VALUE OF COUNTRY OF ORIGIN LABELING INFORMATION FOR BEEF AND PORK IN THE UNITED STATES

By
TYLER JOHN KLAIN
Agricultural Economics
Oklahoma State University
Stillwater, Oklahoma
2009

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
MASTER OF SCIENCE
May, 2011

VALUE OF COUNTRY OF ORIGIN LABELING INFORMATION FOR BEEF AND PORK IN THE UNITED STATES

Thesis Approved:

Dr. Jayson Lusk
Thesis Adviser

Dr. Bailey Norwood

Dr. Derrell Peel

Dr. Mark E. Payton
Dean of the Graduate College.

ACKNOWLEDGMENTS

It would be most appropriate to begin my acknowledgments to where my inspiration began: on my small North Dakota family farm and ranch. Thank you Mom and Dad for always being a steadfast example and helping me realize the important of agriculture and community.

To the Eric and Cheryl Devuyst family, thanks for your encouragement and support in bringing me here to Oklahoma State University. I appreciate your willingness to open your home to me during my initial days moving to Stillwater and for your continual generosity and kindness. I felt that you offered me a home away from home.

To my chair advisor Dr. Jayson Lusk, you have been superbly supportive throughout this entire process. I am exceptionally thankful for you giving me the opportunity to be part of this research project and for the countless hours you've spent helping facilitate this project. Your unwavering commitment towards building a co-successful and learning environment with your students is greatly appreciated.

To my committee members, Dr. Derrell Peel and Dr. Bailey Norwood, you both have worked very hard to be sure that my thesis was of top quality and I thank you for helping keep me on track.

To Dr. Clement Ward for his strong interest and support in my research topic and for helping to make this possible through his personal involvement and indirect support through the Clem Ward Endowed Scholarship.

To Rock Andre and Kristen Kovalsky, you both were enthusiastically willing to help me with my research data collection. I could not have done that without your assistance.

To my classmates and friends, Matt Padgett, John Mann, Max Corbin, Luis Serrano, Eyosiyas Tegegne, Darren Holt, Brenna Ellison and several others of whom have helped and/or encouraged me throughout these past two years. Your uplifting attitudes and supportive personalities have been helpful both in and out of the classroom.

To all my professors, faculty, and helpful staff in the OSU Department of Agricultural Economics of whom have all been great catalysts towards this final product. This thesis and all that has gone into it could not have been accomplished without your help, guidance, teaching and support.

And lastly but not least, to my family, who have been very supportive throughout my time here as I've been so far from home. Your strong work ethic and perseverance has taught me a lot and that has been very facilitative towards my personal drive towards achievement.

I am very grateful to have been given this opportunity at Oklahoma State University. These experiences and friendships that I have been able to make throughout the past two years in Stillwater are cherished and I look forward to their continuation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Figure Page

ABSTRACT

Mandatory country of origin labeling (MCOOL) for fresh meats, fish, nuts and perishable food products in the United States was implemented by the USDA on March 16th, 2009. US trading partners such as Canada and Mexico have been strong opponents of MCOOL due to its trade restrictive nature while other opponents argue that MCOOL has not presented any added value to consumers. These controversies have prompted interest in attaining an accurate measure of the value of the information (VOI) provided by MCOOL. Prior MCOOL research has been conducted to determine consumers' willingness to pay (WTP) for meat from a specific country of origin however, no post-MCOOL research has determined consumers' VOI provided by MCOOL. Beef and pork consumers in two Texas grocery stores were recruited to participate in one of two types of economic field experiments involving real food and real money. Data show that, in the context of the experiment, consumers VOI for MCOOL range from $1.37 to $2.26 per meat shopping experience depending on the method used to elicit the values. However a large proportion of consumers (82%) are unaware of the existence of MCOOL. When this fact is coupled with the way MCOOL has actually been implemented by most retailers, the empirical estimates suggest that the value of origin information for beef and pork is about $0.025/lb.

CHAPTER I

INTRODUCTION

The United States Department of Agriculture (USDA) amended the 2008 Farm Bill and implemented the final rule for mandatory country of origin labeling (MCOOL) to become effective on March 16th, 2009 (Link, 2009). MCOOL requires all participants in the supply chain to provide country-of-origin labeling information for fresh beef, pork, lamb, chicken, goat, wild and farm-raised fish and shellfish, peanuts, pecans, ginseng, and macadamia nuts (Link, 2009). Product labeling can provide stakeholders with product-specific information and can reduce uncertainty faced by consumers who may value the information. Labels, however, come at a cost, and the labeling mandate underwent several changes prior to 2009 final ruling due to the concern amongst several opposing and supporting entities.

The beef and pork industries represent the largest sectors directly affected by MCOOL. Therefore the participants in this industry have a larger economic concern for the implication of this mandate. The policy affects participants throughout the supply chain include producers, feedlots, packers, retailers and grocery stores, and ultimately the consumers who purchase these fresh meat products. However restaurants, hotels and institutions such as universities and prisons are excluded from having to provide consumers with origin information.

The degree of concern towards the potential costs or benefits of MCOOL in these various sectors is highly variable. Also, the actual costs affecting these sectors are debatable but several studies have presented adequate estimates of these costs (Brester, et al., 2004, Informa Economics Inc., 2009, Lusk and Anderson, 2004). Lusk and Anderson (2004) and Brester, et al. (2004) both used equilibrium displacement models to determine how participants in the beef and pork industry may be affected by MCOOL. Lusk and Anderson (2004) conclude that consumers will be the most affected by MCOOL whereas producers stand to benefit as long as beef and pork demand increases at least 2%. Similar results were concluded by Brester et. al. (2004) stating that if demand increases do not result from the implementation of MCOOL for the respective commodities, then those sectors will face loses in producer surplus. The retail beef and pork industries would require a one-time demand increase of 4.05% and 4.45% respectively to retain producer surplus in the long-run (Brester, et al., 2004). Both studies suggest that producers would be the most likely benefactors of MCOOL, however the inclusion of the poultry industry in the recent MCOOL law was not reflected in these studies and may require a follow-up assessment.

A more recent assessment of the overall costs of MCOOL for the beef and pork industry has been conducted by Informa Economic Inc. (2009) which is a follow-up of a past study done by a recently acquired company, Sparks Companies Inc. (2004). This 2009 economic assessment concludes that the total supply chain costs for the beef and pork industries will range between $1.058-1.265 billion and $167.5-228 million (Informa Economics Inc., 2009) versus the former study by Sparks Companies Inc. (2004) which estimated the costs to range from $1.57-1.72 billion and $513.75-805.75 million for the

beef and pork industries respectively. Informa Economics Inc. estimated costs in the beef industry to be the least burdensome for producers and feedlot backgrounders whereas the largest proportion (approximately 86%) of these costs would be absorbed by the retailers and grocery stores followed by the packer industry (approximately 13%). The pork industry would be faced with similar circumstances where producers would face a lighter burden than packers, retailers and grocery stores that would be handling multi-origin beef and pork products that would require additional segregation and record-keeping (Informa Economics Inc., 2009). These affected participants as well as additional non-domestic participants have established distinctly differing stances about the policy of MCOOL.

Canadian and Mexican producers represent a group in strong opposition to MCOOL because the increase in regulation for imported beef and pork has intensified the difficulties of the open and efficient flow of live and processed livestock. The beef and pork industries rely heavily on exports to the United States. The fluid movement of cattle and hogs between Mexico, Canada and the US has evolved throughout the years to allow for efficient low-cost production of beef and pork for consumers. County of origin labeling is viewed very negatively by Canada and Mexico due to its restrictive nature and it's strong resemblance as a fancy trade barrier (United States General Accounting Office, 1999). This controversy has resulted in Canadian and Mexican government appeals with the World Trade Organization (WTO) claiming that MCOOL violates trade regulation under the General Agreement on Tariffs and Trade (GATT). This international trade agreement is enforced by the WTO the purpose of GATT, as referenced in the preamble, is the "substantial reduction of tariffs and other trade barriers and the elimination of preferences, on a reciprocal and mutually advantageous basis." According

to Sawka and Kerr (2010), Canadian officials could challenge the provision under GATT that states:

> The laws and regulations of contracting parties relating to the marking of imported products shall be such as to permit compliance without…materially reducing their value, or unreasonably increasing their cost

The results obtained by Rude et al. (2006) suggest the potential of MCOOL "materially reducing" the value of Canadian pork or "unreasonably increasing their cost." They concluded that the hog industry in Canada could suffer from a -53% decrease in net pork exports to the United States when additional transaction costs are incurred for Canadian hogs. In addition, the hog prices received by producers in Canada and the US could decrease by 1% and 4% and consumer costs of pork would increase by 1% and 4% respectively (Rude, et al., 2006). However, these assumptions are difficult to defend since it is not clearly understood how U.S. consumers value the information provided by MCOOL.

Another opposition group includes the tri-national feedlot and meatpacking industry of whom would bear a large majority of the costs resulting from MCOOL. The incurred costs are a direct result of MCOOL and are associated with the increase in necessary record-keeping, physical separation of multi-origin cattle and hogs, and the delicate tracing of an ever-complex supply chain. The additional costs have been estimated by Informa Economics Inc. (2009) to range between $1.226 and $1.493 billion for the two main sectors affected by MCOOL which include a vast array of beef and pork products. Also, the Agricultural Marketing Service, a branch of the US Department of Agriculture, estimated that the participants in the supply chain of all commodities listed under MCOOL would face additional costs of approximately $2.6 billion and US

consumers would face an increase in food costs of about $211.9 million in the tenth year of the implementation of MCOOL (Link, 2009). Despite these potential additional costs associated with MCOOL there are beneficiaries whom stand as strong MCOOL supporters.

U.S. lobbyist groups such as Ranchers-Cattlemen Action Legal Fund (R-CALF) have relentlessly fought in favor of MCOOL in anticipation for an increase in domestic beef demand and ultimately an increase in domestic livestock prices for the cattlemen they represent. R-CALF has openly attempted to construct trade barriers by requesting to Congress that the "USDA shall require (either in cooperation with Treasury or independently) all imported livestock to be marked with a mark of origin" (R-CALF United Stockgrowers of America, 2003). By requiring only imported livestock to be identified and tracked can be viewed as an apparent attempt to construct trade barriers against imported cattle and beef (Peel, 2008). Although R-CALF, as well as other proponents, may claim that origin labeling information is enhancing the safety and quality of products, such arguments are highly debatable.

A mandatory labeling system in the European Union has helped restore consumer confidence after several disease outbreaks (Gracia and Zeballos, 2005); however several studies have shown that a country of origin label will only be perceived as being valuable if and only if consumers correlate the origin with positive intrinsic values such as safety, quality, or other attributes of value (Loureiro and Umberger, 2007, Miranda and Kónya, 2006). Therefore, U.S. consumers will only value the origin information provided by MCOOL if they associate that information as a positive intrinsic value. However, consumers' value for origin information may be ethnocentrically derived, meaning that

this positive intrinsic value could be based on personal perceptions of local products being superior to identical foreign products regardless of any concrete quality attributes.

Past research has been conducted to determine how consumers value different attributes when purchasing various products. Consumers exiting a Safeway in Australia were asked to participate in a survey ranking various information cues and found that product brand name, composition and best-before dates were valued more than country of origin labeling (Miranda and Kónya, 2006). Also beef consumers in the European Union generally valued quality marks such as best-before dates more than country of origin labeling (Verbeke and Roosen, 2009).

Umberger et al. (2003) conducted an auction with beef steak consumers in Denver and Chicago where they found that 73% of participants were willing to pay (WTP) a premium for COOL which averaged to be $0.42 per pound. These consumers preferred an origin label since they had a strong desire to support U.S. producers and they associated U.S. beef as being of a higher level of quality and food-safety (Umberger, et al., 2003). On the other hand, participants in this study were not asked how they would value the COOL information but rather how they would prefer having U.S. origin beef steaks. Also, Verbeke and Roosen (2009) define COOL as being a "noisy signal" of quality since many consumers are unaware of the actual food quality policies of the involved countries.

Food safety assurances are important concerns for consumers especially after cases of food contamination that cause public distress. The U.S. BSE scare on December 23rd, 2003 erupted consumer concerns over safety and origin labeling. Ward et al (2005) had U.S. consumers participate in an auction experiment before and after the BSE scare

to determine if they were willing to exchange a U.S. inspected and farm traceable beef sandwich for a similar beef sandwich that was inspected and imported from Canada. Participants before the BSE scare required a payment of $1.89 to make the exchange in contrast to a payment of $4.30 required after the BSE incident (Ward, et al., 2005). Surprisingly, 69% of participants expressed support for a mandatory ID system in the U.S. and also a majority of the blame for the BSE incident was placed on Canada, which resulted in a shift in consumer demand for U.S. origin beef at the expense Canadian beef. Loureiro and Umberger (2007) conducted a hypothetical nationwide mail survey concluding that beef steak consumers in the U.S. expressed a considerable amount of value on USDA food safety labeling ($8.068/pound) followed by U.S. origin labeling ($2.568/pound) and traceability assurances ($1.899/pound). Mennecke et al. (2007) conducted a conjoint analysis survey amongst three different social groups including animal science students, business students and a nationwide random sample. This study concluded that all groups valued the region of origin the most when choosing a beef steak. These studies all reinforce the notion that U.S. consumers place a large value on food safety assurances and U.S. origin products. Maintaining the identity and flow of the safety and origin information throughout the supply chain can also be considered as being very important in order to ultimately preserve the value of these information assurances (Mennecke, et al., 2007). However, the hypothetical nature of research can significantly inflate WTP values (List and Gallet, 2001, Lusk and Schroeder, 2004) and contrarily, the addition of too much information can cause decreasing marginal WTP values to consumers whom typically present a diminishing ability to process additional information (Gao and Schroeder, 2009). Also, a post-MCOOL understanding of how U.S. consumers

value the country of origin information provided by MCOOL as opposed to consumers value for "U.S. certified" versus foreign products would be beneficial in attaining a better understanding of the value of MCOOL.

Previous literature illustrates that U.S. consumers are willing to pay a premium for U.S. labeled beef and pork products over products from other countries(Link, 2009, Loureiro and Umberger, 2007, Miranda and Kónya, 2006, Umberger, et al., 2003, Ward, et al., 2005). While this statistic is relevant to the debate on MCOOL, it is not what is needed in a cost-benefit analysis of the benefits of MCOOL. Rather, information is needed on the value of origin information (VOI) regardless of the actual origin itself. As such, this research focuses on how consumers value "knowing" the country of origin as reflected in a world where a mandatory country of origin labeling system exists in comparison to consumers "not knowing" the origin information. To our knowledge, Loureiro and Umberger (2007) is the only study to have provided a means to estimate this value of information; however, more work is needed because this study: 1) was a hypothetical mail survey prone to hypothetical bias, 2) was conducted pre-MCOOL implementation, and 3) didn't actually estimate the VOI in a utility theoretic manner. Our study uses a non-hypothetical, in-store field experiment to measure consumers' VOI. A key contribution of this research is the comparison of two approaches (a direct and indirect) approach to determining VOI. To our knowledge, this is the first paper to provide a method of directly estimating the VOI in a non-hypothetical setting.

CHAPTER II

METHODS AND PROCEDURES

To provide a robust estimate of consumers' value for country of origin labeling information, two experiments were conducted. The first was structured to directly determine consumers' willingness-to-pay for information on the origin of a meat product, and as such we refer to this approach as the *direct* choice experiment. Importantly, the direct approach does not measure consumers' preference for U.S. versus foreign beef *per se*, but rather measures the value of having information about the origin of the meat. The second approach involves asking consumers to choose between meat produced from different origins. These choices can be used along with a conceptual model to indirectly infer the value of information, and thus we refer to this approach as the *indirect* choice experiment. Although the two approaches involve consumers making different types of choices, theoretically the value of information obtained from the direct and indirect choice experiments should be equivalent.

Data Collection

Approximately 500 consumers were recruited from two supermarkets located in a Dallas, TX suburb and in San Antonio, TX during the months of October 2010 and January 2011 respectively. The consumers were approached as they passed by the fresh meat counter.

Customers that agreed to participate were allocated to one of the 15 treatments shown in table 1. Treatments varied by approach (either direct or indirect), participation fee offered ($2 or $4), commodity (beef or pork), location (Dallas or San Antonio), and for the direct valuation approach the price range used in the choice experiment (from $0 to $2.5 or from $0 to $5). The various treatment-combinations were used to determine the extent to which the estimated value of information was sensitive to the verities of the experimental protocol (i.e., participation fee and price ranges) as opposed to "true" underlying values of country of origin information.

Each participant was recruited by offering either a free 12 ounce cut of meat (either a New York strip steak or a pork chop) in addition to $2 or $4 cash. Participants were notified that they would make a series of non-hypothetical choices and the cash could be used to pay for any purchase they made, but we stressed that ultimately the cash was theirs to keep. In cases where the prices exceeded the endowed cash amount, participants were informed that they would be required to pay any additional amount out of pocket. We provided the cash endowment because we were concerned that without it, many people would not participate because shoppers often come to the store without cash, planning to pay with credit card. Of course, providing a cash endowment might inflate willingness-to-pay values, which is why we varied the level of endowment (to extrapolate what would happen were none given) and included prices that exceeded the level of the endowment so as to empirically determine the seriousness of this potential problem. As we will show later, the magnitude of the endowment had very little effect on the choices people made, and as such, when we moved to the second location in San Antonio, we only used the lower $2 endowment. The endowment of meat product was

an integral part of our design to elicit the value of information and it also allows us to selectively encourage participation from actual fresh meat consumers. After completing the choice tasks, each participant completed a survey. Participation took approximately 5-10 minutes.

Direct Choice Experiment

In the direct choice experiment, consumers choose between receiving a steak (or pork chop) with a country of origin label versus an identical product without a country of origin label, where at the time the decision was made the consumer did not know the actual origin of the labeled product. In essence, our approach elicits consumers' willingness-to-pay for the origin information irrespective of the actual origin. The unlabeled steaks (or pork chops) were placed in a red cooler and the labeled steaks (or pork chops) in a blue cooler. The participants were asked to read a set of presented instructions and they were verbally notified that the meat products in both coolers "all have been USDA inspected and are of the same size, weight, and quality grade" and the meat product "could be from the U.S., Canada, Mexico, Australia (Denmark for pork), or a combination of these origins." Participants were informed that the only difference between these two options is that the meat product from the blue cooler had a label denoting its country of origin. Participants chose which cooler they wished to pick a steak from (without being able to see the contents inside the cooler).

In order to determine consumers' WTP for the country of origin information, a multiple price list (MPL) format was used where each participant answered six choice question scenarios. In each choice, the participant could pick from the unlabeled cooler

for free (price of $0), but choosing from the cooler with the labeled steaks would cost from $0 to $2.50 in some treatments and $0 to $5 in other treatments.

The MPL was used because it is incentive compatible. Moreover, Andersen et al. (2006) argue the MPL is easily understood and can be quickly answered in our retail setting – something which may not be true of auction-based approaches like the BDM procedure used by, for example, Lusk et al. (2001). Two price variations were used to create a situation in which participants would have to potentially pay out of pocket for the labeled meat product, and to determine the sensitivity of estimates to this experimental design choice (Andersen, et al., 2006). After a participant made all six choices, a 6-sided die was rolled to determine which choice was binding and from which cooler they would receive their meat product. Figure 1 shows the instructions and an example of the choice questions respondents were asked to complete.

Analysis of Direct Experiment Data

As shown in figure 1, the first choice question in the MPL asks respondents whether they want a labeled or unlabeled steak where the prices of both are $0. The next question is the same except the price of the labeled steak is increased $0.50 (or $1 depending on the treatment). If a respondent chooses the labeled steak on the first question but the unlabeled on the second, then their willingness-to-pay for the origin information is between $0 and $0.50.

By observing when a respondent switches their choice between the increasingly higher-priced labeled steak and the lower-priced unlabeled steak, the MPL provides a range on respondents WTP (Andersen, et al., 2006). In particular, let WTP_i^* be

respondent i's true willingness-to-pay for origin information. As in Cameron (1988) WTP_i^* can be expressed as:

$$(1) \qquad WTP_i^* = \beta + X_i\rho + \varepsilon_i$$

where β is a constant ; $\boldsymbol{X_i}$ is a vector of explanatory variables including dummy variables describing the particular experimental treatment and variables defining the socio-economic characteristics of individual i ; $\boldsymbol{\rho}$ is a vector of coefficients; and ε_i is a stochastic error term.

Let $P_{i,low}$ and $P_{i,high}$ indicate the lowest and highest prices individual i was willing to pay for the labeled steak as indicated by their six discrete choices. Now, we know that $P_{i,low} \leq WTP_i^* < P_{i,high}$. If ε_i is independently and identically Normally distributed with a standard deviation of σ, then the log-likelihood function for the interval censored regression can be written as:

$$(2) \quad LLF^{Direct} = \Phi\left(\left(P_{i,high} - \frac{X_i\rho}{\sigma}\right)\right) - \Phi\left(\left(P_{i,low} - \frac{X_i\rho}{\sigma}\right)\right),$$

where Φ is the cumulative standard normal distribution function, and ρ, and σ characterize the distribution of willingness-to-pay for the value of origin information. Estimates of ρ indicate the marginal effect of X_i on WTP_i^*. If the model is estimated with only a constant term and excluding any other explanatory variables, then the constant is an estimate of the mean WTP for origin information across the experimental treatments studied.

Indirect Choice Experiment

In the indirect choice experiment, respondents choose from eight options between steaks (or pork chops) from specific origins that differed in terms of cost. Figure 2 shows

the instructions that were presented and explained to each participant before the choice experiment. In each choice question, respondents were asked to choose between keeping an unlabeled steak (or pork chop) or exchanging it for one of seven steaks (or pork chops) labeled specifically as being either the U.S., Canada, Mexico, Australia (Denmark for pork), Canada and U.S., Mexico and U.S., or Canada, Mexico, and U.S. Participants were also verbally notified that all the meat products were "USDA inspected and are of the same size, weight, and quality grade". The price of the labeled options was varied between the values of $0, $2 and $4, whereas the "keep unlabeled steak" option was the status-quo option equal to a price of $0 in each choice (this was the free steak respondents were promised for participating).

Because there were seven labeled steak options varying at three price levels each, there were 3^7=2,187 possible choices that could have presented to respondents. From this full factorial, we selected an orthogonal main-effects fractional factorial that consisted of 27 price combinations. The design is such that the prices of each steak type are completely uncorrelated across all 27 choice questions. Rather than asking each participant to answer all 27 choice questions, we blocked the choices into three sets of nine to achieve a more manageable sized activity for our in-store participants. Each participant in the indirect valuation treatments randomly received one of the three blocks. To make the choice task incentive compatible, after the participants completed all nine choices, a 9-sided die was rolled to determine the scenario that was binding and actually paid out.

Analysis of indirect experiment data

A random utility framework is referred upon to explain the indirect choice experiment modeling. This can be broken down to assume that each individual i would choose any specific choice option j in which their utility U_{ij} is maximized and can be expressed as:

$$(3) \quad U_{ij} = V_{ij} + \varepsilon_{ij}$$

where V_{ij} is a vector for the deterministic utility function described by the attributes of a steak (or pork chop) provided by choice option j ; and ε_{ij} is an unobserved random variable (stochastic element) that is not explained in V_{ij} . These j attributes include price and the country of origin options; United States (US), Canada (Can), Mexico (Mex), Australia or Denmark (Aus/Den), United States and Canada (USCan), United States and Mexico (USMex), or United States, Canada and Mexico (USCanMex). Assuming that V_{ij} is linear in parameters, we can empirically define the utility functional form as:

$$(4) \quad V_{ij} = \alpha(Price)_{ij} + \beta_1(US)_{ij} + \beta_2(Can)_{ij} + \beta_3(Mex)_{ij} + \beta_4(Aus/Den)_{ij} + \beta_5(USCan)_{ij} + \beta_6(USMex)_{ij} + \beta_7(USCanMex)_{ij}$$

where α_{ij} is the marginal utility of income (multiplied by negative one), $Price_{ij}$ is the price faced by individual i for option j; β_n represents the marginal utilities of the respective origins relative to the unlabeled option. For specification purposes, we normalized the utility of the "no label" option to zero. Therefore, due to this normalization we can interpret β_1 as the utility for having a meat product labeled as being from the United States relative to a meat product that is unlabeled as to its origin.

The probability of individual i choosing alternative j as:

$$(5) \quad Prob\{V_{ij} + \varepsilon_{ij} \geq V_{ik} + \varepsilon_{ik} \ for\ all\ k \in C_i\}$$

where C_i is the choice set for individual i , and $C_i = (1,2 \ldots 8\}$. The eight choice options include the seven origin-labeled cuts listed previously and the "no label" option. McFadden (1974) shows that if the random errors in equation (5) are independent and identically distributed across the j alternatives with a type I extreme value distribution, then the probability of consumer i choosing alternative j in the familiar multinomial logit (MNL) model is equal to

$$(6) \quad \pi_{ij} = Prob(j\ is\ chosen) = \frac{exp^{V_{ij}}}{\sum_{k \in C} exp^{V_{ik}}}$$

where k represents all the alternatives other than which has been choosen (j).

The parameters in equation (4) can be estimated by maximizing their log-likelihood functions so that:

$$(7) \quad LLF^{Indirect} = \sum_{i=1}^{N} \left(y_{ij} * \ln \left(\sum_{j=1}^{7} \pi_{ij} \right) \right)$$

where y_{ij} is equal to 1 if individual i chooses option j and y_{ij} is equal to 0 otherwise; and π_{ij} is the probability that individual i receives product j which can be from any one of seven origins.

Applying the conceptual model developed by Just and Foster (1988) to the discrete choice context, Leggett (2002) derived a the value of information (VOI) on which we base the following analysis. In particular, we conceptualize a case in which information improves (via the provision of MCOOL), but where true quality remains constant. In this case, Leggett (2002) shows that the welfare change is given by:

$$(8) \quad VOI = \frac{1}{\alpha}\left[\sum_{j\in C} \exp\left(V_j^{1*}\right) - \sum_{j\in C} \exp(V_j^{0*}) - \sum_{j\in C} \pi_j^{0*}\left(V_j^{0} - V_j^{0*}\right)\right]$$

where V_j^{1*} is the consumer's perception of quality after origin labeling, V_j^{0*} is the consumer's perception of quality before origin labeling, V_j^0 is the true quality before origin labeling (which happens to also equal V_j^{1*} since it is assumed that consumers have perfect information about quality after labeling), and π_j^{0*} is the probability of choosing option *j* based on pre-labeling perceptions.

The first portion of equation (8), $\frac{1}{\alpha}\left[\sum_{j\in C} \exp\left(V_j^{1*}\right) - \sum_{j\in C} \exp\left(V_j^{0*}\right)\right]$ is just the conventional welfare measure based on (potentially incorrect) *perceptions*, something Leggett (2002) refers to as the "anticipated benefit." The last term in equation (8), $\frac{1}{\alpha}\left[\sum_{j\in C} \pi_j^{0*}\left(V_j^0 - V_j^{0*}\right)\right]$, adjusts this welfare measure for inaccurate perceptions that result from imperfect information. It represents the lost welfare that results from consumers making a different set of choices than what they would have chosen had they possessed better information.

Equation (8) can be implemented in a variety of ways depending on how one envisions the pre- and post-labeling scenarios playing out. As a first point of comparison, we implement equation (8) so as to provide a calculation of the value of origin information that can be directly compared with our direct VOI elicitation approach. For this calculation, we envision the post-label scenario as representing the blue cooler in which there were steaks/chops from seven labeled origins. In this case the utility of the seven options, $V_j^{1*} = V_j^0$, is given by the respective coefficients in equation (4). For example, the utility of the US labeled steak is $V_{US}^{1*} = V_{US}^0 = \beta_1 + \alpha Price_{US}$, the utility of

the Canadian steak is $V_{CAN}^{1*} = V_{CAN}^{0} = \beta_2 + \alpha Price_{CAN}$, and so on. All prices are set at $2, which is the midpoint of the design.[1] In the pre-label scenario, seen as representing the red cooler in which there were unlabeled steaks/chops, the utility from each steak is assumed to equal $V_{Unlabeled}^{0*} = \alpha Price_{Unlabled}$. Recall that the "no label" coefficient was normalized to zero in the econometric model for identification purposes. So that a "choice set size effect" doesn't drive the welfare estimate, we assume people also chose between seven options in the pre-label scenario, where the utility of all options were given by $V_{Unlabeled}^{0*} = \alpha Price_{Unlabled}$. Given this set-up the VOI given by equation (8) can be calculated and compared to the direct VOI approach.

The calculation described above relates to the VOI *in the context* of our experiment. It is the calculation which allows us to compare the direct and indirect VOI approaches. This is a statistic, however, which may not necessarily relate to the VOI of MCOOL as it has actually been implemented in the marketplace. For example, in the post-label, MCOOL world many grocery stores do not carry meat products labeled from seven different countries – rather they often carry a single product such as "Product of Canada and US" label. Moreover, in the pre-label, pre-MCOOL world consumers may *believe* their cuts come from the US or some other origin despite any labels telling them as such. These observations suggest that equation (8) might be used, along with some ancillary data obtained in a post-experiment survey, to calculate the VOI associated with MCOOL as it has actually been implemented in many grocery stores.

In the pre-MCOOL world, consumers have beliefs about where an unlabeled steak/chop originates. As such, their utility for an unlabeled steak/chop may not equal

[1] The VOI calculation is invariant to the choice of prices as long as they are held constant pre- and post-label.

that associated with the utility of the unlabeled steak in our experiment. In the post-experiment survey, we asked consumers to indicate, of the last 10 steaks they purchased, how many they thought were from each of the seven origins under consideration (as reflected in Table 4). This data can be used to form a probability associated with an unlabeled steak. Let θ_{ij} be the i^{th} consumer's belief (calculated as probability) that an unlabeled steak is from origin j as ascertained by the post-experiment survey. In this case, the utility of an unlabeled steak can be determined as an expected utility: $V^{0*}_{Unlabeled} = \sum_{j=1}^{7} \theta_j \beta_j + \alpha Price_{Unlabled}$, where β_j are the utilities derived from each origin as given in equation (4). In the post-MCOOL world, however, consumers do not actually have the option to choose from steaks/chops of many different origins, but rather only have the option to choose from a single option within most grocery stores. For example, a store may carry a single options labeled "Canada and US," providing a utility of $V^{1*}_{CANUS} = V^{0}_{CANUS} = \beta_5 + \alpha Price_{CANUS}$. Or, they may only carry a "US" label. To determine the value of information from these labels in these settings, the equations can be plugged into equation (8) to calculate several alternative VOI estimates as MCOOL has actually been implemented.

Post-Experiment Questionnaire

After the experimental choices, each respondent completed a brief questionnaire – an exact copy of which is shown in figure 3. The survey was the same for all respondents except for the substitution of the word "pork" for "beef" depending on the treatment. The responses from participants were designed to determine basic demographics (gender, education, age, race and income), meat consumption behavior (consumption per week),

knowledge of the existence of MCOOL, typical behavior of using COOL information, country of origin beliefs, and level of ethnocentrism using a modified version of the CETSCALE.

The original CETSCALE created by Shimp and Sharma (1987) focused on measuring consumer purchasing tendencies which they defined as consumer ethnocentrism. The term "consumer ethnocentrism" is adapted from the classical concept of ethnocentrism but has been specifically tailored toward the study of consumer behavior (Shimp and Sharma, 1987). Consumer ethnocentrism is a physiological term that describes those who believe that it is a moral, patriotic, or American obligation as a consumer to purchase and/or support American-made products. Ethnocentrism may lead to heightened demand for origin information that goes beyond simple concerns about product quality or safety. Some have argued that motivations for COOL are primarily driven by ethnocentrism and that a "protectionist measure is almost certain to harm societal welfare" (Lusk, et al., 2006).

The original CETSCALE consisted of 17 seven level Likert-scaled questions. This was, however, too many questions to ask in our store setting. We selected the three items from Shimp and Sharma's (1987) that had the highest factor loadings with the overall ethnocentrism scale. Our measure of ethnocentrism is calculated by averaging the respondent's answer to the three questions where each individuals' responses ranged from "strongly agree" to "strongly disagree" on a five point Likert-scale. We reverse coded the responses such that in our analysis a higher score implies a higher level of ethnocentrism and a lower score implies a lower level of ethnocentrism.

Finally, it should be mentioned that two of the questions (13 and 14) shown in figure 3 were included only after the Dallas experiments. In particular, in the San Antonio sessions, participants answered a 5-level Likert-scale question to determine whether they believed their responses in the experiment would affect government policy decisions for MCOOL. Lastly, an open ended question included to allow respondents to indicate the reasoning behind the decisions made in the experiment. In total, approximately 30 participants failed to answer one or more questions. These missing values were replaced with the means of the non-missing values in order to refrain from having to drop participants from our regression analysis.

CHAPTER III

RESULTS

Summary Statistics

Summary statistics related to demographics are shown in table 2. There were 259 participants from Dallas and 267 in San Antonio. There were more females participants, primarily because there were more females in the grocery stores. The majority of participants were between the 45 and 54 years of age, but all age groups were well represented. Racial background were reflective of the region as the majority included Caucasians, followed by Hispanic/Latinos, African Americans and other races. Incomes were higher in San Antonio which was reflective of the neighborhood in which the particular store was located. Table 3 also reports summary statistics associated with meat purchase behavior and MCOOL knowledge.

As a result of encouraging participation through the endowment of either a free steak or pork chop, along with being located in the meat aisle of a grocery store, we selectively involved meat consumers in our study. As shown in Table 3, the consumption frequency of beef consumers trends higher than that of pork consumers. Consumers were asked about their knowledge and purchasing behavior in regards to country of origin labeling. Consumers were asked if "grocery stores [are] currently required by law to indicate the country of origin for all fresh beef (pork) products." The use of the term

"beef" or "pork" was dependent on if they were given a steak or pork chop in the initial choice experiment. A surprising majority (60%) stated that they never look for COOL information when shopping for fresh beef or pork products. By focusing people's attention on this attribute, it is possible consumers will perceive it as more important than in every-day shopping. For example, the country of origin effect has been found to be larger in studies that only investigated origin as compared to studies that investigated origin in combination with other attributes (Verlegh and Steenkamp, 1999). The results also indicate that between 14-25% of respondents said that they believed a COOL law did not exist when it has actually been in effect for nearly two years.

We also asked if consumers looked for a COOL label when purchasing fresh beef or pork at a grocery store. Derived from Table 3, a clear majority (60%) of consumers responded to never have looked for COOL information. Also, approximately 11% stated that they always looked for COOL information when in actuality many respondents were only aware of its origin because they purchased meat directly from a farm/ranch. Lastly, consumers were asked three questions to measure ethnocentrism levels. As shown in table 3, the respondents in our Dallas trial presented higher levels of ethnocentrism than our San Antonio trial.

An additional behavioral question was added for our second trial in San Antonio. The respondents were asked if he/she agreed or disagreed that the "answers in this study will influence government policy on country of origin labeling?" where 1=strongly disagree and 5=strongly agree. The average response of 2.89 suggests that participants were fairly indifferent in believing that their responses in this study would be influential in policy implications for MCOOL.

Table 4 summarizes the participants' beliefs about where their beef (or pork) comes from. Rather than asking a probabilistic statement, which we thought would be difficult for most consumers to answer, respondents were asked which country or combination of countries they thought their last 10 beef steaks (or pork chops) that they purchased originated. These responses were checked to ensure that they summed to ten. A vast majority felt that all of their meat came from the United States whereas the least frequent origin was Australia (Demark for pork) and "Other" which reflected any other country or countries that was not listed in the choice options.

Direct VOI

Table 5 presents the mean WTP for the origin information as determined by interval censored regressions. Separate models are estimated for each location and product as well as a combined version that includes all of the direct choice experiment participants. In San Antonio, the mean WTP values were $1.37 and $1.84 per pound of beef and pork, respectively. These values were greater than those in Dallas. This could be due to the higher income levels of those in San Antonio. An interesting note is that consumers in Dallas were willing to pay more for the origin information of beef ($1.10) than that of pork ($0.93) whereas those in San Antonio valued information for pork information ($1.84) more than beef information ($1.37). A combined value of $1.37 expresses the value of information for all participants in all of our trials. As expected, our VOI value of $1.37 is significantly less that Loureiro and Umberger's (2007) hypothetical WTP estimate of $2.57 per pound for U.S. origin beef.

In general, consumers were willing to pay less that the $2 and $4 amounts endowed to them for participating in the choice experiments. This must be mentioned and considered since several consumers chose to keep the money and forego having the label information, which suggests that many participants value the cash more than the labeling information. Table 5 also reveals large standard deviation estimates, suggesting significant heterogeneity across people in their value of information. Further analysis of this heterogeneity is reflected in Table 6 where consumers we divided into three groups based on their value of information in the direct choice experiment. Consumers whom did not chose the 'labeled' option in any of the choice questions preferred to keep the cash endowment over having the label information and were referred to as 'Savers'. A larger proportion of the participants in Dallas were 'Savers' than in San Antonio. At the other extreme, the consumers who chose the 'labeled' option for every choice question were willing to pay the largest amount of all and were called 'Big Spenders'. Consumers who elicited a degree of price sensitivity and switched their choice due to the increase in cost were classified as 'Bargainers'. A larger proportion of the participants were Bargainers in San Antonio and the distribution of these three groups were split more evenly in Dallas.

Table 7 expands the interval censored regression model to further investigate the determinants of the value of information. Model 1 reflects the base model and excludes all explanatory variables except a constant. This model shows the mean WTP across all treatments and commodities and locations was $1.37. Model 2 includes a dummy variable for commodity type (beef versus pork) and locations (San Antonio versus Dallas). Model 3 also includes controls for our sensitivity checks. A variable was included for the endowment or participation fee provided ($2 versus $4) and price range

used in the multiple price list ($0 to $2.50 versus $0 to $5.00). None of these additional variables are significantly related to the VOI. One interpretation of these results is that the estimated VOI was not unduly influenced by the choice of experimental procedures (and location), and that we are arriving at a relatively stable estimate of people's value for information. It might be tempting, however, to conclude that the results suggest WTP is randomly distributed – not corresponding to any of the variables one might expect to have an influence as models 4, 5, and 6 show, however, this is not the case.

Model 4, 5, and 6 all include a variable for consumer ethnocentrism and they show significance levels of 5%, 5% and 10% respectively. More ethnocentric consumers place a significantly higher value on origin information than less ethnocentric consumers. For example, model 4 shows that as a consumer's level of ethnocentrism rises by 1 unit, willingness to pay for origin information increases by $0.33. The results suggest that patriotic tendencies are a key driver of the demand for origin information.

Models 5 and 6 both include several grouped variables which include consumption levels, gender, education and income levels. Model 6 differs only by the addition of a variable reflecting the extent of which a consumer uses or looks for a COOL label when shopping for beef or pork products in the grocery store. Both models conclude that consumption levels significantly represent consumer VOI levels. Moderate and frequent meat consumers express that they are willing to pay between $1.76-$1.99 and $1.66-$1.90 dollars less respectively than infrequent consumers for the COOL information. This may reflect the idea that after consumers experience these products they are unable to correlate the COOL information as being an important value-added cue relative to other cues.

As reflected in models 5 and 6, consumers with an education level of a bachelors degree or better significantly (5% level) are willing to pay between $0.74-$0.81 more for the COOL information. This is supported by Mennecke et. al (2007) whom state that education of consumer can influence behavior toward choice attributes. Gender and income levels did not significantly represent these models although the relations of these two variables were as expected. Females tended to value COOL information more than males and participants with medium and high income levels presented higher VOI levels in relation to low income consumers.

The addition in model 6 includes variables which are intended to ascertain consumers behaviors towards using COOL information when purchasing meat products in a grocery store. The variables of 'LOOK Always' and 'LOOK Sometimes' refer to how often a consumers looks for a COOL label when purchasing beef or pork products (see question #3 in Figure 3). The obvious assumption to make would be that consumers whom state that they always look for a country of origin label will present a revealed preference towards paying more for the COOL information. As shown in table 7, this assumption is clearly supported and shows that a consumer who claims to always look for COOL information will pay $1.69 more for COOL information relative to a consumer who never looks. This states that consumers stated and revealed preferences coincide.

Model 7 includes the final addition of variables which aim to determine whether consumers' knowledge about the existence of the MCOOL law affects the value they place on origin information. Consumers were asked if grocery stores were "currently required by law to indicate the country of origin" for all fresh beef or pork products to determine their level of knowledge of MCOOL (refer to question #2 in Figure 3). The

participant response options were either “No”, “Yes” or “I don’t know.” As shown in Table 7, he variables ‘No MCOOL Law’ and ‘Don’t Know MCOOL Law’ were statistically insignificant. Consumers’ knowledge about MCOOL did not affect their value for the origin information.

Indirect VOI

An indirect estimate of the VOI can be obtained from the choice experiment. Table 8 reports the results of the multinomial logistic model estimated to determine the coefficients from equation 4. Recall that participants were asked to chose between 8 different country of origin options, one of which was a “no label” option (see Figure 2). Table 8 reveals which countries of origin consumers most prefer. Throughout all of our trial locations and variations between beef and pork products, we discovered that a significant value is place on U.S. origin beef and pork ($2.006/pound) and the largest discount was placed on meat originating from Mexico (-$2.701/pound) relative to the “no label” option. The three least preferred options included meat products that had some relation with being of Mexican origination (ex Product of Mexico; Product of US and Mexico; Product of US, Canada Mexico), which shows strong disapproval of Mexican originated meat.

A supplementary model was derived in order to determine how other variables influenced consumer behavior in the indirect choice experiment. Expanding on the variables from Table 8, two interaction effects were added to the model presented in Table 9. The initial interaction, which is denoted as the coefficient σ_1, expresses how much more/less a consumer would pay for a specific origin when he/she received an

endowment ($2 relative to $4) prior to the choice experiment. Similar to our discovery in the direct experiment, consumers were not significantly influenced by the endowment, which is why we discontinued the endowment variation in the following San Antonio trial. The second interaction σ_2 shows that if a consumer chooses a "Product of US", he/she will pay approximately $0.344/lb. more for every additional level of ethnocentrism. As expected, this interaction variable (σ_2) was significant in this model, concluding that consumers with more ethnocentric attitudes are willing to pay more for the US origin meat relative to other origins.

The values in Table 8 are used to calculate the VOI *in the context* of our experiment as shown in equation (8) and we will refer to these estimates as "Value of Information in the Experimental Setting". Again, we are assuming that a consumer will have 8 origin options to choose in our experimental setting, one of which includes a "no label" option. Table 10 shows the various VOI estimates in the different trial locations and product variations. Dallas consumers expressed higher VOI estimates for both beef and pork trials in comparison to consumers in San Antonio, and when considering all of our participants we concluded that their VOI level was $2.26. The standard errors for these estimates were calculated using the Krinsky-Robb parametric bootstrapping method (Krinsky and Robb, 1986). In addition to our indirect VOI estimation in the experimental setting, we are able to derive other variation of this indirect VOI estimate that may more accurately reflect the origin options that are actually presented in a typical grocery store setting.

Alternative Indirect VOI

Recall that we derived an alternative VOI calculation f intended to include consumers' beliefs of where their meat products come from in a pre-MCOOL world (refer to Table 4) and compare to a post-MCOOL world that does not include all seven potential origins but rather only a single origin option as is the case in most grocery stores. We created four alternative scenarios where only one origin option of either a "Product of United States", "Product of Canada", "Product of Canada and US", or a "Product of Mexico and US" is presented to the consumer after he/she receives the MCOOL information in a post-MCOOL world. Again, these alternative scenarios are meant to more accurately reflect the value of information in the "real world" as MCOOL has been implemented.

The results of this analysis for each alternative scenario are listed in Table 11 and are referred to as "Alternative Value of Information Estimates for the Indirect Approach". We concluded that the alternative VOI estimates are significantly less than the VOI estimates in the experimental setting. A consumer in this alternative natural situation would actually be worse off when receiving a "Product of Canada", "Product of Canada and US", or a "Product of Mexico and US" than they would have been if they received a "no label" steak or pork chop. When considering all the consumers in each of the four alternative scenarios, we found that they were worse off having the MCOOL information if they did not receive a "Product of US" labeled product. For example, as shown in Table 11, consumer's negatively valued MCOOL information being provided to them by -$3.00 in a situation when they assumed that there was a 70% chance of their beef or pork being a "Product of US" but then later received the MCOOL information that stated it

was instead a "Product of Mexico and US". This presents a pragmatic situation where a consumer's utility is negatively influenced if the actual country of origin differs significantly from the consumer's assumptions or beliefs. Before MCOOL, they thought they were buying US but after MCOOL they find they are buying, say, a product of Mexico and US, and as a result are disappointed as reflected by the negative welfare calculation.

Comparing the Direct and Indirect VOI's

T he differentiation of the direct and indirect experimental approaches allowed us to analyze how consumer's choice-making behavior changes under alternating experimental circumstances. The direct approach determined participants VOI by asking them how much they valued "knowing" versus "not knowing" the country of origin information. Alternatively, the indirect approach asked participants to choose a specific origin that they would prefer and this VOI estimate was indirectly derived using Leggett's (2002) VOI equation.

Our analysis revealed that these two experimental approaches did not result with the same VOI results. The VOI estimate derived from the direct approach was $1.37 whereas the indirect approach resulted with a larger VOI estimate of $2.26. Also, all the direct VOI values from each specific treatment (Table 5) were less than the respective indirect VOI values (Table 10).The comparison of these two approaches reflects how participant behavior changes in different experimental environments and how alternative approaches may reach conflicting conclusions.

CHAPTER IV

CONCLUSION

The objective of this study was to determine how U.S. consumers value the information (VOI) for beef and pork products after the implementation of the mandatory country of origin labeling system (MCOOL). Two different non-hypothetical choice experiments were conducted in a natural grocery store setting to determine how consumer responses change under alternative experimental approaches. Prior to stating our comparison and conclusions for these two VOI values we must be aware that the endowment of $2 or $4 in addition to the emphasis of the 'origin' attribute due to the experimental setting may result in inflated values relative to "true" VOI in the real world.

The results of the analysis show that consumers elicit slightly lower VOI values in the *direct* approach ($1.37/lb.) versus the *indirect* approach ($2.26/lb.). We can make two conclusions in regards to the reasoning for these VOI value differences. Firstly, we may conclude that Leggett's (2002) VOI equation did not ideally fit our modeling and therefore resulted in slightly inflated VOI values in relation to the direct approach. On the other hand, we could assume that consumers' had higher VOI values in the direct approach because they were able to choose a beef steak or pork chop from a specific origin and know with confidence that they would receive that product. Whereas on the other hand, the direct approach reveals a level of uncertainty because they did not know

'exactly' what product origins were in the blue cooler. Also, we are able to evaluate the influence of several explanatory variables.

The results indicate that consumers who ate beef or pork more frequently were found to have a lower value for having MCOOL information than those who infrequently consumed beef or pork. This may be a result of frequent consumers being unable to correlate any value-added attributes (taste, tenderness, etc.) to any specific country of origin. Consumers who presented higher levels of ethnocentrism were willing to pay more for a product with COOL information. Although consumers express a clear value to have the information provided by MCOOL, the influence of ethnocentric attitudes does not make the battle over the legitimacy of MCOOL less ambiguous. Also, a large majority (82%) of participants are not aware of the existence of a mandatory country of origin labeling system in the U.S.

The results presented in this paper can be used to estimate the benefits of the MCOOL policy. Given that 82% of the subjects were not aware of the existence of a mandatory country of origin labeling, the value of the policy to them must be, by definition, $0.00. For the remaining 16%, table 11 shows the value of information under alternative scenarios about the options offered by a consumers' retailer. If we assume 70% of retailers offer "Product of the US," 10% offer "Product of Canada," 10% offer "Product of US and Canada" and the remaining 10% offer "Product of US and Mexico," then the weighted-average benefit of the policy (for knowledgeable consumers representing 16% of the sample) is 0.7*$1.10 - 0.1*$2.09 – 0.1*$1.20 – 0.1*$3.00 = $0.141 for the combined model. Assuming consumers who are and are not knowledgeable of MCOOL have a similar value of information (a fact supported by

model 7 in table 7), then the then the overall average benefit of MCOOL is 0.82*$0.00 + 0.16*$0.141 = $0.025. If people tend to buy one pound of pork or beef on each shopping occasion, then the benefit of the MCOOL policy under these assumptions is $0.025/lb of beef or pork sold.

.

Table 1. Experimental Treatments

					Number of Participants	
Treatment	Approach	Endowment	Price Range	Commodity	Dallas	San Antonio
1	direct	$2	$0 to $2.5	beef	20	45
2	direct	$4	$0 to $2.5	beef	22	-
3	direct	$2	$0 to $5	beef	20	45
4	direct	$4	$0 to $5	beef	23	-
5	indirect	$2	$0 to $4	beef	14	29
6	indirect	$4	$0 to $4	beef	15	-
7	indirect	$2	$0 to $4	beef	14	29
8	indirect	$4	$0 to $4	beef	14	-
9	indirect	$2	$0 to $4	beef	14	28
10	indirect	$4	$0 to $4	beef	14	-
11	direct	$2	$0 to $2.5	pork	21	32
12	direct	$2	$0 to $2.5	pork	20	30
13	indirect	$2	$0 to $5	pork	16	10
14	indirect	$2	$0 to $4	pork	17	10
15	indirect	$2	$0 to $4	pork	15	9
# Observations					259	267

.

Table 2. Summary Statistics associated with Demographic Variables

		Dallas		San Antonio	
Variable	Definition	Beef	Pork	Beef	Pork
Gender	Female	58%	62%	49%	48%
Age	18-34 years old	22%	16%	24%	15%
	35-44 years old	24%	21%	22%	30%
	45-54 years old	28%	31%	31%	32%
	55-64 years old	20%	18%	18%	18%
	65 years or older	7%	13%	5%	5%
Race	African American	8%	8%	6%	3%
	Caucasian	71%	78%	61%	68%
	Hispanic/Latino	15%	12%	28%	26%
	Other	6%	2%	5%	1%
Income	Less than $25,000	17%	12%	8%	7%
	$25,000 to $99,999	61%	62%	50%	47%
	More than $100,000	19%	21%	39%	44%
Degree	Bachelors degree or greater	36%	35%	62%	66%
# Observations		170	89	176	91

Table 3. Summary Statistics associated with Consumption Behavior and Knowledge of MCOOL

		Dallas		San Antonio	
Variable	Definition	Beef	Pork	Beef	Pork
Eat Beef (Pork)	4 or more times per week	21%	2%	20%	0%
	2-3 times per week	52%	20%	47%	15%
	Once per week	17%	35%	16%	33%
	2-3 time per month	7%	27%	14%	26%
	Once a month or less	2%	15%	3%	23%
	Never	1%	1%	0%	2%
MCOOL Knowledge	Yes	25%	18%	14%	15%
	No	26%	22%	24%	16%
	I don't know	49%	60%	62%	68%
Look for COOL	Every time	12%	13%	11%	8%
	Sometimes	30%	20%	32%	32%
	Never	58%	66%	57%	60%
Participation is Influential	1=Strongly Disagree; 5=Strongly Agree	-	-	2.87	2.92
Ethnocentrism	1=Low Ethnocentrism; 5=High Ethnocentrism	3.76	3.50	3.12	3.14
# Observations		170	89	176	91

Table 4. Country of Origin Beliefs

		Dallas		San Antonio	
Variable	Definition	Beef	Pork	Beef	Pork
COOL Beliefs	Product of United States	72%	73%	70%	62%
	Product of Canada	4%	4%	4%	2%
	Product of Mexico	5%	6%	5%	7%
	Product of Australia (Denmark)	2%	1%	2%	1%
	Product of Canada and U.S.	5%	7%	4%	8%
	Product of Mexico and U.S.	-	-	4%	10%
	Product of Canada, Mexico, and U.S.	11%	10%	10%	9%
	Other	1%	0%	1%	1%
	Unknown beliefs; participants dropped	4	2	0	0
# Observations		166	87	176	91

Table 5. Interval Censored Maximum Likelihood Estimation for Direct Approach

		Dallas		San Antonio	
Parameter	Combined[a]	Beef	Pork	Beef	Pork
Constant	1.368**	1.019[a]	0.925[b]	1.369**	1.836**
	(0.183)[c]	(0.572)	(0.494)	(0.212)	(0.383)
Scale (Std. Dev)	2.814	4.595	2.842	1.916	2.781
	(0.200)	(0.774)	(0.549)	(0.196)	(0.417)
# Observations	277	84	41	90	62

** Denotes 1% significance

[a] P-value for parameter is 0.0746

[b] The p-value for the parameter is 0.0613

[c] Numbers in parentheses are standard errors

Table 6. Consumer Groups in Direct Choice Experiment

		Dallas		San Antonio	
Variable	Definition	Beef	Pork	Beef	Pork
Savers	Participant always chooses to pay $0 in CE	38%	34%	19%	24%
Bargainers	Participant mixes choices between $0 and $5 in CE	34%	46%	64%	48%
Big Spenders	Participant always chooses to pay for label in CE	28%	20%	17%	27%
# Observations		84	41	90	62

Table 7. Direct Beef and Pork Interval Censored Regression Analysis

Parameter	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Constant	1.368**	1.243**	1.540	0.400	1.321	1.355	1.340
	(0.183)	*(0.376)*	*(0.850)*	*(1.024)*	*(1.308)*	*(1.293)*	(1.403)
Beef[b]		-0.153	-0.122	-0.129	0.210	0.060	0.169
		(0.380)	(0.400)	(0.397)	(0.448)	(0.444)	(0.454)
San Antonio[c]		0.391	0.334	0.571	0.325	0.355	0.368
		(0.371)	(0.422)	(0.437)	(0.440)	(0.434)	(0.444)
Endowment[d]			-0.080	-0.101	-0.081	-0.121	-0.066
			(0.307)	(0.305)	(0.306)	(0.303)	(0.316)
Price Range[e]			-0.201	-0.259	-0.255	-0.203	-0.248
			(0.365)	(0.364)	(0.358)	(0.355)	(0.359)
Ethnocentrism				0.332*	0.340*	0.279	0.342*
				(0.167)	(0.166)	(0.165)	(0.166)
Eat Frequent[f]					-1.903**	-1.663*	-1.877*
					(0.746)	(0.739)	(0.747)
Eat Moderate[f]					-1.995**	-1.760**	-1.959**
					(0.707)	(0.700)	(0.709)
Female[g]					0.291	0.283	0.306
					(0.363)	(0.358)	(0.365)
Degree[h]					0.809*	0.738*	0.791
					(0.392)	(0.389)	(0.393)
High Income[i]					0.096	0.048	0.1
					(0.626)	(0.620)	-0.626
Med Income[i]					0.160	0.053	0.147
					(0.573)	(0.565)	(0.574)
Look Always[k]						1.690**	-
						(0.667)	-
Look Sometimes[k]						0.236	-
						(0.398)	-
No MCOOL Law[l]							0.122
							(0.566)
Don't Know MCOOL Law[l]							-0.198
							(0.483)
Scale (Std. Dev)	2.814	2.813	2.798	2.775	2.698	2.653	2.697
	(0.200)	(0.200)	(0.200)	(0.198)	(0.192)	(0.189)	(0.192)
# Observations	277	277	277	277	277	277	277

** Denotes 1% significance
* Denotes 5% significance
[a] Numbers in parentheses are standard errors
[b] Effect of beef trial versus pork trial
[c] Effect of San Antonio trial versus Dallas trial
[d] Level of endowment given to participant (either $2 or $4)
[e] Effect of price range of ($0.00 to $2.50) relative to price range of ($0.00 to $5.00)
[f] Effect of eating beef or pork frequently (2 or more times per week), or moderately (less than once per week but greater than 2 times per month) relative to infrequently (Less than once per month)
[g] Effect of females relative to males
[h] Effect of having a Bachelors degree or higher relative to participants with no college degree

[i] Effect of income level relative to participants with an income of less than $25,000
[k] Effect of frequency of looking for COOL label when purchasing meat products relative to participants who never look
[k] Effect of thinking that MCOOL does not exist (No MCOOL Law) or not knowing about MCOOL (Don't Know MCOOL Law) relative to knowing that the MCOOL law exists

Table 8. Multinomial Logit Estimates for Indirect Approach Data in Dallas and San Antonio

		Dallas		San Antonio	
Parameter	Combined[a]	Beef	Pork	Beef	Pork
Price (α)	-0.464**	-0.493**	-0.473**	-0.415**	-0.621**
	(0.021)[b]	(0.040)	(0.052)	(0.032)	(0.073)
Product of US (β_1)	2.006**	1.756**	1.296**	3.092**	2.857**
	(0.074)	(0.125)	(0.153)	(0.170)	(0.261)
Product of Canada (β_2)	-0.752**	-1.251**	-1.890**	0.684**	-0.128
	(0.113)	(0.204)	(0.319)	(0.209)	(0.326)
Product of Mexico (β_3)	-2.701**	-4.642**	-3.606**	-0.929**	-2.128**
	(0.264)	(1.003)	(0.714)	(0.351)	(0.730)
Product of Australia (or Denmark) (β_4)	-0.799**	-2.353**	-1.202**	0.962**	-1.772**
	(0.113)	(0.327)	(0.236)	(0.195)	(0.605)
Product of US and Canada (β_5)	0.018	-0.577**	-0.744**	1.471**	0.386
	(0.088)	(0.159)	(0.201)	(0.181)	(0.281)
Product of US and Mexico (β_6)	-1.541**	-2.578**	-2.374**	0.073	-1.058
	(0.153)	(0.363)	(0.391)	(0.242)	(0.447)
Product of US, Canada and Mexico (β_7)	-1.073**	-1.322**	-2.680**	0.184	-0.191
	(0.128)	(0.210)	(0.459)	(0.238)	(0.335)
Log-Likelihood	-2824	-850	-516	-1029	-283
# Choice Observations	2232	765	432	774	261

** Denotes statistical significance of 1% level or lower.

[a] Combined model includes all participants in both Dallas and San Antonio trials

[b] Numbers in parentheses are standard errors

Table 9. Multinomial Logit Interaction Estimates for Indirect Approach Data in Dallas and San Antonio

		Dallas		San Antonio	
Attribute	Combined[a]	Beef	Pork	Beef	Pork
Price (α)	-0.402**	-0.578**	-0.485**	-0.420**	-0.644**
	(-0.057)[b]	(-0.098)	(-0.053)	(-0.032)	(-0.075)
Product of US (β_1)	0.834**	0.348	-0.001	2.090**	1.434**
	(0.162)	(0.302)	(0.368)	(0.293)	(0.459)
Product of Canada (β_2)	-0.743**	-1.239**	-1.879**	0.689**	-0.106
	(0.113)	(0.204)	(0.319)	(0.209)	(0.327)
Product of Mexico (β_3)	-2.694**	-4.632**	-3.596**	-0.923**	-2.114**
	(0.264)	(1.004)	(0.715)	(0.351)	(0.731)
Product of Australia (or Denmark) (β_4)	-0.791**	-2.343**	-1.190**	0.967**	-1.761**
	(0.113)	(0.327)	(0.237)	(0.195)	(0.605)
Product of US and Canada (β_5)	0.029	-0.563**	-0.732**	1.478**	0.411
	(0.088)	(0.159)	(0.201)	(0.181)	(0.282)
Product of US and Mexico (β_6)	-1.534**	-2.569**	-2.364**	0.078	-1.045*
	(0.153)	(0.363)	(0.391)	(0.242)	(0.447)
Product of US, Canada and Mexico(β_7)	-1.064**	-1.311**	-2.670**	0.188	-0.167
	(0.128)	(0.210)	(0.459)	(0.238)	(0.336)
Price * Endowment (σ_1)	-0.030	0.024	-	-	-
	(0.022)	(0.029)	-	-	-
Product of US * Ethnocentrism (σ_2)	0.344**	0.388**	0.378**	0.308**	0.456**
	(0.043)	(0.077)	(0.099)	(0.074)	(0.127)
Log-Likelihood	-2791	-837	-509	-1020	-277
# Observations	2232	765	432	774	261

** Denotes statistical significance of 1% level or lower.
* Denotes statistical significance of 5% level or lower.
[a] Combined model includes all participants in both Dallas and San Antonio trials
[b] Numbers in parentheses are standard Errors

Table 10. Value of Information Estimates for Indirect Approach

		Dallas		San Antonio	
	Combined[a]	Beef	Pork	Beef	Pork
Value Of Information in the Experimental Setting	2.257	2.999	2.572	1.876	2.253
	[b](0.125)	(0.380)	(0.369)	(0.177)	(0.283)
	[c] [2.037, 2.514]	[2.535, 4.018]	[1.990, 3.401]	[1.583, 2.261]	[1.776, 2.895]

[a] Combined includes all participants from Dallas and San Antonio
[b] Numbers in parentheses ( ) are standard errors, estimated using 2,000 repetitions of the Krinsky-Robb method.
[c] Numbers in brackets [ ] are 95% confidence intervals

Table 11 Alternative Value of Information Estimates for the Indirect Approach

		Dallas		San Antonio	
	Combined[a]	Beef	Pork	Beef	Pork
Product of United States	1.10	1.04	1.07	1.19	0.81
	[b](0.090)	(0.169)	(0.230)	(0.153)	(0.237)
	[c][0.090, 1.289]	[0.756, 1.423]	[0.705, 1.593]	[0.934, 1.532]	[0.428, 1.364]
Product of Canada	-2.09	-2.06	-2.48	-2.20	-1.01
	(0.200)	(0.366)	(0.610)	(0.340)	(0.340)
	[-2.504, -1.727]	[-2.879, -1.450]	[-3.899, -1.518]	[-2.946, -1.609]	[-1.797, -0.495]
Product of Canada and US	-1.20	-1.36	-1.21	-1.09	-0.70
	(0.115)	(0.238)	(0.286)	(0.181)	(0.227)
	[-1.445, -0.992]	[-1.922, -0.969]	[-1.893, -0.765]	[-1.509, -0.783]	[-1.255, -0.347]
Product of Mexico and US	-3.00	-3.42	-3.02	-3.06	-1.58
	(0.286)	(0.643)	(0.746)	(0.452)	(0.514)
	[-3.597, -2.482]	[-4.850, -2.339]	[-4.725, -1.827]	[-4.056, -2.295]	[-2.787, -0.796]

[a] Combined includes all participants from Dallas and San Antonio

[b] Numbers in parentheses are standard errors, estimated using 2,000 repetitions of the Krinsky-Robb method.

[c] Numbers in brackets [ ] are 95% confidence intervals

You have been given a free 12 oz. steak and $2 cash. The money is yours to keep as compensation for your time. You do **not** have to use it in our study.

Beside me are two coolers containing 12oz steaks that have all been USDA inspected and are of the same size, weight, and quality grade. Both coolers contain the same steak, however one contains labels and the other does not.

- Option RED is a steak from the *Red* cooler. Your free steak is from this cooler.
  - Steaks in the *Red* cooler do not have any information about country of origin. The steak could be from the U.S., Canada, Mexico, Australia, or a combination of these origins but you will not know exactly which country the steak is from.
  - In the *Red* cooler, likelihood of a steak being from U.S., Canada, Mexico, Australia, or a combination of these origins is similar to the likelihood of finding steaks from one of these locations in a typical grocery store in the U.S.
- Option BLUE is a steak from the *Blue* cooler. You can pay a price to exchange your free steak for one from this cooler.
  - In the *Blue* cooler, each steak has a label indicating its origin. Each steak will have a label indicating whether it is from the U.S., Canada, Mexico, Australia, or a combination of these origins.

Please answer the following six questions. Note: these questions are **not** hypothetical. We will roll a die and pick one of the six choices, and you will receive the option you chose. If you choose option BLUE, you can choose a steak from the *Blue* cooler and you will be expected to pay the price.

1. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from *Red* cooler and pay $0	choose steak from *Blue* cooler and pay **$0**
☐	☐

2. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from *Red* cooler and pay $0	choose steak from *Blue* cooler and pay **$0.50**
☐	☐

3. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from *Red* cooler and pay $0	choose steak from *Blue* cooler and pay **$1.00**
☐	☐

4. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from *Red* cooler and pay $0	choose steak from *Blue* cooler and pay **$1.50**
☐	☐

5. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from *Red* cooler and pay $0	choose steak from *Blue* cooler and pay **$2.00**
☐	☐

6. Do you prefer option RED or BLUE? (Choose one)

Option RED	Option BLUE
keep steak from *Red* cooler and pay $0	choose steak from *Blue* cooler and pay **$2.50**
☐	☐

Figure 1. Direct Choice Experiment (Beef Version 1)

You have been given a free 12 oz. pork chop and $2 cash. The money is yours to keep as compensation for your time. You do **not** have to use it in our study.

Beside me are 2 coolers containing 12oz pork chops that have all been USDA inspected and are of the same size, weight, and quality grade. Both coolers contain the same pork chop, however one contains labels and the other does not. Your pork chop came from the RED cooler and it does not have a country of origin label. Your pork chop could be from the U.S., Canada, Mexico, Denmark, or a combination of these origins but you will not know exactly which country the pork chop is from. The BLUE cooler contains pork chops with country of origin labeling information.

You can keep your pork chop (and pay nothing) or exchange it for a pork chop from a specific country. Please answer the following 9 questions. Note: these questions are **not** hypothetical. We will roll a die and pick one of the nine choices, and you will receive the option you chose. For example, if you choose a pork chop from country X for $4, you will exchange your free pork chop for the labeled pork chop from country X and you will pay the price of $4.

Scenario 1: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of U.S.	Product of Canada	Product of Mexico	Product of Denmark	Product of Canada and U.S.	Product of Mexico and U.S.	Product of Canada, Mexico, and U.S.
⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
$0	$0	$0	$0	$0	$0	$0	$0
❑	❑	❑	❑	❑	❑	❑	❑

Scenario 2: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of U.S.	Product of Canada	Product of Mexico	Product of Denmark	Product of Canada and U.S.	Product of Mexico and U.S.	Product of Canada, Mexico, and U.S.
⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
$0	$0	$2	$2	$2	$2	$2	$0
❑	❑	❑	❑	❑	❑	❑	❑

Scenario 3: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of U.S.	Product of Canada	Product of Mexico	Product of Denmark	Product of Canada and U.S.	Product of Mexico and U.S.	Product of Canada, Mexico, and U.S.
⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
$0	$0	$4	$4	$4	$4	$4	$0
❑	❑	❑	❑	❑	❑	❑	❑

Scenario 4: Which option do you prefer? (Choose one)

Keep unlabeled pork chop	Product of U.S.	Product of Canada	Product of Mexico	Product of Denmark	Product of Canada and U.S.	Product of Mexico and U.S.	Product of Canada, Mexico, and U.S.
⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
$0	$2	$0	$0	$4	$2	$0	$4
❑	❑	❑	❑	❑	❑	❑	❑

Figure 2. Indirect Choice Experiment (Pork Version 1; only scenarios 1-4 of 9)

QUESTIONNAIRE

1. **How often do you eat beef?**
   - ❑ 4 or more times per week
   - ❑ 2-3 times per week
   - ❑ Once per week
   - ❑ 2-3 times per month
   - ❑ Once a month or less
   - ❑ Never

2. **Are grocery stores currently required by law to indicate the country of origin for all fresh beef products?**
   - ❑ Yes
   - ❑ No
   - ❑ I don't know

3. **When you purchase fresh beef at a grocery store do you look for a country of origin label?**
   - ❑ Every time
   - ❑ Sometimes
   - ❑ Never

4. **Out of the last 10 beef steaks you purchased, how many do you think were from each of the following countries or combination of countries?**

Product of United States _____
Product of Canada _____
Product of Mexico _____
Product of Australia _____
Product of Canada and U.S. _____
Product of Mexico and U.S._____
Product of Canada, Mexico, and U.S. _____
Other_____

TOTAL = 10

5. **What is your gender?**
   - ❑ Male
   - ❑ Female

6. **Do you have a Bachelor's degree from a University or College?**
   - ❑ Yes
   - ❑ No

7. **What is your age?**
   - ❑ 18-34 years old
   - ❑ 35-44 years old
   - ❑ 45-54 years old
   - ❑ 55-64 years old
   - ❑ 65 years or older

8. **What is your race?**
   - ❑ African American
   - ❑ Caucasian
   - ❑ Hispanic/Latino
   - ❑ Other

9. **What is your annual household income?**
   - ❑ Less than $25,000
   - ❑ $25,000 to $99,999
   - ❑ More than $100,000

10. **Do you agree or disagree that: It is not right to purchase foreign products because it puts Americans out of jobs?**
    - ❑ Strongly agree
    - ❑ Somewhat agree
    - ❑ Neither agree nor disagree
    - ❑ Somewhat disagree
    - ❑ Strongly disagree

11. **Do you agree or disagree that: A real American should always buy American-made products?**
    - ❑ Strongly agree
    - ❑ Somewhat agree
    - ❑ Neither agree nor disagree
    - ❑ Somewhat disagree
    - ❑ Strongly disagree

12. **Do you agree or disagree that: Americans should not buy foreign products, because it hurts American business and causes unemployment?**
    - ❑ Strongly agree
    - ❑ Somewhat agree
    - ❑ Neither agree nor disagree
    - ❑ Somewhat disagree
    - ❑ Strongly disagree

13. **Do you agree or disagree that: My answers in this study will influence government policy on country of origin labeling?**
    - ❑ Strongly agree
    - ❑ Somewhat agree
    - ❑ Neither agree nor disagree
    - ❑ Somewhat disagree
    - ❑ Strongly disagree

14. **Why did you choose the steaks you did?**

Figure 3. San Antonio Questionnaire for Steak Endowed Participants

REFERENCES

Andersen, S., G. Harrison, M. Lau, and E. Rutström. 2006. "Elicitation using multiple price list formats." *Experimental Economics* 9(4):383-405.

Andersen, S., G.W. Harrison, M.I. Lau, and E.E. Rutstrom. 2006. "Elicitation Using Multiple Price List Formats." *Experimental Economics* 9(4):383-405.

Brester, G.W., J.M. Marsh, and J.A. Atwood. 2004. "Distributional impacts of country-of-origin labeling in the US meat industry." *Journal of Agricultural and Resource Economics* 29(2):206-227.

Cameron, T.A. 1988. "A new paradigm for valuing non-market goods using referendum data: Maximum likelihood estimation by censored logistic regression." *Journal of Environmental Economics and Management* 15(3):355-379.

Foster, W., and R.E. Just. 1989. "Measuring welfare effects of product contamination with consumer uncertainty." *Journal of Environmental Economics and Management* 17(3):266-283.

Gao, Z., and T.C. Schroeder. 2009. "Effects of Label Information on Consumer Willingness-to-Pay for Food Attributes." *American Journal of Agricultural Economics* 91(3):795-809.

Gracia, A., and G. Zeballos. 2005. "Attitudes of retailers and consumers toward the EU traceability and labeling system for beef." *Journal of food distribution research* 36:45-56.

Informa Economics Inc. "Update of Cost Assessments for Country of Origin Labeling – Beef & Pork (2009)."

Krinsky, I., and A.L. Robb. 1986. "On Approximating the Statistical Properties of Elasticities." *Review of Economics and Statistics* 68(4):715-719.

Leggett, C. 2002. "Environmental Valuation with Imperfect Information The Case of the Random Utility Model." *Environmental and Resource Economics* 23(3):343-355.

Link, J.E. 2009. "Mandatory Country of Origin Labeling of Beef, Pork, Lamb, Chicken, Goat Meat, Wild and Farm-Raised Fish and Shellfish, Perishable Agricultural Commodities, Peanuts, Pecans, Ginseng, and Macadamia Nuts." *The Federal Register / FIND* 74(010):2658.

List, J.A., and C.A. Gallet. 2001. "What Experimental Protocol Influence Disparities between Actual and Hypothetical Stated Values?" *Environmental and Resource Economics* 20(3):241-254.

Loureiro, M.L., and W.J. Umberger. 2007. "A choice experiment model for beef: What US consumer responses tell us about relative preferences for food safety, country-of-origin labeling and traceability." *Food Policy* 32(4):496-514.

---. 2003. "Estimating Consumer Willingness to Pay for Country-of-Origin Labeling." *Journal of Agricultural and Resource Economics* 28(2):287-301.

Lusk, J.L., and J.D. Anderson. 2004. "Effects of Country-of-Origin Labeling on Meat Producers and Consumers." *Journal of Agricultural and Resource Economics* 29(2):185-205.

Lusk, J.L., J. Brown, T. Mark, I. Proseku, R. Thompson, and J. Welsh. 2006. "Consumer Behavior, Public Policy, and Country-of-Origin Labeling " *Review of agricultural economics* 28:284-292.

Lusk, J.L., J.A. Fox, T.C. Schroeder, J. Mintert, and M. Koohmaraie. 2001. "In-Store Valuation of Steak Tenderness." *American Journal of Agricultural Economics* 83(3):539-550.

Lusk, J.L., and T.C. Schroeder. 2004. "Are Choice Experiments Incentive Compatible? A Test with Quality Differentiated Beef Steaks." *American Journal of Agricultural Economics* 86(2):467-482.

McFadden, D. 1973. *Conditional Logit Analysis of Qualitative Choice Behavior*. Berkeley, California: University of California.

Mennecke, B.E., S.M. Lonergan, D.J. Hayes, and A.M. Townsend. 2007. "A study of the factors that influence consumer attitudes toward beef products using the conjoint market analysis tool." *Journal of animal science* 85(10):2639-2659.

Miranda, M.J., and L. Kónya. 2006. "Is mandatory country-of-origin labelling a retrograde step in the long run?" *International Review of Retail, Distribution & Consumer Research* 16(5):579-590.

Peel, D. "Implementation of Country of Origin Labeling (COOL) in the Beef Industry." *Choices*.

R-CALF United Stockgrowers of America. 2003. "Blueprint for Maximizing the Benefits of Mandatory Country of Origin Labeling While Minimizing Costs to Producers and Unnecessary Government and Industry Regulation."

Rude, J., J. Iqbal, and D. Brewin. 2006. "This Little Piggy Went to Market with a Passport: The Impacts of U.S. Country of Origin Labeling on the Canadian Pork Sector." *Canadian Journal of Agricultural Economics* 54(3):401-420.

Sawka, A.L., and W.A. Kerr. 2010. "Challenging US Country of Origin Labelling at the World Trade Organization: The Law, The Issues, and The Evidence."

Shimp, T., and S. Sharma. 1987. "Consumer ethnocentrism: construction and validation of the CETSCALE." *Journal of Marketing Research*:280-289.

Sparks Companies Inc. 2004. "COOL Cost Assessment." Memphis TN.

Umberger, W., D. Feuz, C. Calkins, and B. Sitz. 2003. "Country-Of-Origin Labeling Of Beef Products: US Consumers' Perceptions." *Journal of food distribution research* 34(03).

United States General Accounting Office. 1999. *Fresh Produce : Potential Consequences of Country-of-Origin Labeling : Report to Congressional Committees / United States General Accounting Office.* Washington, D.C. (P.O. Box 37050 Washington 20013) : The Office, [1999].

Verbeke, W., and J. Roosen. 2009. "Market Differentiation Potential of Country-of-Origin, Quality and Traceability Labeling." *Estey Centre Journal of International Law and Trade Policy* 10(1):20-35.

Verlegh, P.W.J., and J.-B.E.M. Steenkamp. 1999. "A review and meta-analysis of country-of-origin research." *Journal of Economic Psychology* 20(5):521-546.

Ward, R., D. Von Bailey, and R. Jensen. 2005. "An American BSE Crisis: Has it affected the Value of Traceability and Country-of-Origin Certifications for US and Canadian Beef?" *International Food & Agribusiness Management Review* 8(2):92-114.

VITA

Tyler John Klain

Candidate for the Degree of

Master of Science

Thesis: VALUE OF COUNTRY OF ORIGIN LABELING INFORMATION FOR BEEF AND PORK IN THE UNITED STATES

Major Field: Agricultural Economics

Biographical:

Personal Data: Raised near Ruso, North Dakota, Born to Durnell and Darcy Klain on May 31st, 1986. Graduated from Turtle Lake-Mercer High School in May 2004.

Education: Graduated from North Dakota State University, Fargo, North Dakota, July 2009, received a Bachelors of Science in Agricultural Economics and a Bachelors of Arts in Spanish.

Experience: Graduate Research Assistant, Oklahoma State University Department of Agricultural Economics, January 2010 to May 2011; Commodity Merchandiser Internship, Bunge North America, Council Bluffs, Iowa, Summer 2010.

Professional Memberships: Graduate and Professional Student Government Association, August 2009 to May 2011; Agricultural Economics Graduate Student Association, August 2009 to May 2011; Oklahoma State University Academic Integrity Panel, September 2010 to May 2011.

Name: Tyler John Klain Date of Degree: May Year: 2011

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: VALUE OF COUNTRY OF ORIGIN LABELING INFORMATION FOR BEEF AND PORK IN THE UNITED STATES

Pages in Study: 53 Candidate for the Degree of Master of Science

Major Field: Agricultural Economics

Abstract:

Mandatory country of origin labeling (MCOOL) for fresh meats, fish, nuts and perishable food products in the United States was implemented by the USDA on March 16th, 2009. US trading partners such as Canada and Mexico have been strong opponents of MCOOL due to its trade restrictive nature while other opponents argue that MCOOL has not presented any added value to consumers. These controversies have prompted interest in attaining an accurate measure of the value of the information (VOI) provided by MCOOL. Prior MCOOL research has been conducted to determine consumers' willingness to pay (WTP) for meat from a specific country of origin however, no post-MCOOL research has determined consumers' VOI provided by MCOOL. Beef and pork consumers in two Texas grocery stores were recruited to participate in one of two types of economic field experiments involving real food and real money. Data show that, in the context of the experiment, consumers VOI for MCOOL range from $1.37 to $2.26 per meat shopping experience depending on the method used to elicit the values. However a large proportion of consumers (82%) are unaware of the existence of MCOOL. When this fact is coupled with the way MCOOL has actually been implemented by most retailers, the empirical estimates suggest that the value of origin information for beef and pork is about $0.025/lb.

ADVISER'S APPROVAL: Dr. Jayson Lusk