $2.21, and the WTP for the branded alternatives ranges from $2.76 to $3.09 per pound. The range of WTP estimates for these different brands is relatively small. We therefore assume that it is unlikely to have economic relevance. It is, however, notable that the WTP for the store brand is higher than the WTP for the other two considered national brands, and all three are larger than the WTP for non-branded alternative. This finding is a surprise, but can be explained if consumers tend to purchase products in the same store over time and, therefore, their trust for the store brands is reinforced with repeated positive experience or they change their preferred shopping locale.

Finding 3: Consumers are egocentrically altruistic. At the mean, consumer preferences for the attributes of interest when they appear singly in a pork chop can be ranked in order of importance as antibiotic free, animal well-being and environmentally friendly. This is somewhat expected outcome, implying that individuals are more concerned about direct health hazards today, than with indirect consequences of the environmentally unhealthy practices in future. The fact that most of the consumers are willing to pay premiums for the production externalities talks about their altruistic intentions. Lusk et al. (2007) also confirm the relationship between consumer altruism and their WTP for environmentally and animal friendly production. On the other hand, consumers happen to put larger weight on own health-related attributes, rather than others' (other individuals, animals, future generations) health-related attributes, which makes them selfishly, or egocentrically, altruistic.

6. CONCLUSIONS

The main objective of this paper was to reveal how the preferences for the branded and/or non-branded products are affected by introducing credence attributes into the product. In general, the effects of the selected credence attributes are higher in non-branded products, implying that 1) credence attributes have a negative net brand effect on brand equity and 2) additional information in non-branded products increases credibility and reduces uncertainty in such product quality.

The results of the research suggest that on average consumers are willing to pay more for branded products (positive brand equity), but introduction of the credence attributes in the product reduces the difference in the overall WTP for the branded and non-branded products (negative brand effect). That is, more information makes the branded and non-branded products look similar for consumers, from the psychological perspective, and hurts the branded producers relative to the generic producers, from the economic perspective.

Implications from this finding can be summarized as follows: since additional credence attributes benefit more the generic producers, they are expected to pioneer product certification with credence attributes. Branders are expected to follow in introducing the certified credence attributes, as they increase consumer WTP for the product. And finally, branders should undertake measures to enhance the non-attribute-based component of brand equity (e.g. Park and Srinivasan, 1994) to make up for the loss of attribute-based brand equity.

In addition, primary producers and processors of food products may find that certification is a mechanism to differentiate and add value to their products in downstream markets, such value may erode quickly, however, as others in the marketplace recognize the opportunity and

commoditize the attributes. This makes it doubly important that certifier develop proprietary standards and capture some consumer loyalty if they hope to preserve these first-mover advantages in to the future.

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TABLES

Table 1: Selected Descriptive Statistics

	Research Sample (2004)	US Census (2000)
Female (percent)	60.6	50.9
Age (mean/median)	53	44*
Household Size (mean)	2.6	2.6
Children under 18 in Household (percent)	32.4	36.0
Urban (percent)	68.5	79.0
Annual Household Income (median)	56023	41994

*** Calculated for the Population of Age 20 and Older**

***Source*: Survey and U.S. Census Bureau**

Table 2: Results of Conditional Logit Models

	Choices with Brands				Choices without Brands
	Hormel	**Tyson**	**Store Brand**	**No brand**	
Price	-1.33***	-1.59***	-1.54***	-1.50***	-1.59***
ASC	3.66***	4.45***	4.80***	3.19***	3.78***
ANT	1.08***	0.82***	0.97***	1.66***	1.32***
ENV	1.04***	0.67***	0.26**	0.57***	0.55***
WEL	0.85***	0.91***	0.30***	1.14***	0.95***
ANT×ENV	-0.17	0.47***	0.34***	0.01	0.25**
ANT×WEL	0.43***	0.50***	0.41***	-0.14	0.16
ENV×WEL	0.04	0.40***	0.82***	0.51***	0.61***

***, **, and * represent significance at α=0.01, 0.05, and 0.1 levels, respectively

Table 3: Results of Mixed Logit Models

	Choices with Brands				Choices without Brands
	Hormel	**Tyson**	**Store Brand**	**No brand**	
Price	-1.39***	-1.78***	-1.63***	-1.64***	-3.30***
ASC	3.83***	5.15***	5.04***	3.63***	9.95***
S.D.	0.13	0.32	0.49**	0.23	3.14***
ANT	1.08***	0.62***	0.99***	1.61***	2.09***
S.D.	0.00	0.26	0.10	0.38	3.43***
ENV	1.05***	0.47***	0.24**	0.53***	0.80***
S.D.	0.10	0.31	0.06	0.14	2.65***
WEL	0.80***	0.73***	0.30**	1.10***	1.40***
S.D.	0.38	0.08	0.15	0.06	3.12***
ANT×ENV	-0.15	0.79***	0.40***	0.08	1.23***
S.D.	0.04	0.40	0.02	0.17	0.71
ANT×WEL	0.51***	0.71***	0.47***	-0.13	1.03***
S.D.	0.02	0.84	0.03	0.53	1.12*
ENV×WEL	0.08	0.62	0.89***	0.60***	1.57***
S.D.	0.26	0.76**	0.20	0.12	2.32***

***, **, and * represent significance at α=0.01, 0.05, and 0.1 levels, respectively

Table 4: WTP Estimates from Mixed Logit Models

	Choices with Brands				Choices without Brands
	Hormel	**Tyson**	**Store Brand**	**No brand**	
ASC	2.76***	2.90***	3.09***	2.21***	3.01***
S.D.	0.09	0.18	0.30**	0.14	0.95***
ANT	0.78***	0.35***	0.61***	0.98***	0.63***
S.D.	0.00	0.15	0.06	0.23	1.04***
ENV	0.76***	0.26***	0.15**	0.32***	0.24***
S.D.	0.07	0.17	0.04	0.09	0.80***
WEL	0.58***	0.41***	0.18**	0.67***	0.42***
S.D.	0.28	0.05	0.09	0.04	0.95***
ANT×ENV	-0.11	0.45***	0.25***	0.05	0.37***
S.D.	0.03	0.22	0.01	0.11	0.21
ANT×WEL	0.37***	0.40***	0.29***	-0.08	0.31***
S.D.	0.02	0.47***	0.02	0.32	0.34*
ENV×WEL	0.05	0.35***	0.54***	0.37***	0.48***
S.D.	0.19	0.43**	0.12	0.07	0.70***

***, **, and * represent significance at α=0.01, 0.05, and 0.1 levels, respectively

Table 5: Measures of Brand Equity and Attribute-Related Effects

	Hormel			Tyson			Store Brand		
	BE	**%BE**	**ΔBE**	**BE**	**%BE**	**ΔBE**	**BE**	**%BE**	**ΔBE**
BE_0	0.55	24.9		0.69	31.2		0.88	39.8	
BE_A	0.35	11.0	-0.20	0.06	1.9	-0.63	0.51	16.0	-0.37
BE_E	0.99	39.1	0.44	0.63	24.9	-0.06	0.71	28.1	-0.17
BE_W	0.46	16.0	-0.09	0.43	14.9	-0.26	0.39	13.5	-0.49
BE_{AEW}	0.67	14.8	0.12	0.60	13.3	-0.09	0.59	13.1	-0.29

***Note*: BE denotes the brand equity calculated according to Equation 10; ΔBE denotes the net brand effect calculated according to Equation 11; and %BE is a ratio of BE and non-branded product evaluated at given attribute levels and expressed in percentage terms.**

FIGURES

Figure 1: Conceptual Model of Attribute-Related Effects on Brand Equity

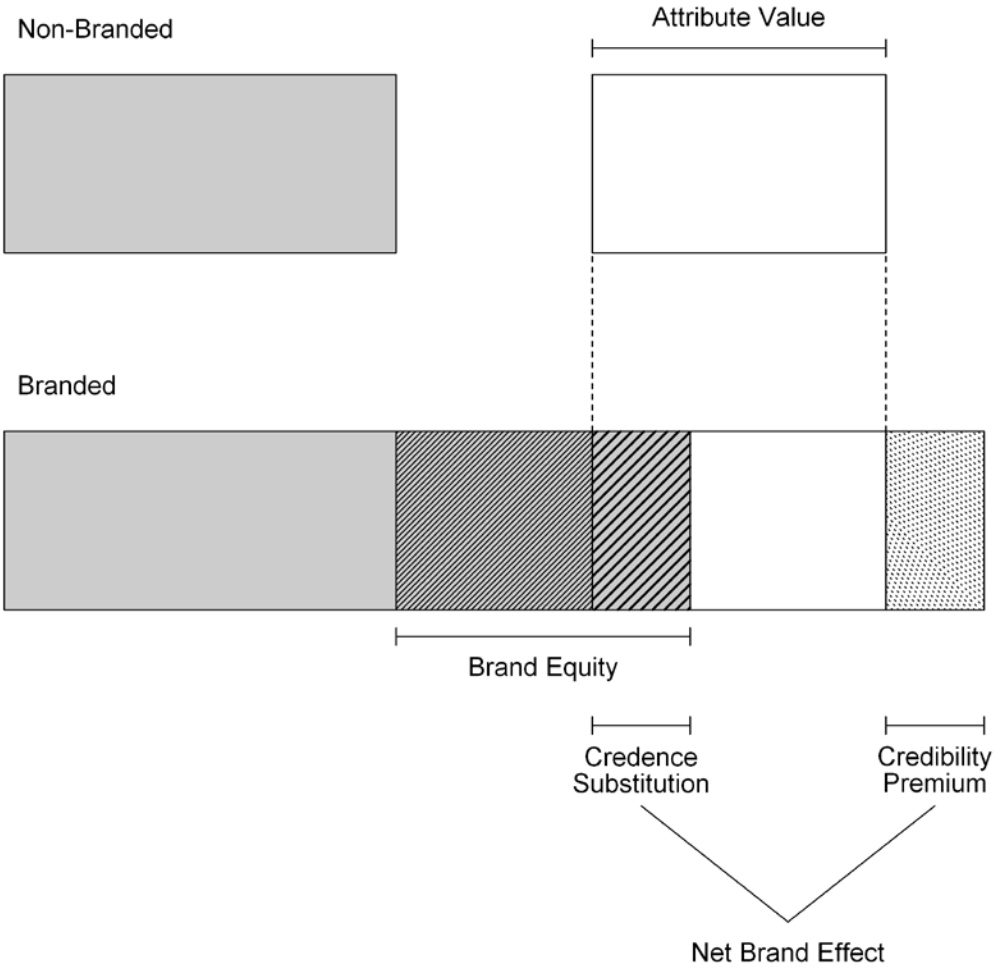

Figure 2: Sample Choice Set Used in Choice Experiment

Please choose A, B, C, D, **or** E.

Option / Attribute	*A*	*B*	*C*	*D*	*E*
Brand Name	Hormel	Tyson	Store Brand	No Brand	
Price ($/lb)	$4.00	$4.00	$3.60	$3.30	I would not purchase any of these products
Environmentally Certified					
Certified for Animal Well Being				✓	
Certified Free of Antibiotics	✓	✓	✓		
I would choose . . .	○	○	○	○	○

A check mark indicates that the pork chop is certified according to the specified program.

Figure 3: Pork Attributes and Levels in Choice Experiment

Attribute	Levels	Definition
Price	3.00	US Dollars per Pound
	3.30	
	3.60	
	4.00	
Environmentally Certified (ENV)	Binary	Requires that the farmer follow an environmental plan that is approved by the International Standards Organization (ISO), which controls the disposal of waste and the location of the farm relative to houses and water in order to reduce pollution and other nuisances
Certified for Animal Well-Being (WEL)	Binary	Requires that the farmer and the processor both meet the specifications developed by the Food Marketing Institute (FMI) and the National Council of Chain Restaurants (NCCR) for proper animal care, housing, and transportation
Certified Free of Antibiotics (ANT)	Binary	Requires that pigs have received no antibiotics through feed or injections during their entire life