

# A Comparison of Hypothetical Survey Rankings with Consumer Shopping Behavior

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Hypothetical surveys are commonly used to elicit consumer behavior to guide product development, marketing, and labeling strategies. However, despite the prevalence of surveys in consumer food studies, previous work has not assessed the relationship between hypothetical responses and actual consumer behavior in real-world purchase situations. We explore whether attributes cited by consumers in surveys as being important to them when making decisions indeed factor into their product decision process in real-world markets. Evidence from a point of sale study of 702 pork purchasers indicates that there is a strong correspondence between hypothetical survey ratings and actual shopping behavior.

*Key Words:* attribute ranking, consumer shopping behavior, hypothetical surveys, origin labeling, pork

**JEL Classifications:** C8, C9, Q1

Product labels are a key mechanism at the point of sale to communicate both desirable and undesirable product attributes and to facilitate informed product choices by consumers. For the crowded food-product space, which is characterized by an abundance of close substitutes differentiated by credence and experience attributes, an extensive literature has emerged evaluating consumers' purchase behavior for existing and new attributes that can be signaled by labels. Researchers, given the absence or lacking nature of revealed behavioral data, use

numerous methods for eliciting consumer preference behavior, including survey instruments, choice experiments, and experimental auctions.

Despite having less attractive theoretical properties compared with choice experiments and auctions, hypothetical surveys are widely used for eliciting consumers' preferences for food attributes due to their simplicity and low cost of implementation. Whereas there is great variety across the literature in the specific framing of survey questions, an illustrative example would be as follows. Consumers are presented with a printed list of product attributes (e.g., price, fat content, origin, and brand for some commodity [e.g., beef]). Consumers are then asked to evaluate the attributes from the list on some scale specified by the researcher. For example, "select which attribute is most important and least important to you when making your product purchase decision" or "on a scale from 1 to 5 (where 1 is not important and 5 is very important), how important is each attribute in

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your purchase decision?" These types of questions are widely used in the consumer and marketing literature and serve as the basis for providing producers and retailers with recommendations for product development, marketing strategies, and labeling. For example, a sampling of studies focusing just on meat products using similar hypothetical survey instruments to elicit consumer perceptions include Bernués, Olaizola, and Corcoran (2003), Chen et al. (2002), Davidson, Schröder, and Bower (2003), Glitsch (2000), Hoffmann (2000), Lusk and Parker (2009), Roosen, Lusk, and Fox (2003), and Verhoef (2005).

Responses to survey questions such as these conceptually reveal what attributes consumers consider when making their product decisions in real-world market situations. However, despite the popularity of survey methods in the agricultural and food economics literature and the reliance of producers and regulators on their findings, previous studies have not sought to evaluate if responses to food attribute surveys correspond with real-world consumer purchase behavior and product perceptions. In particular, a question that has not been addressed is if those attributes that consumers cite in surveys as being very important to them indeed factor into their product decision process in real-world markets. Whereas analyses of food products using these survey methods implicitly presume such a relationship exists, it is unclear from previous research whether this is indeed the case let alone the strength of the correspondence between survey responses and actual consumer behavior.

Given the hypothetical feature of survey questions of this nature, there is clear reason for concern as a result of the well-documented evidence of hypothetical bias across different valuation mechanisms (for reviews, see Harrison and Rutström, 2008; Murphy et al., 2005) and recent evidence on social desirability bias (e.g., Lusk and Norwood, 2009). The preponderance of evidence across a variety of valuation mechanisms has indicated that there is a disconnect between consumers' hypothetical and actual valuations of goods despite increasingly sophisticated questioning mechanisms and protocols designed to mitigate hypothetical bias. These

mechanisms include certainty scales (e.g., Champ et al., 1997; Li and Mattsson, 1995), cheap-talk scripts (e.g., Cummings and Taylor, 1999; Loomis et al., 1996), and dissonance minimization (e.g., Blamey, Bennett, and Morrison, 1999). Whereas for a marketed good such as food products (particularly those without novel attributes) in which consumers have a high degree of familiarity and experience with the commodity, it is less likely for the persistence of hypothetical bias (see Cummings, Brookshire, and Schulze, 1986 for a discussion of this issue), there is little research on food products in this direction. In fact, across all preference elicitation mechanisms, the literature comparing findings in food studies with actual consumer behavior and market outcomes is surprisingly small. Existing studies include a comparison of real-world outcomes with auctions (Brookshire, Coursey, and Schulz, 1987), choice experiments (Chang, Lusk, and Norwood, 2009), framed field experiments (Lusk, Pruitt, and Norwood, 2006), and discrete choice and payment cards (Shogren et al., 1999). In this study, we add to this literature assessing the external validity of consumer preference methods by comparing consumers' hypothetical survey rankings of food attributes with actual consumer purchase behavior. In particular, we focus on the question of whether in fact food attributes in a hypothetical survey ranked by participants as being important to them indeed factor into consumers' product evaluation when making purchase decisions in real markets.

In our study, we focus on a key food attribute that has attracted significant attention in the literature—origin of production. Interest in investigating consumers' preferences toward origin labeled products, and in particular country of origin (COO) labels, has in part been invigorated with the passing of several new mandatory labeling laws and an emerging view that origin labeling can be an effective mechanism for producers to differentiate their products. Variations in product quality across countries, which may be determined by differences in the natural environmental and climatic conditions as well as differences in national quality standards, production and processing technologies, quality audit systems, etc., have even led to the reference of COO as "country brands" (e.g.,

Gilmore, 2002; Unterschultz et al., 1998). Research using a variety of methods has largely found that origin is an important attribute to a significant share of consumers when making their product choices. Examples of studies using hypothetical surveys focusing specifically on origin of production in which participants were asked to rank or rate a series of food attributes include Davidson, Schröder, and Bower (2003), Glitsch (2000), Hoffmann (2000), and Roosen, Lusk, and Fox (2003).

As previously noted, consumer attitudes toward COO labels have been an active area of research. Additional studies, most of which have found that consumers value foods bearing origin labels, include Abidoye et al. (2011), Alfnes and Rickertsen (2003), Chung, Boyer, and Han (2009), Dransfield et al. (2005), Feuz et al. (2004), Loureiro and Umberger (2005, 2007), Tonsor, Olynk and Wolf (2009), Tonsor et al. (2005), and Umberger et al. (2003). However, whereas most studies indicate that the origin of food is an important quality cue and factor in consumers' product evaluations and purchase decisions, the relative importance compared with other attributes (e.g., color, fat content) is widely mixed across the different products and consumer segments considered.

To assess whether product origin information is as relevant to consumers as previous studies indicate and the correspondence between hypothetical surveys and consumer behavior, we use data from a field interview of 702 pork purchasers conducted at the point of sale in a variety of food retailers. Participants engaged in both a hypothetical survey eliciting evaluations of the importance of different pork attributes (e.g., product's origin, price, color, visible fat) and a series of questions related to their knowledge and awareness of the actual attributes of pork purchased during their shopping trip. By conducting the survey concurrently with collecting consumers' actual decision in a market situation, we are able to compare commonly used hypothetical survey methods with actual market behavior. Evidence from the field study and a series of discrete choice models supports three primary findings: 1) in agreement with previous studies, we find that the place of origin is a highly relevant attribute to a subset of consumers;

2) a share of consumers does pay attention to the origin of the product and is willing to undertake costly search for origin information even if it is not present on the label/display; and 3) there is a strong degree of agreement between hypothetical survey responses and attributes relevant during the actual purchase decision process. This latter finding has practical implications because it instills confidence in the outcomes and prescriptions emerging from consumer research studies on food attributes through hypothetical survey methods for industry practitioners and policymakers.

The remainder of the article is as follows. In the following section, an overview of the data collection procedure is provided. The next section presents a summary of consumers' responses. Discrete choice models further assessing the relationship between hypothetical responses and actual behavior are provided in the following section. Finally, we conclude.

## Design of the Study

Data on consumers' attribute rankings and pork purchases were solicited through a questionnaire-based face-to-face interview conducted at five different food retailers in northern Germany. Pork is the most popular type of fresh meat consumed in Germany representing 75% (in quantity) of all fresh meat consumption in the country. Pork sold in Germany originates from a number of countries with the largest shares originating from Germany (almost 80%), and several European Union countries: Denmark (7%), Belgium (6%), and The Netherlands (3%). Although there have been discussions to implement mandatory origin labeling laws for pork, and significant support among consumers unsatisfied with existing labeling laws,<sup>1</sup> currently no policy is in place. However, origin labeling is common. In the stores considered in this study,

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<sup>1</sup> A recent survey at the national level by the German consumer organization "Verbraucherzentrale" found that 95% of respondents were not currently satisfied with current EU mandatory origin labeling requirements (see [http://www.vzbv.de/mediapics/bericht\\_umfrage\\_herkunft\\_von\\_lebensmitteln\\_23.07.2007\\_copy.pdf](http://www.vzbv.de/mediapics/bericht_umfrage_herkunft_von_lebensmitteln_23.07.2007_copy.pdf); accessed May 30, 2011).

the majority of the pork originated from Germany and Denmark with not only COO designations, but also more specific origin information such as the federal states (e.g., Schleswig-Holstein, Lower Saxony). To obtain a representative sample of consumers, interviews were conducted at: 1) a large supermarket in the center of a major city; 2) a smaller neighborhood supermarket on the periphery of the city; 3) a discounter; 4) a hypermarket; and 5) a butcher shop. Interviews were conducted over the course of a week during all shopping hours to capture different consumer segments.

Customers at the retailers were asked, after completing their purchases, if they had purchased pork during their shopping trips. Customers who responded affirmatively were asked to participate in a research project on shopping behavior. From a sample of 767 individuals who agreed to participate in the study, 702 individuals completed the full interview process, which lasted approximately 15 minutes and yielded complete responses to the survey questions. Summary statistics for the sociodemographics of the sample are presented in Table 1.

Over the course of the interview, participants were asked questions on a variety of topics, including 1) their attitudes toward pork and pork attribute ranking; 2) knowledge of the attributes of the pork they had just purchased; 3) their

history and habits when shopping for pork; and 4) sociodemographic information.

For the hypothetical survey of consumer attribute rankings, consumers were asked to rank a list of attributes based on their importance when purchasing pork. The list of attributes included: 1) brand; 2) color; 3) humane animal treatment; 4) controlled production (“Kennzeichnung einer kontrollierten Produktion”); 5) origin; 6) price; 7) shelf life; and 8) visible fat content. The choice of the attributes is based on a literature review in Grebitus (2008) with special regard to the results of a meta-analysis by Steenkamp (1989) and a literature review provided by Engelage (2002). This list of attributes is similar to those selected in many other survey studies evaluating the importance of food attributes (e.g., see Roosen, Lusk, and Fox, 2003).

To contrast these responses with real behavior when shopping for pork, an actual measure of whether consumers really use product origin information in the decision-making process is needed. Following Steenkamp’s (1990) model of the quality perception process, purchase decisions are the result of a complex cognitive process of quality perception based on newly acquired and stored information and quality evaluation. According to Steenkamp, the quality perception process starts with the acquisition of quality cues observed by the consumer in the

**Table 1.** Sample Characteristics

Variable Category	Variable	Mean	SD
Sociodemographic information	Age	45.69	17.06
	Education (years of schooling)	11.70	2.62
	Gender (female)	0.61	0.49
	Household size	2.35	1.16
	Net income (in Euros per month)	1440.16	791.04
Historical pork-purchasing habits	Exclusively purchase pork at the store	0.25	0.43
	Regular pork purchaser	0.65	0.48
Pork purchase characteristics	Pork on sale or advertised	0.12	0.32
	Pork expenditure (in Euros)	5.49	6.68
Where pork was selected in store	Cooler or freezer	0.51	0.50
	Counter	0.49	0.50
Type of retailer	Butcher	0.03	0.18
	Discounter	0.16	0.36
	Hypermarket	0.42	0.49
	Supermarket	0.39	0.49

SD, standard deviation.

purchase environment. Quality cues are informational stimuli and include the product's intrinsic (e.g., color, fat content) and extrinsic cues (e.g., origin information) as well as the product's surroundings (e.g., the point of sale itself). Depending on the consumer's cognitive abilities, the acquired cues are categorized (i.e., processed to produce new knowledge) and combined with stored information to form beliefs about the product quality that ultimately lead to decision-making (Kroeber-Riel and Weinberg, 2003; Steenkamp, 1990).

However, whether origin information (or any quality cue) is factored into the product evaluation process (i.e., is used by the consumer in the decision-making process) is not to be observed directly by the researcher (Olson, 1972), yet the researcher is able to verify if a given cue is acquired and transformed into knowledge by consumers. We propose a two-step questioning mechanism that verifies whether consumers have acquired and stored the information regarding the product's origin into their short-term memory, a necessary condition for a quality cue to be used in purchase decisions. We then proxy origin information "actual use" by the consumer's product origin "knowledge." Knowledge is as close as the researcher can go to determine whether origin information is factored into a consumer's product evaluation process.

The two-step questioning mechanism works as follows. First, we ask participants whether they knew the country, state, area or region of production of the pork they had just purchased. Second, we follow up by asking participants to state the actual place of origin of the product verifying the correctness of their claim against the actual purchase. Only those who were able to correctly answer the follow-up question are categorized as "actual users of origin information." Finally, participants were asked the source of their information about the pork's origin (e.g., label, sales personnel, etc.).

Before presenting an analysis of consumer responses, there are a couple of aspects regarding the data collection procedure that are important to note because they differ from previous studies. First, unlike other studies addressing origin labeling that have used random samples from the population (either through a mail survey or in-

person experiment), we limited ourselves to actual purchasers of the product in question. In addition to facilitating the analysis of actual purchase decisions, it ensures that our results are not confounded by responses from non-consumers or unlikely consumers of the products in question.

Second, when consumers were asked about the origin of their purchased pork, we did not explicitly limit responses to the COO. Any origin response was invited. Allowing more general responses enables us to capture any origination characteristic of the product that consumers perceive as quality cues and enter into the product evaluation and the purchase decision process. If the findings of previous studies focusing explicitly on COO translate from an experimental setting to a real-world environment, we would expect to find that the more encompassing category of "origin" cues to be no less important to consumers.

Third, by verifying whether consumers were actually aware of their purchased pork's origin, we are able to capture valuable information not directly assessable from market level data or hedonic analysis (e.g., Parcell and Schroeder, 2007). Specifically, we are able to assess whether consumers in fact knew the origin of their product and hence were able to factor this information into their decision-making process, not simply whether they did indeed purchase pork (possibly without intention) from a specific origin. This distinction is critical for assessing consumer preferences and additional willingness to pay for origin.

### Summary of Survey Responses

Table 2 presents summary statistics for the hypothetical survey component of the study focusing on the relative importance of eight key pork attributes. The percentage of surveyed pork shoppers who selected each attribute as the most, second most, and least important is presented. Price (29.9%) and shelf life (15.5%) were the two most commonly cited attributes as being the most important factor when purchasing pork. Origin was the third highest ranked attribute (14.4%) ahead of two intrinsic quality cues (color and visible fat content), two production-related

**Table 2.** Pork Attribute Ratings from Hypothetical Survey

Attribute	Level of Importance		
	Most	Second Most	Least
Brand	0.7%	2.0%	35.6%
Color	11.0%	15.0%	5.8%
Humane animal treatment	3.8%	3.3%	10.4%
Official label of controlled production	10.0%	10.5%	5.8%
Origin	14.4%	7.4%	12.5%
Price	29.9%	21.1%	11.3%
Shelf life	15.5%	18.1%	8.0%
Visible fat content	13.4%	21.1%	4.3%
Other	1.3%	1.6%	6.3%

attributes (controlled production and humane animal treatment), and brands. An additional 7.4% of individuals cited origin as being the second most important factor, yielding approximately 22% of the sample indicating that origin is highly relevant when purchasing pork.<sup>2</sup> However, countering these individuals, 12.5%, the second largest share overall, stated that origin was the least important attribute when shopping for pork, thus indicating that there is heterogeneity among consumer attitudes toward origin.

If our survey and the many previous studies addressing consumers' preferences for COO using survey methods are consistent with and capturing actual consumer behavior, we would expect to find that a significant share of consumers is using origin information when selecting among different pork alternatives in an actual real-world purchase situation. Explicitly, we would expect

those individuals who indicate in a hypothetical or nonmarket situation that origin is a highly important attribute to them when making product decisions to exhibit this behavior also in the marketplace (i.e., we expect those consumers to be able to correctly identify the origin of the purchased product).

We find that across the entire sample, approximately one-third of the survey participants (31.3%) claimed to know the origin of the purchased product (answered yes to the first part of the two-step question). Among these individuals, approximately 97% (30.5% of the entire sample) were able to correctly identify the origin of the pork they had just purchased (i.e., correctly answered the follow-up question). We therefore find an extremely strong correspondence between claimed and actual knowledge of origin information (approximately 97%), which as discussed earlier can be considered as an approximation of the correspondence between claimed and actual use of origin information. The fact that approximately one-third of the sample was able to correctly identify the origin of the product suggests that origin cues are relevant for a significant, but not overwhelming, share of shoppers, but also means that no origin cues are acquired and factored into the product evaluation of two-thirds of shoppers during a typical market situation.

Although the direct comparison between claimed and actual knowledge/use of origin information is quite comforting and indicates a strong correspondence between stated and actual behavior, in what follows we explore whether such a reassuring outcome can also be confirmed

<sup>2</sup> Although the finding that COO is highly relevant to 22% of individuals appears to be in line with other findings in the literature, it is difficult to make a direct comparison as a result of the topical and methodological differences across the many studies of COO. For example, the closest hypothetical survey to ours, Roosen, Lusk, and Fox (2003), found that COO was the most important attribute, whereas we found that it was the third most important. Hypothesizing as to why a relative ranking discrepancy was found is problematic given the host of differences across the studies including product focus (pork vs. beef), methodology (most-least rating vs. Likert scale ranking), sample composition (in-store interview of pork purchasers vs. random mail survey), and the inclusion of two additional attributes (humane treatment and controlled production), which may be correlated with origin.

for hypothetical survey rankings, a commonly used tool by producers and retailers for product development, marketing strategies, and labeling choices. To this end, Table 3 presents the percentage of individuals who were able to correctly identify the origin of their pork conditional on survey responses. A stark difference is found between individuals who cited that origin was the most important attribute, least important, and ratings in between. Of those who ranked origin as the least important attribute when making pork purchase decisions, only 15.9% knew the origin of their pork, whereas 68.3% of those who stated that origin was the most important attribute (64.1% for second most raters) correctly identified the origin of their pork purchase.<sup>3</sup> This result supports the hypothesis that there is a correspondence, although not as strong as one could have expected, between the survey attribute ranking and the attributes consumers actually use to evaluate products and make their purchase decision.

Finally, Table 4 presents responses to an open-ended question asking the pork purchasers, who were able to identify the origin of their pork, to recall the source of their information conditional on their survey rating. The responses were classified into four major categories: 1) product label; 2) store display; 3) store personnel (i.e., verbal statements of the origin); and 4) other responses. Again, we find a significant difference between those who rated origin as being most and least important. The majority of individuals who stated that origin was the least important attribute had acquired their information through a store display (57.1%) and none of them had sought information through store personnel (0.00%). A different picture emerges for their counterparts who rated origin as most important. Compared with the former group, these consumers were relatively more likely to

**Table 3.** Percentage of Individuals Who Correctly Identified the Origin of Their Pork Purchase

Rating of Origin Importance	Percentage Who Correctly Identified Pork Origin
Most important	68.3%
Second most important	64.1%
Least important	15.9%
Other	19.7%
Entire sample	30.5%

have acquired their information through either product labels (42.4% vs. 28.6%) or store personnel (30.5% vs. 0.00%). Individuals with ratings in between fit in an intermediate position compared with the former two groups. This pattern fits with intuition that individuals who value the attribute origin not only are overall more likely to know the product origin (as suggested in Table 3), but are also more likely to undertake the additional effort (i.e. search or informational cost) to acquire the information, whether it be conversing with store personnel or reading food labels and information on the packaging. Additionally, this tends to further support the conclusion that there is a correspondence between the hypothetical ratings and actual shopping behavior when evaluating products.

### Estimation Results

To further assess the relationship between hypothetical survey responses and consumer use of origin information, in this section, we present estimates from three discrete choice models that control for other potentially confounding factors. Table 5 presents estimates from a probit model where the binary variable, "Origin," constitutes the dependent variable taking a value of 1 if the respondent was able to correctly identify the origin of their actual pork purchase. Explanatory variables include 1) several socio-demographic variables that would be hypothesized to be related to the use of origin attributes when shopping (e.g., education and income); 2) two dummy variables to control for historical behavior and potential product familiarity when

<sup>3</sup>To help frame this percentage, consider that in a subsequent interview question 61.0% of individuals who stated that price was the most important factor when shopping for pork were able to recall and to identify the price of their pork at least approximately without relying on the receipt. This level of price recall is in line with previous studies such as Dickson and Sawyer (1990).

**Table 4.** Source of Consumers' Origin Information

Source of Information	Rating of the Importance of Origin		
	Most or Second Most	Other	Least
Product label	42.4%	38.7%	28.6%
Store display	13.6%	22.6%	57.1%
Store personnel	30.5%	14.5%	0.00%
Other	13.5%	24.2%	14.3%

shopping for pork: "Regular Pork Purchaser" and "Exclusively Purchase Pork at the Store" (of the survey); 3) the type of store (supermarket, butcher shop, discounter); 4) the location in the store where the pork was obtained (whether from the meat display "Counter" or from a pre-packaged meat section (a cooler or freezer); and 5) two characteristics of the actual pork purchase (expenditure and whether the pork was on sale or advertised). Finally, we also include dummy variables for the hypothetical survey

ratings to assess the relationship with actual purchase behavior.

Coefficient estimates of the probit model of consumers' use of origin information (Table 5) fall partially in line with expectations. In terms of the sociodemographic and shopping trip variables, older customers, those with larger household sizes, higher income households, and those with greater expenditures were more likely to use origin information when shopping. This fits with intuition that older and more affluent households with greater expenditures would be most likely to use origin information when making their purchase decisions. In terms of consumers' familiarity with the product, no statistically significant relationship was found between whether the participant exclusively purchases pork at the store or whether they are a regular pork purchaser with origin information use. For the different shopping locations, we find that individuals shopping at either a supermarket or a butcher shop were significantly more likely to use origin information relative to individuals shopping at a food discounter. This again fits with intuition in that part of the appeal of stores of this type is their greater variety of product alternatives and efforts to signal and target consumers with demand for credence attributes. Finally, concentrating on responses to the hypothetical survey on the importance of origin to consumers, again, results fit with expectations. Individuals who rated origin in the hypothetical survey as the most or second most important attribute when selecting pork were much more likely to have used origin information when making their purchase (coefficient estimate, 1.1; marginal effect, 0.41). This reinforces the unconditional analysis presented earlier providing further statistical evidence that there is a correspondence between hypothetical survey ratings and actual market decision behavior.

**Table 5.** Estimates of Probit Model of Consumers' Use of Origin Labels

Variable	Coefficient	Standard Error
Age	0.009**	0.004
Education	-0.000	0.024
Gender	0.100	0.116
Household size	0.090*	0.520
Income	0.000*	0.000
Counter <sup>a</sup>	-0.044	0.130
Exclusively purchase pork at the store	-0.062	0.130
Regular pork purchaser	-0.091	0.117
Pork on sale/advertised	-0.038	0.098
Pork expenditure	0.015*	0.008
Origin—most or second most important	1.100***	0.129
Origin—least important	-0.247	0.181
Supermarket	0.586***	0.146
Butcher shop	0.511***	0.194
Hypermarket	0.462	0.322
Constant	-1.960***	0.419
Log-likelihood	-352.06	
Log-likelihood ratio statistic	122.73***	

<sup>a</sup> Equal 1 if pork was purchased at the counter and 0 if from freezer or cooler.

\*, \*\*, and \*\*\* denote variable significant at 10%, 5%, and 1%, respectively.

**Table 6.** Estimates of Multinomial Logit Model of Consumers’ Source of Origin Information

Variable	Product Label	Store Personnel	Other Source
Age	-0.044 (0.021)	-0.018 (0.023)	-0.007 (0.022)
Education	-0.020 (0.123)	0.012 (0.121)	-0.107 (0.133)
Gender	-0.538 (0.656)	-0.745 (0.685)	-0.422 (0.670)
Household size	-0.560 (0.255)	-0.244 (0.259)	-0.240 (0.273)
Income	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Counter	-1.686 (0.634)	1.046 (0.811)	-0.651 (0.683)
Exclusively purchase pork at the store	-0.193 (0.768)	-0.022 (0.715)	0.552 (0.715)
Regular pork purchaser	-0.781 (0.605)	0.251 (0.678)	-0.106 (0.659)
Pork on sale/advertised	1.239 (0.904)	0.537 (0.956)	-0.970 (1.277)
Pork expenditure	0.018 (0.062)	0.010 (0.064)	0.035 (0.056)
Origin—most or second most important	1.401** (0.626)	1.640** (0.646)	0.341 (0.673)
Constant	5.523 (2.339)	-0.018 (2.410)	3.166 (2.565)
Log-likelihood	-134.40		
Log-likelihood ratio statistic	72.34***		

Note: Store Display is the base category. \*, \*\*, and \*\*\* denote variable significant at 10%, 5%, and 1%, respectively. Standard deviations in parentheses.

Table 6 presents estimates of a multinomial logit model of how consumers acquired their information regarding the origin of their purchased pork product (corresponding marginal effects are presented in Table 7). The categorical

responses for information source, as detailed in Table 4, include “Product Label,” “Store Display,” “Store Personnel,” and “Other Sources” capturing responses not fitting into the three dominant categories. If the survey is capturing consumer

**Table 7.** Estimated Marginal Effects of Consumers’ Source of Origin Information

Variable	Product Label	Display	Store Personnel	Other Source
Age	-0.009**	0.005	0.001	0.003
Education	0.003	0.006	0.007	-0.016
Gender	0.052	0.127	-0.014	-0.165*
Household size	-0.097**	0.068*	0.014	0.015
Income	-0.000	0.000	0.000	0.000
Counter	-0.408***	0.121	0.285**	0.002
Exclusively purchase pork at the store	-0.091	-0.010	-0.013	0.113
Regular pork purchaser	-0.199*	0.063	0.098	0.038
Pork on sale/advertised	0.302*	-0.105	-0.018	-0.179***
Pork expenditure	0.001	-0.003	-0.001	0.004
Origin—most or second most important	0.177	-0.192**	0.127	-0.112

Note: \*, \*\*, and \*\*\* denote variable significant at 10%, 5%, and 1%, respectively.

**Table 8.** Estimates of Multinomial Logit Model of Consumers' Choice of Pork Retailer

Variable	Supermarket	Discounter	Butcher Shop
Age	-0.017** (0.007)	-0.019* (0.010)	0.024 (0.021)
Education	0.244*** (0.043)	0.239*** (0.061)	0.290*** (0.109)
Gender	-0.081 (0.212)	-0.065 (0.289)	0.261 (0.626)
Household size	-0.325*** (0.098)	-0.270** (0.136)	-0.242 (0.303)
Income	0.000*** (0.000)	-0.001*** (0.000)	0.000 (0.000)
Exclusively purchase pork at the store	0.307 (0.236)	-0.635 (0.389)	1.130* (0.593)
Regular pork purchaser	0.197 (0.215)	0.160 (0.292)	-0.351 (0.582)
Pork on sale/advertised	-0.812*** (0.226)	-2.036*** (0.469)	-1.055 (0.727)
Pork expenditure	-0.128*** (0.027)	-0.318*** (0.066)	-0.052 (0.050)
Origin—most or second most important	0.483* (0.244)	-0.525 (0.386)	1.149* (0.605)
Origin—least important	-0.033 (0.302)	-0.551 (0.453)	-0.927 (1.367)
Constant	-0.526 (0.713)	0.230 (0.993)	-7.666*** (2.242)
Log-likelihood	-560.40		
Log-likelihood ratio statistic	323.58***		

Note: Hypermarket is the base category. \*, \*\*, and \*\*\* denote variable significant at 10%, 5%, and 1%, respectively. Standard deviations in parentheses.

behavior, *a priori* we would hypothesize that individuals who are more concerned with pork origin would be more willing to undertake costly search activities to acquire this information, i.e., they would be more likely to ask store personnel or to read a product label. We hypothesize that store displays, which are likely the most obvious source of information, would be relatively less likely. Coefficient estimates of the multinomial logit model of consumers' source of origin information yield few statistically significant variables explaining consumers' information source. However, in agreement with expectations, individuals who rated origin as the most or second most important attribute when purchasing pork were relatively more likely to acquire their information through product labels or store personnel than individuals who did not rate origin as being one of the most critical attributes when purchasing pork.

Finally, as one further test of the relationship between survey and market behavior, Table 8 presents estimates of a multinomial logit model of consumers' choice of the type of retailer where their pork purchase was made (corresponding marginal effects are presented in Table 9). Given the use of a choice-based sampling process (see Manski and Lerman, 1977; Manski and McFadden, 1981) the model was fit using corrective weights based on retailer shares of the total quantity of pork sold in the German market. According to figures compiled by the authors from data by ZMP<sup>4</sup> based on the 2008 GfK-Household Panel, supermarkets, discounters,

<sup>4</sup>ZMP stands for Central Agency for Market and Price Reports on Agricultural, Forest and Food Products Ltd. (in German Zentrale Markt- und Preisberichtsstelle für Erzeugnisse der Land-, Forst- und Ernährungswirtschaft GmbH).

**Table 9.** Estimated Marginal Effects of Consumers' Choice of Pork Retailer

Variable	Supermarket	Discounter	Butcher Shop	Hypermarket
Age	-0.003**	-0.001	0.000	0.004**
Education	0.047***	0.008**	0.003*	-0.057***
Gender	-0.017	-0.002	0.004	0.015
Household size	-0.063***	-0.008	-0.002	0.073***
Income	0.000***	0.000***	0.000	0.000***
Exclusively purchase pork at the store	0.071	-0.037**	0.014*	-0.048
Regular pork purchaser	0.041	0.005	-0.006	-0.040***
Pork on sale/advertised	-0.135***	-0.087***	-0.009	0.232***
Pork expenditure	-0.022***	-0.014***	0.000	0.036
Origin—most or second most important	0.085*	-0.033*	0.014*	-0.066
Origin—least important	0.006	-0.026	-0.012	0.032

Note: \*, \*\*, and \*\*\* denote variable significant at 10%, 5%, and 1%, respectively.

hypermarkets, and butchers were, respectively, responsible for 20%, 22%, 35%, and 16% of total 2007 fresh meat sales to private households.

Again, if the survey is capturing actual consumer behavior, *a priori* we would expect that individuals who rate origin as an important attribute to self-select in terms of their shopping locale, gravitating toward retailers that are more likely to make origin information available (whether via label or nonlabel sources), to sell pork from more desirable origins, and to have a larger variety of products in terms of source of origination. Specifically, we would expect that consumers rating origin to be important in the hypothetical survey to be more likely shoppers at the supermarket or butcher shop relative to the hypermarket or discounter. Estimates from the multinomial logit model of customers' choice of pork retailer bear out this expectation. Consumers who rated origin as being the most or second most important attribute were more likely to be shoppers at the supermarket or the butcher shop (relative to the hypermarket), whereas the coefficient estimate for the discounter retailer is not statistically significant. Other included regression variables, including age, education, household size, and income, are also found to be statistically significant with signs in line with expectations.

### Summary and Conclusions

Understanding the strength of the relationship between hypothetical survey responses and

actual behavior is critical for researchers using survey methods to qualify and quantify how well their hypothetical survey work translates into actual consumer behavior and instill confidence in their research methods. Despite food products potentially being better suited to hypothetical methods as a result of their high degree of familiarity among consumers, a preponderance of evidence across all types of goods indicating a disconnect between hypothetical and actual consumer behavior is a significant source of concern.

In contrast to previous experimental analyses of consumer preferences for COO-labeled products, this study has investigated consumer use of origin information in actual purchase situations, thus allowing a comparison of survey methods with consumer behavior in the marketplace. Specifically, our methodology of interviewing consumers regarding their market purchases of origin-labeled pork has allowed us to investigate the specific information consumers sought and possessed when optimizing over potential products, avoiding the case in which consumers purchased a product with a specific origin attribute without any knowledge of the attribute or specific intent.

From a practitioner's perspective using survey methods, the findings of the analysis are largely positive with some important caveats. We find that indeed there is a strong correspondence between stated preferences for origin in a hypothetical survey with consumers' actual behavior in the market. Given widespread reliance on a host of nonmarket methodologies for assessing

consumer preferences such as rankings, this is admittedly a comforting result and contributes to the small but growing literature comparing findings from hypothetical methods with market behavior.

As well, specifically in terms of the importance of origin to consumers, our survey of pork purchasers indicates that indeed origin is a relevant factor for a significant share of consumers when evaluating products, thus providing market evidence for the findings of previous studies assessing demand for origin labeling. However, whereas our findings tend to support the existing literature on origin, it is abundantly clear that there is not a perfect relationship between hypothetical and market behavior among consumers. One-third of the consumers in the survey who stated that origin is the most important factor when making a selection of pork was not aware of the origin of their product. This finding highlights the need for future research on consumers' underlying motives for using origin information when making purchase decisions and, from a methodological viewpoint, the need for increased attention and improvements to mitigate biases in hypothetical surveys.

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## References

- Abidoye, B.O., H. Bulut, J.D. Lawrence, B. Mennecke, and A.M. Townsend. "U.S. Consumers' Valuation of Quality Attributes in Beef Products." *Journal of Agricultural and Applied Economics* 43(2011):1–12.
- Alfnes, F., and K. Rickertsen. "European Consumers' Willingness to Pay for U.S. Beef in Experimental Auction Markets." *American Journal of Agricultural Economics* 85(2003):396–405.
- Bernués, A., A. Olaizola, and K. Corcoran. "Labeling Information Demanded by European Consumers and Relationships with Purchasing Motives, Quality and Safety of Meat." *Meat Science* 65(2003):1095–106.
- Blamey, R.K., J.W. Bennett, and M.D. Morrison. "Yea-Saying in Contingent Valuation Surveys." *Land Economics* 75(1999):126–41.
- Brookshire, D.S., D.L. Coursey, and W.D. Schulz. "The External Validity of Experimental Economics Techniques: Analysis of Demand Behavior." *Economic Inquiry* 25(1987):239–50.
- Champ, P.A., R.C. Bishop, T.C. Brown, and D.W. McCollum. "Using Donation Mechanisms to Value Nonuse Benefits from Public Goods." *Journal of Environmental Economics and Management* 33(1997):151–62.
- Chang, J.B., J.L. Lusk, and F.B. Norwood. "How Closely do Hypothetical Surveys and Laboratory Experiments Predict Field Behavior." *American Journal of Agricultural Economics* 91(2009):518–34.
- Chen, K., M. Ali, M. Veeman, J. Unterschultz, and T. Le. "Relative Importance Rankings for Pork Attributes by Asian-Origin Consumers in California: Applying an Ordered Probit Model to a Choice-Based Sample." *Journal of Agricultural and Applied Economics* 34(2002):67–79.
- Chung, C., T. Boyer, and S. Han. "Valuing Quality Attributes and Country of Origin in the Korean Beef Market." *Journal of Agricultural Economics* 60(2009):682–98.
- Cummings, R.G., D.S. Brookshire, and W.D. Schulze. *Valuing Environmental Goods: An Assessment of the Contingent Valuation Method*. Totowa, NJ: Rowman and Allanheld, 1986.
- Cummings, R.G., and L.O. Taylor. "Unbiased Estimates for Environmental Goods: A Cheap Talk Design for the Contingent Valuation Method." *The American Economic Review* 89(1999):649–65.
- Davidson, A., M.J.A. Schröder, and J.A. Bower. "The Importance of Origin as a Quality Attribute for Beef: Results from a Scottish Consumer Survey." *International Journal of Consumer Studies* 27(2003):91–98.
- Dickson, P.R., and A.G. Sawyer. "The Price Knowledge and Search of Supermarket Shoppers." *Journal of Marketing* 54(1990):42–53.
- Dransfield, E., T.M. Ngapo, N.A. Nielsen, L. Bredahl, P.O. Sjørdén, M. Magnusson, M.M. Campo, and G.R. Nute. "Consumer Choice and Suggested Price for Pork as Influenced by Its Appearance, Taste, and Information Concerning Country of Origin and Organic Pig Production." *Meat Science* 69(2005):61–70.
- Engelage, A. "Qualitätswahrnehmung bei Lebensmittel." In: *Das Verbraucherbild in Rechtssprechung und Wissenschaft*. Dissertation, Berlin, Germany, 2002.
- Feuz, D.M., W.J. Umberger, C.R. Calkins, and G. Sitz. "U.S. Consumers' Willingness to Pay for Flavor and Tenderness in Steaks as Determined with Experimental Auction." *Journal of Agricultural and Resource Economics* 29(2004):501–16.
- Gilmore, F. "A Country—Can It Be Repositioned? Spain—The Success Story of Country Branding."

- Journal of Brand Management* 9(2002):281–93.
- Glitsch, K. “Consumer Perceptions of Fresh Meat Quality: Cross-National Comparison.” *British Food Journal* 102(2000):177–94.
- Grebitus, C. “Food Quality from the Consumer’s Perspective—An Empirical Analysis of Perceived Pork Quality.” Dissertation. Göttingen: Cuvillier Verlag, 2008.
- Harrison, G.W., and E. Rutsröm. “Experimental Evidence of Hypothetical Bias in Value Elicitation Methods.” *Handbook of Experimental Economics Results*. C.R. Plott and V.L. Smith, eds. New York, NY: North-Holland, 2008.
- Hoffmann, R. “Country of Origin—A Consumer Perception Perspective of Fresh Meat.” *British Food Journal* 102(2000):211–29.
- Kroeber-Riel, W., and P. Weinberg. *Konsumentenverhalten*. Munich, Germany: Verlag Franz Vahlen, 2003.
- Li, C.-Z., and L. Mattsson. “Discrete Choice under Preference Uncertainty: An Improved Structural Model for Contingent Valuation.” *Journal of Environmental Economics and Management* 28(1995):256–69.
- Loomis, J., T. Brown, B. Lucero, and G. Peterson. “Improving Validity Experiments of Contingent Valuation Methods: Results of Efforts to Reduce the Disparity of Hypothetical and Actual Willingness to Pay.” *Land Economics* 72(1996):450–61.
- Loureiro, M.L., and W.J. Umberger. “Assessing Consumer Preferences for Country-of-Origin Labeling.” *Journal of Agricultural and Applied Economics* 37(2005):49–63.
- . “A Choice Experiment Model for Beef: What U.S. Consumer Responses Tell Us About Relative Preferences for Food Safety, Country-of-Origin Labeling and Traceability.” *Food Policy* 32(2007):496–514.
- Lusk, J.L., and F.B. Norwood. “Bridging the Gap Between Laboratory Experiments and Naturally Occurring Markets: An Inferred Valuation Method.” *Journal of Environmental Economics and Management* 58(2009):236–50.
- Lusk, J.L., and N. Parker. “Consumer Preferences for Amount and Type of Fat in Ground Beef.” *Journal of Agricultural and Applied Economics* 41(2009):75–90.
- Lusk, J.L., J.R. Pruitt, and F.B. Norwood. “External Validity of a Framed Field Experiment.” *Economics Letters* 93(2006):285–90.
- Manski, C.F., and S.R. Lerman. “The Estimation of Choice Probabilities from Choice Based Samples.” *Econometrica* 45(1977):1977–88.
- Manski, C.F., and D. McFadden. “Alternative Estimators and Sample Designs for Discrete Choice Analysis.” *Structural Analysis of Discrete Data with Econometric Applications*. C.F. Manski and D. McFadden, eds. Cambridge, MA: MIT Press, 1981.
- Murphy, J.J., P.G. Allen, T.H. Stevens, and D. Weatherhead. “A Meta-analysis of Hypothetical Bias in Stated Preference Valuation.” *Environmental and Resource Economics* 30(2005):313–25.
- Olson, J.C. “Cue Utilization in the Quality Perception Process: A Cognitive Model and an Empirical Test.” Ph.D. dissertation, Purdue University, West Lafayette, IN, 1972.
- Parcell, J.L., and T.C. Schroeder. “Hedonic Retail Beef and Pork Product Prices.” *Journal of Agricultural and Applied Economics* 39(2007):29–46.
- Roosen, J., J.L. Lusk, and J.A. Fox. “Consumer Demand for and Attitudes Toward Alternative Beef Labeling Strategies in France, Germany, and the UK.” *Agribusiness* 19(2003):77–90.
- Shogren, J.F., J.A. Fox, D.J. Hayes, and J. Roosen. “Observed Choices for Food Safety in Retail, Survey, and Auction Markets.” *American Journal of Agricultural Economics* 81(1999):1192–99.
- Steenkamp, J.B. *Product Quality: An Investigation Into the Concept and How It Is Perceived by Consumers*. Assen/Maastricht, The Netherlands: Van Gorcum, 1989.
- Steenkamp, J.B. “Conceptual Model of the Quality Formation Process.” *Journal of Business Research* 21(1990):309–33.
- Tonsor, G.T., N. Olynk, and C. Wolf. “Consumer Preferences for Animal Attributes: The Case of Gestation Crates.” *Journal of Agricultural and Applied Economics* 41(2009):713–30.
- Tonsor, G.T., T.C. Schroeder, J.A. Fox, and A. Biere. “European Preferences for Beef Steak Attributes.” *Journal of Agricultural and Resource Economics* 30(2005):367–80.
- Umberger, W.J., D.M. Feuz, C.R. Calkins, and B.M. Sitz. “Country-of-Origin Labeling of Beef Products: U.S. Consumers’ Perceptions.” *Journal of Food Distribution Research* 34(2003):103–16.
- Unterschlutz, J., K.K. Quagraine, M. Veeman, and R.B. Kim. “South Korean Hotel Meat Buyers’ Perceptions of Australian, Canadian and U.S. Beef Canadian.” *Journal of Agricultural Economics* 46(1998):53–68.
- Verhoef, P.C. “Explaining Purchases of Organic Meat by Dutch Consumers.” *European Review of Agriculture Economics* 32(2005):245–67.