

**Tennessee Consumers' Willingness to Pay
For Beef Produced in Tennessee**

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ABSTRACT

Little is known about Tennessee consumer willingness to pay (WTP) for beef produced in the state or about the type of outlet where they would expect to purchase Tennessee beef. Tennessee beef cattle production and sales decision making can be guided by the willingness to pay of consumers, demographics profiles of those willing to pay a premium for Tennessee beef, and outlet choice for purchasing local beef. A telephone (land-line and wireless) survey of major metropolitan areas in Tennessee was conducted in 2013 to collect data from a total of 1,209 respondents. This data is used in probit models to estimate consumer WTP for two Tennessee beef products: 85%/15% ground beef and a boneless ribeye steak. The probit models are also used to determine how demographic characteristics and consumer attitudes influence WTP. Data is used to determine which outlets people would expect to purchase local beef from and the influences on these expectations. A multivariate probit model is estimated using data from the consumers who expressed a WTP for local beef. The multivariate probit measures the likelihood that the consumer would expect to purchase local beef in outlets including gourmet stores, butcher shops, farmer markets, and directly from farmers.

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CHAPTER I

INTRODUCTION

Willingness to Pay for Tennessee Beef

Tennessee's cattle industry is of significant importance to the state's agriculture. A large number of Tennessee farmers depend on income from the beef cattle industry, as do many rural economies. Cattle are produced in every county in Tennessee, making up an important part of farm and rural community income (United States Department of Agriculture 2012). In 2012, cash receipts for cattle and calf operations in Tennessee were \$783 million, which comprise 20.3% of all commodity cash receipts in the state—which is the largest percentage of cash receipts of all farm commodities (Tennessee Department of Agriculture 2013).

In 2012, approximately 5% of U.S. farms, or 107,000 farms, were involved in local food systems (Johnson, Cowan, and Aussenberg 2012). Sales of locally produced foods are growing with a farm-level value of \$4.8 billion in 2008 (Johnson, Cowan, and Aussenberg 2012). However, vegetable, fruit, and nut sales make up the largest percentage of local sales in contrast to traditional farming, which tends to be dominated by livestock and commodity crop production (Low and Vogel 2011). The local food systems for value-added beef and poultry products are not yet as well-developed, and less is known about the market potential.

If farmers can slaughter cattle or have their cattle slaughtered in-state and market directly to consumers, they would be able to capitalize on consumer willingness to pay (WTP) for locally grown foods. Therefore, Tennessee's cattle farmers and rural economies could benefit from better information on consumer WTP a premium for locally produced beef. By learning how attitudes, values, demographics, and socioeconomic factors influence WTP, local beef producers will have more information to assist them in target-marketing their products. While several studies have

evaluated willingness to pay for local beef in selected areas throughout the United States (e.g., Adalja et al. 2013; Mennecke et al. 2006; Wolf and Thulin 2000; Evans et al. 2011; Maynard, Burdine, and Meyer 2003), little information is available regarding Tennessee consumer WTP for locally produced beef.

WTP for steak and ground beef is particularly important because these two items are the beef products most frequently bought by U.S. consumers (Davis and Lin 2005). In addition, little is known about factors that would increase consumer likelihood of being willing to pay a premium for these products if they were produced in the state. If consumers are willing to pay a premium for local products, knowledge is also needed to inform Tennessee beef producers as to the type of shopping outlet, packaging, and form of beef that consumers would prefer. This information will provide local beef producers insight into how Tennessee beef steaks and ground beef might be successfully marketed to consumers.

To determine WTP for 'local' beef, the term local must first be defined. The definition of local that will be used in this thesis is one that requires that all stages of production be performed in-state (Johnson, Cowan, and Aussenberg 2012). In this respect, beef presents a greater challenge than produce, for example, because there are more stages of production for cattle. If Tennessee consumers are willing to pay premiums for locally produced beef, in-state producers may be able to increase their cash receipts for steak and ground beef from beef cows by selling finished cattle to local slaughter facilities and then selling to those consumers who are willing to pay. Almost 90 percent of Tennessee's cattle farms are cow-calf operations, and 10 percent are involved in backgrounding cattle rather than in finishing (United States Department of Agriculture and National Agricultural Statistics Service 2007). In the backgrounding stage, steers and heifers are raised from weaning until they are ready to enter the feedlot to be finished when

they are between 650 and 800 pounds. Neel (2010) estimates that approximately 750,000 feeder calves in Tennessee are marketed to backgrounding operations and feedlots in the Midwest and High Plains each year. If Tennessee consumers are willing to pay a premium for local beef, then it may be worthwhile for Tennessee beef producers to background and finish their cattle in state. Currently, it is unclear if Tennessee consumers would be willing to pay more for locally produced steak and ground beef, and, if some consumers would be willing to pay, how to best identify and target those individuals.

Outlet Choice for Purchasing Tennessee Beef

It is also unclear where local products could be successfully marketed to consumers. It is difficult for farmers to sell their products through mainstream channels, like grocery stores, warehouse stores, and big box stores, because of traditional outlets' pre-existing relationships with regional producers and because of a lack of intermediaries to group and deliver large and consistent orders of local foods (Abatekassa and Peterson 2011). However, if consumers who wish to purchase Tennessee beef are willing to shop at other outlets, then farmers may be able to make a profit from selling at those outlets. Other outlets may include butcher shops, gourmet stores, farmer markets, and directly from farmers.

Objectives

The primary objective of this study is to determine Tennessee consumer preferences for and WTP for local beef, specifically two Tennessee beef products: 85%/15% ground beef and a boneless ribeye steak. A secondary objective is to ascertain the demographic characteristics and consumer attitudes and opinions that are correlated with consumer WTP a premium for ground beef and ribeye steak produced in Tennessee. A third objective is to provide information about choice of shopping outlets for local beef and consumer characteristics associated with these

choices. The counties where Memphis, Nashville, Chattanooga, Knoxville, and Tri-Cities metropolitan areas are located were targeted for the survey (i.e., Shelby, Davidson, Hamilton, Knox, Sullivan, and Washington).

CHAPTER II

LITERATURE REVIEW

Willingness to Pay for Local Beef

Several studies have found that there is a preference among consumers for locally produced beef versus beef that is not produced locally (Adalja et al. 2013; Mennecke et al. 2006; Wolf and Thulin 2000; Evans et al. 2011; Maynard, Burdine, and Meyer 2003). Adalja et al. (2013) used stated and revealed preference data from a choice-based conjoint survey instrument to determine the WTP of Maryland residents for locally produced ground beef and found that the general population was willing to pay a premium of \$2.71 for beef raised within 100 miles and \$2.39 for beef raised within 400 miles. Mennecke et al. (2006) also used the conjoint method, using a national sample of over 1,000 respondents to find the relative utilities associated with a set of beef characteristics, including local production. They found that consumers indicated a strong preference for local beef.

Wolf and Thulin (2000) evaluated purchase interest to examine the consumer profile of an individual who would purchase a locally-branded beef product in California, evaluating purchase interest using an n-point purchase interest scale with each point indicating the likelihood that the consumer would purchase the local beef product. Evans et al. (2011) utilized an in-store variant of the Becker-DeGroot-Marschack (1964) experimental auction method to determine WTP for grass-fed beef in the Appalachian region and found that local production increased bids for grass-fed beef. Maynard, Burdine, and Meyer (2003) conducted a WTP survey of Kentucky consumers and restaurants and found that consumers were willing to pay premiums for locally produced ground beef and steak. Fifteen percent of consumers were willing to pay a 40 percent premium for ground beef, and 64 percent were willing to pay a 20 percent premium

for locally produced ground beef. For steak, 20 percent of respondents were willing to pay a 40 percent premium for locally produced steak and 52 percent of consumers were willing to pay a 20 percent premium for the local product.

Willingness to Pay for Other Local Products

Other studies have examined WTP a premium for non-beef local products, such as other meats and produce (e.g., Ernst et al. 2006; Darby et al. 2006; Willis et al. 2013; Loureiro and Hine 2002; Adams and Adams 2008; Brooker et al. 1988; Nganje, Hughner, and Lee 2011). Ernst et al. (2006) and Darby et al. (2006) performed a consumer-intercept survey and a choice experiment of food shoppers in direct markets and traditional grocery stores and analyzed the data using conjoint methods to estimate the WTP for locally grown strawberries in Ohio. Willis et al. (2013) used a mixed logit regression on data collected from a mail survey with stated choice questions to estimate the premium that consumers were willing to pay for both meat products and produce and studied if consumer WTP increased if there was a donation to a local food bank associated with the local product. They found that households were willing to pay a premium of \$0.17 per pound for locally grown produce and \$0.33 per pound more for local animal products with the included food bank donation increasing the premium for local products further—to \$0.33 per pound for local produce and \$0.64 per pound for local animal products.

Loureiro and Hine (2002) randomly intercepted Colorado shoppers in the produce section of various grocery stores and asked them to answer questions for a questionnaire about potatoes with various attributes and then performed a multiple bounded probit analysis on the data. They found that consumers were willing to pay more for “Colorado grown” potatoes than for organic or GMO-free attributes but that ‘locally grown’ must be linked in consumers’ minds to certain qualities, such as greater nutrition, for consumers to be willing to pay the higher premium for the

product (Loureiro and Hine 2002). Adams and Adams (2008) intercepted consumers at a farmers' market in Florida and asked how much they would pay for a generic local produce product compared to a non-local product of similar quality, appearance, and freshness. Brooker et al. (1988) set up an experiment in a grocery store in Tennessee where they observed if consumers purchased Tennessee-branded tomatoes at various prices instead of generic tomatoes and estimated WTP for locally branded tomatoes. Nganje, Hughner, and Lee (2011) intercepted consumers at a traditional supermarket, a higher end grocer, a farmer market, and a local restaurant selling moderately priced food and asked them to take a survey on preferences for local spinach and carrots and found an increase in WTP for local ranging between 18 and 27.7 percent.

Still more studies have found a WTP a premium for locally produced processed food products (e.g., Batte et al. 2010; Hu, Woods, and Bastin 2009; James, Rickard, and Rossman 2009; Jekanowski, Williams, and Schiek 2000; Onken, Bernard, and Pesek 2011). Batte et al. (2010) estimated WTP for blackberry jam using conjoint analysis on data from a mail survey and found consumers were willing to pay a premium for the local product. After conducting a consumer-intercept survey in Kentucky grocery stores, Hu, Woods, and Bastin (2009) found that consumers were willing to pay a premium for locally produced processed blueberry products such as blueberry jam, blueberry-lime jam, blueberry yogurt, blueberry fruit rollups, blueberry dry muffin mix, and blueberry raisinettes. James, Rickard, and Rossman (2009) found that Pennsylvania consumers were willing to pay more for locally produced applesauce by conducting a mail survey choice experiment. Jekanowski, Williams, and Schiek (2000) conducted a survey of Indiana consumers and identified a preference for both locally processed food products such as ice cream and wine and local unprocessed agricultural products such as

tomatoes and melons. Onken, Bernard, and Pessek (2011) used a mail survey to conduct a choice experiment of Mid-Atlantic consumers to estimate WTP for locally produced strawberry preserves.

Some studies have found that consumers do not exhibit WTP a premium for locally produced foods (e.g., Eastwood, Brooker, and Orr 1987; Grannis, Hooker, and Thilmany 2000). Eastwood, Brooker, and Orr (1987) found that consumers were not willing to pay more for locally produced food unless freshness was a factor, as in the case of tomatoes and peaches. Similarly, respondents in a study on WTP for a natural beef product showed no preference for locally produced beef (Grannis, Hooker, and Thilmany 2000). Eastwood, Brooker, and Orr (1987) conducted their survey in 1985 on residents of Knox County, Tennessee in an effort to target urban consumers in a medium-sized metropolitan area where consumers were less likely to have their own gardens. Grannis, Hooker, and Thilmany (2000) surveyed 2,200 primary grocery shoppers in Colorado, Utah, and New Mexico with a mailed questionnaire to determine how they ranked attributes in importance and found that consumers ranked local production as the least preferred attribute when compared to use of hormones, animal-friendly production methods, and environmentally-friendly practices. It is possible that the results of these studies showed no WTP a premium for most local products because of how the surveys were conducted or because of where the consumers were located. Also, because these studies were conducted several years before the majority of those that found a WTP a premium for locally produced food, this may suggest that preference for locally produced food has increased over time.

Influence of Demographic and Socioeconomic Characteristics on WTP for Local Food

Consumer age may influence whether or not the consumer is likely to be willing to pay more for locally produced foods. Several studies have found that the older the consumer, the less

likely that consumer is to view the locally produced attribute favorably or to purchase locally produced food (e.g., Adalja et al. 2013; Willis et al. 2013; Hu, Woods, and Bastin 2009; Nganje, Hughner, and Lee 2011). Adalja et al. (2013) found that younger consumers were more likely to be willing to pay a premium for locally produced ground beef, while Willis et al. (2013) studied a variety of food products and attained the same result regarding age and willingness to pay. Hu, Woods, and Bastin (2009) examined willingness to pay for processed blueberry products in Kentucky and found age to be negatively correlated with preference for local blueberry products. Nganje, Hughner, and Lee (2011) found older consumers to be less likely to pay premiums for local carrots and spinach. In contrast, James, Rickard, and Rossman (2009) found that consumers over sixty years old were more likely to purchase local applesauce.

Results have varied concerning the relationship between education and WTP a premium for local food. Many studies found that education is positively correlated with willingness to pay for local food (e.g., Brown 2003; Mennecke et al. 2006; Willis et al. 2013; Govindasamy et al. 2012; Hu, Woods, and Bastin 2009; Nganje, Hughner, and Lee 2011), although in some cases, individuals with higher education were not willing to pay more than less educated consumers for locally grown food (e.g., Loureiro and Hine 2002; Brooker et al. 1988; Jekanowski, Williams, and Schiek 2000). In Brooker et al. (1988)'s study the survey focused on whether or not consumers were influenced by a state brand in their purchasing decisions, and consumers who were high school graduates indicated that they were not affected by the brand. Similarly, Jekanowski, Williams, and Schiek (2000) concluded that more educated consumers become less susceptible to local branding and were less likely to choose local food products. It is possible that the branding aspect of these studies was correlated with the difference in education's role, but it is not possible to make the assertion without more evidence.

Studies have also examined the influence of income on willingness to pay for local food. Most studies found that households with higher incomes exhibit WTP a premium for local food, suggesting locally produced food is a normal good (e.g., Willis et al. 2013; Brown 2003; Njanje, Hughner, and Lee 2011). However, Loureiro and Hine (2002) found that higher income consumers were not willing to pay a higher premium than low income consumers for locally grown potatoes. Similarly, Hu, Woods, and Bastin (2009) found that lower income consumers were more likely to be willing to pay a premium for local blueberry jam.

Gender may influence local purchasing decisions. Many studies have found that females are more likely than males to purchase local food (Willis et al. 2013; Adams and Adams 2008; James, Rickard, and Rossman 2009; Jekanowski, Williams, and Schiek 2000). However, some studies (e.g., Hanagriff, Rhoades, and Wilmeth 2008; Loureiro and Hine 2002) have found no significant difference in preference between genders. Willis et al. (2013) found that females are more likely to be willing to pay more for locally produced food, whether that food is produce or animal products. Likewise, Adams and Adams (2008) found that females were willing to pay significantly more for local food products. Similarly, James, Rickard, and Rossman (2009) found that men were less likely than women to purchase locally produced applesauce. After analyzing survey data from consumers in Indiana using an ordered probit model, Jekanowski, Williams, and Schiek (2000) concluded that females were more likely to purchase local products. In contrast, Hannagriff, Rhoades, and Wilmeth (2008) found that males and females did not value locally produced beef differently to a significant degree. Likewise, Loureiro and Hine (2002) found no significant difference between the amounts that males and females were willing to pay for locally grown potatoes.

Some studies indicate that the place that a person chooses to shop is correlated with WTP for local food (Darby et al. 2006; Adalja et al. 2013; Maynard, Burdine, and Meyer 2003). Local foods tend to be more available in local independent retail stores than in large supermarkets and wholesale chains (Abatekassa and Peterson 2011). Darby et al. (2006) found that consumers intercepted in a grocery store were willing to pay more for local berries than for nonlocal berries, while individuals intercepted at a direct market like a farmer market were willing to pay more than the grocery store shoppers for the local berries. In contrast, Jekanowski, Williams, and Schiek (2000) found that increased visits to farmer markets did not significantly impact consumer likelihood of purchasing locally produced agricultural products. Similarly, Maynard, Burdine, and Meyer (2003) reported that those who shop in specialty meat stores are more likely to be willing to pay a premium for local meats but that farmer market shopping is not significantly correlated with consumer WTP for local meat. Adalja et al. (2013) found that grocery shoppers were willing to pay more for local food products, but they tended to view local production and certain production methods (i.e., grass-fed) as substitutes, while consumers who were members of a buying club were not willing to pay as much for local foods as grocery store shoppers but they did not view locality and production methods as substitutes.

Results concerning the effect of household size and presence of children in a household on WTP for local foods have varied. Willis et al. (2013) found that larger households were willing to pay less for locally produced food than smaller households. However, in a study by Jekanowski, Williams, and Schiek (2000), household size was not associated with WTP for local food. Maynard, Burdine, and Meyer (2003) found that WTP increased in households with children when compared to households without children. In contrast, Loureiro and Hine (2002)

found no significant correlation with WTP for local potatoes and the presence of children in a household.

Farm background, knowledge of agriculture, and community type may have an effect on WTP for local food. Brown (2003) reported that respondents with a farming background (i.e., lived on a farm as a child or parents were farmers) were more likely to be willing to pay a premium for local food. In contrast, James, Rickard, and Rossman (2009) found that increased knowledge of agriculture was correlated with decreased WTP. These findings may suggest that knowledge of agriculture is not associated with the increase in WTP in individuals with a farming background. Studies also find that the community type of respondents, such as rural or urban communities, does not have a significant effect on WTP for locally produced foods (Jekanowski, Williams, and Schiek 2000; Brown 2003).

Attitudes Influencing WTP for Local Foods

Several studies have investigated why people choose locally produced food. Consumers may be more likely to be willing to pay a premium for local food if they are concerned about food miles, think local food is of higher quality, or because they want to support local farmers and businesses. Martinez et al. (2010) found that perceived quality and freshness benefits are correlated with WTP for local foods, and consumers are more likely to be willing to pay a premium for local foods if they perceive local foods are of higher quality or nutritional value, have better methods of production and less environmental impact, or support local farmers. Govindasamy et al. (2012) found that thirty-four percent of the ethnic consumers that they surveyed have increased their purchases of locally produced ethnic greens and herbs due to concerns about food miles. Martinez et al. (2010) report that consumers who value foods

produced with low environmental impact and foods that are of high quality are more likely to be willing to pay premiums for local foods.

Some studies have found that opinions about the quality of local foods affect WTP for a local food product. In a study conducted by Brooker et al. (1988) respondents who thought that local tomatoes would have better freshness, taste, storage life, and nutrition were more likely to care about where tomatoes are grown, but respondents who thought that local tomatoes would be priced lower and have better appearance were less likely to care where the tomatoes were produced. Similarly, Jekanowski, Williams, and Schiek (2000) found that respondents who had positive perceptions about the quality of local food were more likely to purchase local agricultural products; however, they also found that consumers do not expect local products to be any fresher than other products, although they do highly value that quality when making purchase decisions. In contrast, respondents in a consumer intercept survey conducted by Darby et al. (2006) stated that the freshness of local berries was their main reason for preferring local foods.

A desire to support local businesses may be a consumer attitude associated with WTP for local foods. Supporting local businesses was the second most frequently cited reason for choosing local strawberries in a study by Darby et al. (2006). In a South Carolina study, it was found that most respondents purchased local food to support farmers in the state or the state's economy (Carpio and Isengildina-Massa 2013). A slightly smaller segment of respondents in the same study believed that South Carolina products were of the same or better quality than products from other states (Carpio and Isengildina-Massa 2013).

Shopping Outlet Choice

Several studies examined choice of shopping outlets for beef (e.g., Lusk and Cevallos 2004; Grannis, Thilmany, and Sparling 2001; Medina and Ward 1999). Each of these studies found that demographic and attitudinal factors influence shopping outlet choice. Lusk and Cevallos (2004) found that price had a significant effect on shopping outlet choice, with high prices at specialty shops decreasing the likelihood of shopping for beef products at that outlet, while Medina and Ward (1999) found that price had very little impact on outlet choice. Study results differed regarding the impact of gender on specialty store shopping with Lusk and Cevallos (2004) finding that women were more likely to shop for beef at specialty stores, while Grannis, Thilmany, and Sparling (2001) found that if the consumer was a man, there was a correlated increase in likelihood that he would shop at a specialty store (meat shop or natural food store). Grannis, Thilmany, and Sparling (2001) and Medina and Ward (1999) found that those with higher incomes were more likely to shop at specialty stores for meat than respondents with lower incomes.

Lusk and Cevallos (2004) used a choice-based conjoint analysis to determine the potential success of a retail outlet selling all-natural beef in an affluent area of Jackson, Mississippi. The researchers concluded that consumers would make an additional shopping trip to buy ground beef and ribeye steaks from cattle that were not given growth hormones or antibiotics. They found that if the beef retail outlet raised their steak price by one dollar per pound, then they could expect to lose 5.1% of the market share. If traditional grocers raised their steak price by one dollar per pound, then the new outlet could expect an increased market share of 3.7%. For ground beef, the researchers found that a one dollar per pound increase in price at the dedicated beef retail outlet would result in a 28% loss in market share for the beef outlet. In

the ground beef model, consumers who eat ground beef more often were more likely to shop at the dedicated outlet than consumers who did not eat ground beef as frequently. The location of the beef outlet in relation to other stores and the respondent's home also had a significant effect on the likelihood of shopping at the dedicated natural beef outlet: consumers who live or shop farther away from the dedicated store were less likely to shop at the beef outlet for ground beef. However, the distance to the outlet was not a significant predictor when purchasing steak. Women were more likely to shop at the natural beef outlet for both steak and ground beef products.

Grannis, Thilmany, and Sparling (2001) conducted a mail survey in 1998 in Colorado and New Mexico to determine the value to supermarkets of offering a broader range of products (in particular, natural meat products) that might not appeal to the average supermarket shopper. The survey included questions about the respondent's stated preference for natural meat products (ground beef, steak, ham, pork chops, and sides of beef), past shopping behavior, and concerns about particular livestock production practices. Natural meat products were defined as being raised using environmentally friendly practices, being hormone- and antibiotic-free, and never confined in small or overcrowded pens. Respondents could choose whether they made most, some, or none of their meat purchases at supermarkets, health/natural food stores, retail meat shops, or from ranchers/producers. Most (87.7%) of the respondents indicated that they did most of their meat shopping at supermarkets, and 76% indicated they only shop at supermarkets for meat. The researchers concluded that the remaining 24% of respondents represent a market that could be exploited by offering more diverse products in supermarkets.

Grannis, Thilmany, and Sparling (2001) found that consumers with incomes greater than \$50,000 were less likely to shop at supermarkets and that those with incomes higher than

\$75,000 were 7% more likely to shop at a meat shop. Consumers in more urban areas were 3.4% more likely to shop at supermarkets than those from rural areas. Rural residents were 6% more likely to buy their meat from a meat producer than were urban consumers. Older, retired couples without children at home were 9% more likely to shop at meat shops than those respondents in other life stages. Women were 4% less likely to shop at meat shops and 1.8% less likely to shop at natural food stores than males. Respondents who bought at least some of their meat from meat shops were more likely to care about production practices, such as impacts on streams and endangered species, hormones, antibiotics, grassfeeding, local production, and the use of confining pens.

Medina and Ward (1999) collected 198,682 observations from the National Panel Diary in 1998, in which households document their purchasing habits. The researchers used multinomial logit regression to explain consumer outlet choice when purchasing beef, particularly steak, ground beef, roast, and other types of beef. The researchers found that the majority of beef was purchased at supermarkets followed by butchers, warehouse stores, supercenters, and other outlets (i.e. neighborhood shops selling beef, convenience stores, and cooperative outlets).

In Medina and Ward's (1999) study, purchase size had the most profound correlation with outlet choice; consumers were more likely to choose an outlet other than a supermarket to buy larger quantities of beef. When purchase sizes increased, butchers picked up the majority of the supermarkets' loss followed by warehouse stores. Supercenters also exhibited a small gain in market share when the purchase size of steaks increased, though butchers and warehouse stores still gained a greater market share. When buying roasts, consumers were far less likely to change their outlet choice from supermarkets when purchase size increased. The type of beef purchased

also had a notable correlation with outlet selection. Consumers buying steaks were less likely to shop at a supermarket. Demographics did not have much influence on outlet choice except with different purchase sizes. For example, the likelihood that a consumer will shop somewhere other than a supermarket is not strongly influenced by differing demographics when the households are not buying very much beef. However, as the purchase sizes get larger, demographics can play more of a role in outlet choice. The researchers examined the effect of female employment and age and found that females who were older and had more time constraints were more likely to buy beef in supermarkets. Larger households were less likely to shop at supermarkets with warehouses gaining a market share in that segment of the sample. Consumers with higher incomes were more likely to choose an outlet other than a supermarket. Prices had a relatively small impact on outlet choice for all purchase sizes.

CHAPTER III

DATA AND METHODS

Survey Data Collection Methods

A random sample of individuals with landline or wireless phone numbers was drawn from five metropolitan areas in TN. The study area included Shelby, Davidson, Williamson, Hamilton, Knox, Sullivan, and Washington Counties in Tennessee. Survey results were also taken from respondents in surrounding counties. Figure 1 shows the counties that were targeted in the survey. The counties that respondents were actually located in can be seen in Figure 2 in Appendix A. The 2013 survey was conducted by telephone, including both land-line telephones and wireless phone numbers. 1,211 surveys were completed. The land-line sample consists of a random sample of telephone numbers for households in the five metropolitan areas addressed in the study. The wireless sample consists of wireless customers whose contracts are based in the study areas. Using American Association of Public Opinion formulas, the response rate was 28.7% and 23.3% for the landline and wireless sampling frames, respectively. The cooperation rate for the landline sampling frame was 68.2%, and the wireless cooperation rate was 54.3%.

Survey participants were screened to verify that the respondent was at least 18 years old and involved in planning meals or shopping for the household. If there were no individuals in the household with these qualifications, then the interview was terminated. Initial contacts in the wireless sampling frame were also screened to ensure that only Tennessee households were included in the survey.

A comparison of demographic characteristics between the survey sample and Census data at the state and county levels can be seen in Table 1 in the Appendix (United States Census Bureau 2012). The percent of females in the survey was higher than the percent of females at the

state and county level. The percent of survey respondents 65 and older is considerably higher than the United States Census data for the state and selected counties. However, this could be because potential respondents under the age of 18 were excluded from the sample or because landlines were sampled. Household size is lower than the Shelby County average but somewhat higher than the average for the state and other counties. The percent of respondents with a Bachelor's Degree or higher is greater for the sample than for the state or selected counties. Reported household income was also higher among the survey respondents than it was in the state and county median measures of household income. The mean household income among the respondents was \$60,000 to 69,999, while the median income for households in the state was \$41,140.

The survey is in Appendix B. Respondents were asked questions about household beef consumption. If the household did not consume beef, then questions were asked regarding the reasons for not consuming beef, such as vegetarianism, costs, health concerns, and other reasons. The non-beef consuming respondents then moved on to the end of the survey, where they answered questions regarding demographic characteristics. Beef consuming households were asked about the number of meals served at home per week in which beef was served, where they typically purchase beef, and their consumption of ground beef and steak.

If the respondent indicated that his or her household consumed steak but not ground beef, then they were sent on to a set of questions regarding steak. If they indicated that their household consumed ground beef but not steak, then they skipped to questions about ground beef. If the respondent indicated that the household consumed other cuts of beef but not ground beef or steak or if they consumed both products, then they were randomly assigned to either the steak or

ground beef question set. The method for assigning steak or ground beef questions to the respondents can be seen in Figure 3 in Appendix A.

Respondents from beef-consuming households were then asked about the importance of various attributes when purchasing steak or ground beef. Attributes included freshness, flavor, tenderness for steak (texture for ground beef), juiciness, color, leanness, price, and ease of preparation. Respondents were also asked about the importance of whether the animal was treated humanely, naturally raised, locally produced, grass fed, or grain fed.

Before answering questions about their choice to purchase local beef, respondents were read a brief description of the Tennessee beef product. The steak example is below:

TENNESSEE beef means the animals must have been born, raised, and finished within the borders of the State of Tennessee. I'm now going to ask you to choose between TWO Choice-grade, 12-ounce, Boneless Ribeye Steaks. Before making your decision, consider your household's budget for food, keeping in mind that if you spend more on steak, you'll have less money to spend on other food products. Both steaks are the same weight and have IDENTICAL freshness, cut, color, marbling, meat texture, fat, tenderness, juiciness, and flavor.

A similar description was read for ground beef, except the product was described as having 85% meat and 15% fat, with the local and nonlocal products being identical in leanness, freshness, color, meat texture, juiciness, and flavor.

After being read the description, respondents were asked to choose between a base product, a Tennessee beef product, or neither. For the ribeye steak, the base product price was \$9.25 per pound. For ground beef, the base product was \$3.36 per pound. The respondents were randomly assigned to four price levels for the Tennessee beef product. For both products, the

scale of prices offered represents the base price, the base price plus 25 percent of the base price, the base price plus 50 percent of the base price, and the base price plus 75 percent of the base price. For steak, these prices were \$9.25, \$11.56, \$13.88, and \$16.19 per pound. For ground beef, the prices assigned were \$3.36, \$4.20, \$5.04, and \$5.88. The price options for each product were based upon USDA Agricultural Marketing Service retail beef price reports, USDA Weekly Retail Beef Feature Activity, at the time the survey was being developed (United States Department of Agriculture Agricultural Marketing Service 2012). The choice sets for Tennessee steak can be seen in Figure 4, and the choice sets for Tennessee ground beef can be seen in Figure 5.

Respondents who chose the Tennessee beef product were asked to indicate the reasons that influenced their choice of the local product, such as quality, helping farmers, more environmentally-friendly, and other reasons. The respondents who did not choose the local product were asked for reasons that influenced their choice of the base product or neither product, such as reluctance to pay more, quality concerns, familiarity with beef from major beef producing states, and other reasons.

The survey also included questions about where respondents believed they would purchase Tennessee beef. Choices included grocery stores, warehouse stores, big box stores, butcher shops, gourmet stores, farmer markets, or directly from farmers. Respondents were also asked about their preferences regarding the product form and packaging. The final portion of the survey asked questions about respondents' opinions and demographic characteristics. Opinions about the importance of keeping food prices low versus other priorities were asked. Demographic information collected included gender, age, education, household income, residence location, and other demographics.

Summary Analysis

Means, Percentages, and Associations

The data collected in the survey can be analyzed in several ways to address the problems. For continuous data, such as age of the respondent, means and t-tests were used to evaluate the continuous variable across some value. T-tests can be used to determine if two sets of data are statistically different from one another. For example, t-tests can be performed to determine if the self-reported reasons that respondents chose Tennessee ground beef are statistically different than the reasons that respondents chose Tennessee steak. Means and percentages are useful because they allow us to understand the typical respondent. Percentages are particularly useful when looking at the reasons that respondents did or did not choose the Tennessee beef options. Reasons for choosing Tennessee beef ranged from a belief that the quality would be better to an urge to support the local economy. Reasons for not buying Tennessee beef included not thinking that the local product was of better quality and being unable to pay more, among others. Examining the percentages of respondents who gave reasons for or against buying can help to understand what might motivate consumers to buy local beef, which will help when marketing Tennessee beef.

Economic Model

Steak or Ground Beef Choice

Respondents were asked to evaluate two products: a Tennessee-produced labeled product and a conventional product. Consumers were presented with a hypothetical Tennessee boneless ribeye steak or package of 85%/15% ground beef and were asked if they would purchase the Tennessee beef product at a particular price or if they would choose the base product at a particular price. Respondents also had the option to choose neither product. In the contingent valuation approach used, the prices of the Tennessee beef product and the base product are

provided to the respondent, and the respondent selects either product or neither product (Hanemann 1984). In the descriptive paragraph read to respondents prior to the choice question, the respondents were informed that the base product and Tennessee beef products were identical in all respects except for the Tennessee beef label and possibly the price. The respondent was also given the option to not select a product.

Random Utility Models

Random Utility Theory (McFadden 1974) allows for the utility a consumer receives from either choosing to purchase an item or choosing to forgo the purchase of an item to be quantified. The researcher does not know all of the factors that a consumer considers when making their choice, but the assumption is that the consumer will choose whichever of the two options will maximize utility. The Random Utility Theory will be used to determine consumer preference for Tennessee beef and to analyze outlet choice for purchasing Tennessee beef.

Random Utility Model and Tennessee Beef Choice

In the case of Tennessee beef choice, the choice the respondent faced was to purchase a Tennessee beef product at a given price or to purchase a base product that was identical in every other respect. Let U_{iTN} represent the i th consumer's utility from choosing alternative Tennessee beef (TNBEEF) and U_{ic} be the utility from choosing conventional beef, or the base product. The i th consumer will choose TNBEEF if

$$U_{iTN} > U_{ic} . \quad (1)$$

Using a Random Utility Model, the probability that a given consumer will choose Tennessee beef can be found. The probability of choosing the alternative, in our case, Tennessee beef (TNBEEF=1), assuming the standard normal distribution, becomes (Greene 2011),

$$\text{Prob } [TNBEEF_i = 1] = \Phi (\alpha + \beta P_i) \quad (2)$$

where α and β are parameters to be estimated, P is price, and Φ is the standard normal distribution. Therefore, the probability that a consumer will choose the i th alternative is a function of price of the product. Mean WTP for the TENNESSEE BEEF product is calculated as

$$\widehat{WTP}_{TNBEEF} = -\frac{\alpha}{\beta_p}, \quad (3)$$

or the negative of the intercept from the probit model α divided by the estimated coefficient on price, β_p (Greene 2011).

If consumer preferences are influenced by demographic and other non-price factors, then

$$U_{jTN} = f(X_j, P) \quad (4)$$

and

$$U_{jC} = f(X_j, P), \quad (5)$$

where X_j represents demographic and socioeconomic variables for the j th individual. When demographic variables and other non-pecuniary variables are included, the probability of choosing the alternative, or TENNESSEE BEEF, is:

$$\text{Prob}[TNBEEF_{ij} = 1] = \Phi(\alpha + \beta'X_{ij} + \beta_p P_{ij}), \quad (6)$$

where α and β_p are parameters to be estimated, β is a vector of parameters on non-price variables, and X_{ij} is a matrix of demographic and other non-price variables. In this case, the probability that a consumer will choose the j th alternative is a function of the price of the product and a matrix of demographic variables. The mean WTP for the TENNESSEE BEEF product is calculated as:

$$\widehat{WTP}_{jTNBEEF} = -\frac{\alpha + \beta'X_{ij}}{\beta_p}, \quad (7)$$

or the negative of the intercept summed with the non-price variables multiplied by the estimated coefficients of those variables, divided by the estimated coefficient on price, β_p .

The percentages of respondents who chose Tennessee steak and ground beef at differing Tennessee beef price levels are found by dividing the number of respondents who said they would choose Tennessee beef at a particular price level by the sum of the respondents who chose Tennessee beef and those who chose the base product. Then, the resulting number is multiplied by 100 to find the percentage who chose Tennessee beef at the given price level.

Random Utility Model and Outlet Choice

Random Utility Theory can also be used to quantify the utility a consumer receives from their outlet choice for purchasing Tennessee beef. Respondents were asked if they would likely purchase Tennessee beef at a variety of outlets, including a grocery store, big box store, warehouse store, gourmet/organic market, butcher shop, farmer markets, farmers, through a mail order service, or from any other type of outlet. Respondents were able to answer that they would shop for Tennessee beef at more than one of these outlets. As it is difficult for small volume beef producers to enter into large supermarket chain or big box market channels, for the purposes of this study, we focus on farmer markets, direct from farmer, butcher shops, and gourmet shops. The outlets where consumers who stated they would purchase Tennessee beef is assumed to contribute to the consumer i 's utility, as

$$U_i = f(\boldsymbol{\psi}'\mathbf{Z}_m), j = 1, \dots, M. \quad (8)$$

where the consumer will choose alternative m if

$$U_m > U_n \quad (9)$$

where U_m is the utility derived from shopping at a nontraditional outlet and U_n is the utility derived from not purchasing Tennessee beef at those outlets.

As before, a Random Utility Model can be used to determine the likelihood that an individual, i , would choose alternative m . Using a multivariate probit regression, the choices of

nontraditional outlets (OUTLET_m=GOURMET, BUTCHER, FARMM, FARM), can then be estimated by multiple equations that are an analog to seemingly unrelated regressions models for binary variables (Capellari and Jenkins 2003). Consider the M-equation multivariate probit regression:

$$y_{im}^* = \psi' Z_{im} + \epsilon_{im}, m=1, \dots, M \quad (10)$$

$$y_{im}=1 \text{ if } y_{im}^*>0 \text{ and } 0 \text{ otherwise}$$

ϵ_{im} , $m=1, \dots, M$ are error terms distributed as multivariate normal, each with a mean of zero, and variance–covariance matrix V, where V has values of 1 on the leading diagonal and correlations $\rho_{jk}=\rho_{kj}$ as off-diagonal elements. The method of estimation is by simulated maximum likelihood. Using quadrivariate probit case (M=4), the log-likelihood function for a sample of N independent observations is given by

$$L = \sum_{i=1}^N w_i \log \Phi_4(\mu_1; \Omega) \quad (11)$$

Where w_i is a weight for observations $i=1, \dots, N$, and Φ_4 is the quadrivariate standard normal distribution with arguments μ_1 and Ω , where

$$\mu_i = K_{i1}\psi_1'Z_{i1}, K_{i2}\psi_2'Z_{i2}, K_{i3}\psi_3'Z_{i3}, K_{i4}\psi_4'Z_{i4} \quad (12)$$

With $K_{ik} = 2y_{ik} - 1$, for each $i, k = 1, \dots, 4$. Matrix Ω has constituent elements Ω_{jk} ,

$$\Omega_{jk} = 1 \text{ for } j = 1, \dots, 4 \quad (13)$$

$$\Omega_{21} = \Omega_{12} = K_{i1}K_{i2}\rho_{21}$$

$$\Omega_{31} = \Omega_{13} = K_{i3}K_{i1}\rho_{31}$$

$$\Omega_{32} = \Omega_{23} = K_{i3}K_{i2}\rho_{32}$$

$$\Omega_{41} = \Omega_{14} = K_{i1}K_{i4}\rho_{41}$$

$$\Omega_{42} = \Omega_{24} = K_{i4}K_{i2}\rho_{42}$$

$$\Omega_{34} = \Omega_{43} = K_{i3}K_{i4}\rho_{34}$$

The log-likelihood function depends on the quadrivariate normal distribution Φ_4 . An example of joint probability is that all the values are 1, or the consumer would expect to purchase Tennessee beef at any one of the four non-traditional outlets, so

$$\begin{aligned}
 Pr(y_1, y_2, y_3, y_4) &= Pr(\epsilon_1 < \psi_1'Z_1, \epsilon_2 < \psi_2'Z_2, \epsilon_3 < \psi_3'Z_3, \epsilon_4 < \psi_4'Z_4) \\
 &= Pr(\epsilon_4 < \psi_4'Z_4 | \epsilon_3 < \psi_3'Z_3, \epsilon_2 < \psi_2'Z_2, \epsilon_1 < \psi_1'Z_1) \\
 &\quad \times Pr(\epsilon_3 < \psi_3'Z_3 | \epsilon_2 < \psi_2'Z_2, \epsilon_1 < \psi_1'Z_1) \\
 &\quad \times Pr(\epsilon_2 < \psi_2'Z_2 | \epsilon_1 < \psi_1'Z_1) \times Pr(\epsilon_1 < \psi_1'Z_1).
 \end{aligned} \tag{14}$$

The probability that a consumer believes they would purchase Tennessee beef at a particular location is hypothesized to be influenced by demographic and attitudinal variables. Therefore, the explanatory variable matrices Z_m are comprised of respondent demographic variables, attitudes regarding beef attributes, past purchase behavior, and other variables.

Model Estimation

Probit Regressions for Tennessee Beef Choice

Probit regressions are used to estimate how prices and non-price factors influence the probability of purchasing the Tennessee product ($TNBEEF_i = 1$). Probit regressions can result in inconsistent parameter estimates if the distributional error terms are non-normal (Gabler, Laisney, and Lechner 1993). A semi-nonparametric (SNP) model can be used to evaluate whether or not the probit distribution is appropriate by fitting a univariate binary-choice model through the SNP estimators developed by Gallant and Nychka (1987). In the SNP approach, a density function is estimated using a Hermite series (Gallant and Nychka 1987). An SNP model can perform better than a probit model if the error terms are non-normal (Gabler, Laisney, and Lechner 1993). SNP models were run for both ground beef and steak choices. The SNP models were not significantly different than the probit models. Because the polynomial terms were not jointly significantly different than zero, the simple probit is appropriate to use in this case.

Two probit regressions are postulated: one for Tennessee steak and one for Tennessee ground beef. The probit regressions were estimated using Maximum Likelihood estimation in the PROBIT module of the STATA program for both steak and ground beef. The log likelihood function is as follows:

$$LnL = \sum_i [TNBEEF_i \ln \Phi(\beta\alpha + \beta'X_i + \beta_p P_i) + (1 - TNBEEF_i)(\ln(1 - \Phi(\alpha + \beta'X_i + \beta_p P_i)))] \quad (15)$$

Measures of overall significance of the model and its predictive accuracy include the Log Likelihood Ratio (LLR) test and the percent correctly predicted. The LLR test of the overall significance of the model compares the log likelihood from the model with the variables of interest included with the log likelihood from an intercept-only model. The test statistic is $LLR = -2(LnL_r - LnL_u)$ where L_r is the log likelihood of the restricted model in which all parameters are equal to zero and L_u is the log likelihood of the unrestricted model. The test statistic is distributed as chi-square with k degrees of freedom, where k is the number of explanatory variables included in the model. The predicted probabilities are calculated from equation (6) using the actual data. The percent correctly classified compares the predicted values with the actual values of those choosing or not choosing Tennessee beef. If the predicted probability falls above 0.5, then the predicted value $\widehat{TNBEEF} = 1$. The percent correctly classified is then calculated by comparing the overall percentage where $TNBEEF = \widehat{TNBEEF}$.

The primary hypothesis is that Tennessee consumers' WTP for TNBEEF products will be greater than their WTP for the base beef products. This hypothesis is based on previous studies that have found that price premiums for local beef are significantly greater than zero (e.g. Adalja et al. 2013; Mennecke et al. 2006; Wolf and Thulin 2000; Evans et al. 2011; Maynard, Burdine, and Meyer 2003). Probit regressions can be estimated to find the factors that influence whether or not a given consumer will be willing to pay a premium for TNBEEF. To begin, the following

model was postulated to find Tennessee consumers' probability of choosing the Tennessee boneless ribeye steak (*TNSTEAK*):

$$\text{Pr} (TNSTEAK=1)=f (\text{price, demographics, shopping preferences, and beef opinions}). \quad (16)$$

A similar model was postulated to find Tennessee consumers' preference for Tennessee 85%/15% ground beef:

$$\text{Pr} (TNGBEEF=1)=f (\text{price, demographics, shopping preferences, and beef opinions}). \quad (17)$$

The price of the Tennessee beef is likely to influence if a consumer will choose the Tennessee product or the base product. Demographics such as gender, age, and income have been found to be correlated with WTP a premium for local foods in previous studies. Shopping preferences, such as whether the respondent shops at a gourmet market, may be correlated with WTP a premium for locally produced beef. Opinions about beef such as concerns about safety, interest in how the animal was raised, and values placed on freshness and other beef characteristics may affect a person's opinion about and WTP a premium for Tennessee beef.

Because the sample was skewed toward older respondents, the models were weighted by age. To do this, one is divided by the median age of the county in which the respondents resided. This is included as a p-weight, or a probability weight, on the models. The final models are listed below in equations (18) and (19).

The model for the probability of being willing to purchase the Tennessee boneless, rib-eye steak is:

$$\text{PR}(TNSTEAK=1)=F(\text{STEAKPRICE, AGE, FEMALE, COLLEGE, INCOME1, INCOME2, INCOME3, DUMMYINC, URB1, URB2, HHSIZE, CHLDT6, FRMBK, BEEFMEALS, WARE, BIGBOX, GOURM, BUTCHER, FMMKT, FARMER, LEAN, FRESH, EASE, TEND/TEXT, JUICY, FLAV, COLOR, PRICE, NATUR, GRASS, GRAIN, HUMANE, SAFE}). \quad (18)$$

The model for the probability of being willing to purchase Tennessee ground beef is:

$$\begin{aligned} \text{PR}(\text{TNGBEEF}=1) = F(\text{GBPRICE}, \text{AGE}, \text{FEMALE}, \text{COLLEGE}, \text{INCOME1}, \\ \text{INCOME2}, \text{INCOME3}, \text{DUMMYINC}, \text{URB1}, \text{URB2}, \text{HHSIZE}, \text{CHLDT6}, \\ \text{FRMBK}, \text{BEEFMEALS}, \text{WARE}, \text{BIGBOX}, \text{GOURM}, \text{BUTCHER}, \text{FMMKT}, \\ \text{FARMER}, \text{LEAN}, \text{FRESH}, \text{EASE}, \text{TEND/TEXT}, \text{JUICY}, \text{FLAV}, \text{COLOR}, \text{PRICE}, \\ \text{NATUR}, \text{GRASS}, \text{GRAIN}, \text{HUMANE}, \text{SAFE}). \end{aligned} \quad (19)$$

Definitions of the variables and sample means are in Table 2. Nonresponses were eliminated when finding the means and running the models, except in the case of income, where median county income replaced nonresponses. Hypothesized effects on the probability of being willing to purchase Tennessee beef are provided in Table 3. The effects were hypothesized based on previous studies, which are listed in the table. In the event that no previous studies included the variable, a sign was hypothesized based on studies that used similar but not identical variables. For example, if a study found that people who chose local foods placed a high value on food safety, then that could result in a positive hypothesized sign for the SAFE variable.

Marginal Effects for Tennessee Beef Choice

Marginal effects for continuous explanatory variables, such as age, are calculated as:

$$\frac{\partial \text{Prob}[\text{TNBEEF}_i=1]}{\partial X_k} = \phi(\alpha + \beta'X_i + \beta_P P_i) \beta_k \quad (20)$$

where ϕ is the standard normal density function and β_k is the estimated parameter associated with the explanatory variable of interest. For a discrete variable, the marginal effect for X_k is calculated as:

$$\frac{\partial \text{Prob}[\text{TNBEEF}_i=1]}{\partial X_k} = \text{Prob}[\text{TNBEEF}_i = 1 | X, X_k = 1] - \text{Prob}[\text{TNBEEF}_i = 1 | X, X_k = 0] \quad (21)$$

Means and standard errors of the marginal effects can be calculated from the individual values and equation (20) or (21). Means and standard errors of the WTP estimates can be calculated from their individual values and equation (7).

Quadrivariate Model for Outlet Choice

The multivariate probit regression of outlet choice was estimated using the MVPROBIT module in STATA. The simulation method used for evaluating multivariate normal distribution functions is the Geweke–Hajivassiliou–Keane (GHK) smooth recursive conditioning simulator (Capellari and Jenkins 2003). As with the probit regressions, the LLR test is used to assess overall significance of the model. The predicted joint probabilities can be obtained using the estimated model coefficients. The following model was postulated to predict outlet choice:

$$\Pr(\text{OUTLET}_m = \text{FMMKT, FARMER, BUTCHER, GOURMET}) = f(\text{demographics, previous year shopping habits, type of meat purchased, and beef values}). \quad (22)$$

Demographics such as gender, age, education, income, and farm background were postulated to have an impact on the choice of outlet because they have been significant in previous outlet choice studies. If the respondent has shopped for beef at a farmer market, gourmet shop, or butcher shop or purchased meat directly from the farmer, then it is likely that they could envision themselves doing so again in the future. The type of meat purchased has been significant in previous outlet choice studies. Values when purchasing beef, such as valuing low prices or production practices, are also hypothesized to be correlated with outlet choice.

The hypothesized model is as follows:

$$\Pr(y_m=1)=F(\text{AGE, FEMALE, COLLEGE, INCOME1, INCOME2, INCOME3, DUMMYINC, URB1, URB2, HHSIZE, OUTLET}_m, \text{MEATSTK, GRASS, GRAIN, PRICE, HUMANE, ENVIRO}). \quad (23)$$

Note that y_m represents the Tennessee beef outlet choice and $OUTLET_m$ represents whether the respondent has shopped for beef at that particular type of outlet in the past year. The multivariate probit model shows if there is correlation between the dependent variables. The variable definitions and means are in Table 4. The hypothesized signs for the independent variables are in Table 5.

CHAPTER IV

RESULTS

Reasons for Choosing Tennessee Beef or Base Choice

The potential reasons for choosing Tennessee steak or ground beef and the two combined were evaluated (Table 6). The most influential reason for choosing Tennessee beef was the feeling that buying Tennessee steak or ground beef supports farmers in the respondent's state. This was followed by the feeling of supporting the Tennessee economy, followed by the belief that Tennessee beef would be fresher than out of state beef. Respondents also felt that purchasing Tennessee beef is better for the environment because the beef has to be transported shorter distances. The differences in the average ratings across steak and ground beef were compared using t-tests. The influence rating of safety and quality of Tennessee beef were statistically higher for ground beef than for steak.

The respondents who did not choose Tennessee beef were asked to select reasons for their answer (Table 7). The most frequently cited reason was that the respondent could afford to pay more but was not willing to do so (60.77%). Next were those respondents who stated that they could not afford to pay more for Tennessee beef (53.08%). These reasons were followed by respondents who preferred corn fed beef over grazed beef (24.16%), not believing that Tennessee beef is of better quality (15%), and finally trusting beef products from major beef producing states more than locally produced beef (8.46%).

Results of Probit Regressions for Tennessee Beef Choice

The results of the probit regressions for the probability of choosing Tennessee steak and Tennessee ground beef can be seen in Table 8. The steak model's LLR test was significant at the 99 percent level. The model correctly classified 78.41% of the responses. As expected, the sign

on price was negative. This means that as the price of Tennessee steak increases, consumers are more likely to choose the base product over the Tennessee product. Demographic variables influenced the probability of choosing Tennessee steak as well. Age is statistically significant and negatively correlated with Tennessee steak choice. Older consumers are less likely to choose Tennessee steak. This result was expected since many other studies found that older consumers were less likely to be willing to pay for local products (Adalja et al. 2013; Willis et al. 2013; Hu, Woods, and Bastin 2009; Nganje, Hughner, and Lee 2011). The sign on the income variable *INCOME3* was significant and negative. This suggests those with household incomes of \$50,000 to \$70,000 are less likely to purchase Tennessee steak than those with other incomes.

BUTCHER was significant and negative, meaning that consumers who previously shopped at butcher shops are less likely to choose Tennessee steak. This result is surprising, as another study found that shopping at a butcher shop increased the likelihood of choosing local beef (Maynard, Burdine, and Meyer 2003). The sign for the variable *TEND* was significant and negative in the steak model. If consumers highly rank the importance of tenderness when shopping for steak, they are less likely to purchase Tennessee steak. This may suggest that consumers believe that Tennessee steak is not as tender as the base product or that it is not different enough to choose the local product. However, the sign on *FLAV* was significant and positive, indicating that consumers may think that Tennessee beef will have better flavor than the base product. If the consumer rated flavor as being of high importance when purchasing steak, then he or she is more likely to choose Tennessee steak. This finding corresponds with other studies (Brooker et al. 1988; Darby et al. 2006). The sign on concern about price was significant and negative. Not surprisingly, if the consumer is concerned about price when choosing beef, then he or she will be less likely to be willing to pay for Tennessee steak. The sign on grain fed

was significant and positive. If a consumer values the grain fed label, then he or she will be more likely to choose Tennessee steak.

When the price of the Tennessee steak product increases by \$1, the probability that the consumer will choose the Tennessee steak decreases by 0.085 (Table 8). An increase in age of one year corresponds to a 0.005 decrease in likelihood of choosing Tennessee steak. The income category *INCOME3* corresponds to a decrease of 0.220 in likelihood of choosing Tennessee steak. If a respondent has shopped at a butcher shop in the previous year, then their likelihood of choosing the Tennessee steak decreases by 0.155 compared to those who have not shopped at a butcher shop in the preceding year. If a consumer values tenderness when purchasing steak, the probability that they will choose Tennessee steak decreases by 0.119. High importance rating of flavor when purchasing steak increases the likelihood that the consumer will purchase Tennessee steak by 0.135. If the consumer is concerned about price, then it is 0.103 less probable that the respondent will choose the Tennessee steak product. If the respondent cares whether or not the label indicates that the animal was grain fed, then they are 0.128 more likely to choose Tennessee steak.

The Tennessee ground beef probit regression's LLR test was significant at the 99 percent level. The model correctly classified 80.41% of the responses. As in the steak model, the sign on the price variable was significant and negative. As the price of Tennessee ground beef increases, consumers are less likely to choose the Tennessee product over the base product. The sign for *CHLDLT6* was significant and positive, meaning that if children under six reside in the household, the consumer is more likely to choose Tennessee ground beef. Shopping at a butcher shop was significant for the ground beef model, as in the steak probit model. However, in contrast to the butcher variable in the steak model, the sign for the ground beef butcher variable

was positive. If a consumer shopped at a butcher shop in the previous year, then they are more likely to choose Tennessee ground beef. The sign for freshness was significant and positive. This means that if a consumer thinks the freshness of the meat is important when purchasing ground beef, then he or she is more likely to purchase the Tennessee ground beef product. Similarly, the sign for *NATUR* was significant and positive. This means that if a consumer considers a naturally raised (no hormones or antibiotics) label important when buying ground beef, they are more likely to choose Tennessee ground beef. The sign for *SAFE* was significant and positive.

Consumers that believe that ensuring food safety and nutrition are more important than keeping food prices low will be more likely to choose Tennessee ground beef. This finding is similar to those of other studies (Martinez et al. 2010; Brooker et al. 1988; Loureiro and Hine 2002).

When the price of the Tennessee ground beef product increases by \$1, the likelihood that the respondent will choose the Tennessee product decreases by 0.191 (Table 8). If a child under six years of age resides in the household, the consumer is 0.194 more likely to choose Tennessee ground beef than households without young children in the home. Shopping at a butcher shop in the previous year increases the probability of choosing Tennessee ground beef by 0.161. If the consumer ranks freshness of ground beef as high importance, then the chance that the consumer will choose Tennessee ground beef increases by 0.216. If the respondent values the label of “naturally raised,” then that respondent’s probability of choosing Tennessee ground beef increases by 0.094. The belief that ensuring food safety and nutrition is more important than keeping food prices low increases the probability of choosing Tennessee ground beef by 0.1.

Among beef consumers, mean willingness to pay for the Tennessee steak product is \$14.28 (Table 9). The base steak product was priced at \$9.25 per pound. The premium that the consumer is paying for local steak is \$5.03, which is a percent premium of 54.39%. The t-test is

statistically significant and indicates that the premium is statistically different from zero. The percentage of respondents that chose Tennessee steak at various price levels is shown in Figure 6. As expected, a greater percentage of respondents chose Tennessee steak when the price of Tennessee steak was lower. 86.25% chose Tennessee steak at the base price of \$9.25. At \$11.56, 35.44% chose Tennessee steak. When the given Tennessee steak price was \$13.88, 29.89% of respondents chose Tennessee steak. Of those randomly assigned the highest Tennessee steak price level of \$16.19, 16.84% chose Tennessee steak.

The willingness to pay for the Tennessee ground beef product is \$5.03. The base ground beef's price was \$3.36 per pound. The consumer is paying a premium of \$1.67 per pound at this price, which is a 49.68% premium. The t-test is statistically significant, indicating that the premium is statistically different from zero. The percentage of respondents that chose Tennessee ground beef at the different given price levels is in Figure 7. The highest percentage of respondents (84.85%) said that they would choose Tennessee ground beef at the base ground beef price level of \$3.36. When the given price was \$4.20, 30.30% of respondents chose the Tennessee ground beef. At the second highest price level for ground beef (\$5.04), the percentage of respondents that said they would choose Tennessee ground beef was the lowest at 11.48%. When the given price was \$5.88, the percentage of respondents choosing Tennessee ground beef rose to 19.18%.

Outlet Choice Multivariate Probit Results

The results of the multivariate probit regression for outlet choice can be seen in Table 10 in the Appendix. For all four outlet choices, previous shopping habits are significant and positive in relation to whether or not a consumer can envision themselves purchasing Tennessee beef at a gourmet store, butcher shop, a farmer market, or directly from a farmer. If a consumer has

shopped at a gourmet store, butcher shop, a farmer market, or purchased directly from a farmer in the previous year, then he or she is more likely to be able to envision themselves shopping for local beef at that outlet in the future.

Demographic variables were significant when consumers envisioned themselves shopping for Tennessee beef at gourmet stores in the future. The sign on *COLLEGE* was significant and positive. Consumers with a college degree are more likely to envision themselves shopping at a gourmet store for local beef. *URB1* was significant and positive on the chances of choosing a gourmet store for future local beef purchases. This means that living in a rural or small town increases the likelihood of interest in shopping at a gourmet store for Tennessee beef. The sign on grass fed was significant and positive for gourmet stores. Valuing a grass fed label increases the probability of choosing a gourmet store. The price variable is negative and significant for consumers choosing gourmet stores for Tennessee beef purchases. If the respondent is more concerned about the price of beef when making beef purchasing decisions, then the consumer is less likely to envision themselves shopping at a gourmet store for Tennessee beef.

Other demographic variables were significant in respondents' opinion of whether or not they would shop for Tennessee beef at a butcher shop. The *INCOME3* variable is significant and negative for consumers envisioning themselves shopping at butcher shops. This indicates that if a consumer's income is between \$50,000 and \$70,000, then the consumer is less likely to envision themselves shopping at a butcher shop for Tennessee beef than consumers in other income categories. On the other hand, the sign on the grain fed label was significant and positive. This means that a high valuation of a grain fed label increases the likelihood that the consumer will envision themselves buying Tennessee beef at a butcher shop.

Other variables were significantly correlated with choosing to shop for Tennessee beef at a farmer market or directly from a farmer. *INCOME1*'s sign was significant and positive for respondents when envisioning themselves shopping at a farmer market for local beef. This indicates that lower income consumers (less than \$40,000 per year) are more likely to think that they would shop at a farmer market for Tennessee beef than consumers with higher incomes. The variable *ENVIRO* was significant and positive for consumers choosing to shop at farmer markets for Tennessee beef. Valuing the reduction of the environmental impact of food production over keeping food prices low increases the chances that a consumer will be interested in shopping at a farmer market for Tennessee beef. The only statistically significant variable for the choice to buy Tennessee beef directly from a farmer was having bought directly from a farmer in the past.

CHAPTER V

CONCLUSION

Tennessee beef consumers express a willingness to pay a premium for beef that is produced in the state. Because of this, Tennessee producers should consider performing all stages of beef production in the state and having the cattle slaughtered at in-state facilities. Then, they can use the results of this study to price the beef appropriately and sell it in state, adding value to their production. A marketing program might be implemented by the state government or by a state-level industry association. For example, a voluntary Tennessee-produced beef logo might be administered by the Tennessee Department of Agriculture or by the Tennessee Cattlemen's Association.

Tennessee producers can use the study results to target market their local beef products to consumers who are most likely to be willing to pay a premium. Producers can target market their beef to make it more accessible and appealing to those that are more likely to choose Tennessee beef. Additionally, the attitudes and opinions that were revealed to influence willingness to pay can be targeted via advertising and, in some cases, altered production practices. For example, since those who ranked the naturally raised characteristic particularly important when purchasing beef were more likely to choose Tennessee ground beef, producers who are interested in marketing their beef locally might consider limiting the amount of hormones and antibiotics administered to their beef cows, if not eliminating them entirely.

Among steak consumers, the significance and signs indicate that Tennessee producers should focus on quality characteristics like tenderness and flavor. The grain fed result suggests that steak consumers may be concerned about marbling of beef as well. If Tennessee producers want to market local steak, they should focus on marketing to younger consumers who have

incomes higher than \$70,000 per year. They should sell their product at outlets other than butcher shops since shopping at butcher shops decreased the likelihood of choosing Tennessee steak. Tennessee producers should focus on increasing their steaks' tenderness, since high valuation of tender beef decreased the likelihood of purchasing Tennessee steak in this study. When advertising Tennessee steak, the steak's flavor and feeding method should be highlighted since those attributes were highly ranked among consumers who were more likely to choose Tennessee steak.

The significance and signs of variables in the ground beef regression indicate that Tennessee producers should focus on safety, freshness, and nutritional characteristics, like production practices. For the marketing of Tennessee ground beef, producers should focus on families with children under six years of age. They should sell the beef in a butcher shop, since frequenting a butcher shop was correlated with an increased likelihood of choosing Tennessee ground beef. This may be because consumers who purchase ground beef at a butcher shop are able to see their meat being ground by the butcher, adding a feeling of safety to the purchase process. Tennessee producers should highlight the freshness and safety of their product since consumers were concerned about these qualities when purchasing ground beef. The method of production should be advertised if the cattle are naturally raised.

The outlet choice results can be used to determine which consumers are most likely to shop for local beef at a particular outlet. Demographics characteristics, attitudes, and opinions can have an effect on where consumers will choose to shop for Tennessee beef, and these factors can be kept in mind when deciding on the best outlet for a particular producer to market their beef. For example, a producer who is interested in raising grass fed cattle and marketing them locally would likely be most successful when selling their product at a gourmet store, since

interest in a grass fed label increased the likelihood that a consumer would shop at that outlet for Tennessee beef.

Further research can be done to determine whether marketing beef locally will be profitable to Tennessee beef producers. To determine the profitability, it is necessary to determine the extent to which costs increase when finishing and slaughtering beef in state. Further research can also be conducted to determine the packaging and product characteristics that consumers prefer when purchasing locally produced beef.

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APPENDICES

APPENDIX A: Tables and Figures

Table 1. Demographic Characteristics of the Sample and State/County Comparisons

Characteristic	Sample	State	Shelby	Davidson	Hamilton	Knox	Washington
	Percent or Mean						
Female Gender (%)	59.00 (N=1200)	51.2 (2012)	52.3	51.6	51.8	51.3	51.1
Age 65 and Over (%)	31.15 (N=991)	14.2 (2012)	10.8	10.7	15.2	13.7	16.0
Household Size (# of people)	2.64 (N=997)	2.51 (2008-2012)	2.66	2.37	2.44	2.32	2.31
Bachelor's Degree or Higher (%)	41.00 (N=993)	23.5 (2008-2012)	28.7	35.0	27.8	34.3	28.9
Household Income Category for 2012*	6.66 (\$60,000-69,000) (N=384)	\$44,140 (2008-2012)	\$46,251	\$46,676	\$46,544	\$47,270	\$42,995

*Household Income for 2012: 1=Less than \$20,000; 2=\$20,000 to 29,999; 3=\$30,000 to 39,999; 4=\$40,000 to 49,999; 5=\$50,000 to 59,999; 6=\$60,000 to \$69,999; 7=\$70,000 to 79,999; 8=\$80,000 to 89,999; 9=\$90,000 to 99,999; 10=\$100,000 to 109,999; 11=\$110,000 to 119,999; 12=120,000 or more

(Source: United States Census Bureau, State and County Quickfacts)

Table 2. Variable Definitions and Means for Tennessee Beef Probits

Variable Name	Variable Definition	Mean for Steak N=264	Mean for Ground Beef N=245
Dependent Variables			
<i>TNSTEAK</i>	1 if choose TN steak, 0 otherwise	0.424	-----
<i>TNGBEEF</i>	1 if choose TN ground beef, 0 otherwise	-----	0.363
Explanatory Variables			
<i>STEAKPRICE</i>	Price of TN steak per pound: 9.25, 11.56, 13.88, or 16.19	13.042	-----
<i>GBPRICE</i>	Price of TN ground beef per pound: 3.36, 4.20, 5.04, or 5.88	-----	4.575
<i>AGE</i>	Age of respondent in years	52.918	51.796
<i>FEMALE</i>	1 if female, 0 otherwise	0.524	0.611
<i>COLLEGE</i>	1 if respondent graduated from college, 0 otherwise	0.501	0.394
<i>INCOME1</i>	1 if household income \$40K or less, 0 otherwise	0.108	0.150
<i>INCOME2</i>	1 if household income \$40K to \$50K, 0 otherwise	0.492	0.518
<i>INCOME3</i>	1 if household income \$50K to \$70K, 0 otherwise	0.079	0.087
<i>DUMMYINC</i>	1 if observation based on MEDHHINC, 0 if income reported by respondent	0.491	0.546
<i>URB1</i>	1 if rural or small town, 0 otherwise	0.343	0.334
<i>URB2</i>	1 if suburban, 0 otherwise	0.427	0.411
<i>HHSIZE</i>	Household size in number of individuals	2.980	2.652
<i>CHLDLT6</i>	1 if child less than 6 years of age in household, 0 otherwise	0.096	0.129
<i>FRMBK</i>	1 if from farm background, 0 otherwise	0.400	0.359
<i>BEEFMEALS</i>	1 if beef served at home more than 3 times per week, 0 otherwise	0.449	0.335
<i>WARE</i>	1 if bought beef at warehouse store in past year, 0 otherwise	0.367	0.260
<i>BIGBOX</i>	1 if bought beef from big box in past year, 0 otherwise	0.477	0.411
<i>GOURM</i>	1 if bought beef from gourmet store in past year, 0 otherwise	0.255	0.213
<i>BUTCHER</i>	1 if bought beef from butcher shop in past year, 0 otherwise	0.133	0.099
<i>FMMKT</i>	1 if bought beef from farmer's market in past year, 0 otherwise	0.059	0.067
<i>FARMER</i>	1 if bought beef from farmer in past year, 0 otherwise	0.055	0.043
<i>LEAN</i>	Importance of leanness when purchasing beef, 1=not, 2=somewhat, 3=very	2.450	2.611

Table 2. Continued

Variable Name	Variable Definition	Mean for Steak N=264	Mean for Ground Beef N=245
<i>FRESH</i>	Importance of freshness when purchasing beef, 1=not, 2=somewhat, 3=very	2.899	2.925
<i>EASE</i>	Importance of ease of preparation when purchasing beef, 1=not, 2=somewhat, 3=very	2.160	2.307
<i>TEND/TEXT</i>	Importance of tenderness/texture when purchasing beef, 1=not, 2=somewhat, 3=very	2.797	2.421
<i>JUICY</i>	Importance of juiciness when purchasing beef, 1=not, 2=somewhat, 3=very	2.720	2.480
<i>FLAV</i>	Importance of flavor when purchasing beef, 1=not, 2=somewhat, 3=very	2.902	2.848
<i>COLOR</i>	Importance of color when purchasing beef, 1=not, 2=somewhat, 3=very	2.696	2.776
<i>PRICE</i>	Importance of price when purchasing beef, 1=not, 2=somewhat, 3=very	2.458	2.444
<i>NATUR</i>	Importance of natural label when purchasing beef, 1=not, 2=somewhat, 3=very	2.331	2.347
<i>GRASS</i>	Importance of grass fed label when purchasing beef, 1=not, 2=somewhat, 3=very	1.938	1.872
<i>GRAIN</i>	Importance of grain fed label when purchasing beef, 1=not, 2=somewhat, 3=very	1.917	1.839
<i>HUMANE</i>	Importance of humanely treated label when purchasing beef, 1=not, 2=somewhat, 3=very	2.489	2.506
<i>SAFE</i>	Importance of keeping food prices low versus safe and nutritious food, 1=food prices more important, 2=about same, 3=safety and nutrition more important	2.405	2.429
<i>WTAGE</i>	1/median age of household in the county	0.026	0.027

Table 3. Hypothesized Signs and Supporting Studies for Tennessee Beef Probits

Variable	Hypothesized Sign	Studies Supporting Hypothesis
<i>STEAKPRICE</i>	-	
<i>GBPRICE</i>	-	
<i>AGE</i>	-	Adalja et al. 2013*; Willis et al. 2013; Hu, Woods, and Bastin 2009; Nganje, Hughner, and Lee 2011
<i>FEMALE</i>	+	Willis et al. 2013; Adams and Adams 2008; James, Rickard, and Rossman 2009; Jekanowski, Williams, and Schiek 2000
<i>COLLEGE</i>	+	Brown 2003**; Mennecke et al. 2006**; Willis et al. 2013**; Govindasamy et al. 2012**; Hu, Woods, and Bastin 2009**; Nganje, Hughner, and Lee 2011**
<i>INCOME1</i>	-	
<i>INCOME2</i>	-	
<i>INCOME3</i>	+	
<i>DUMMYINC</i>	-----	
<i>URB1</i>	Not significant	Jekanowski, Williams, and Schiek 2000; Brown 2003
<i>URB2</i>	Not significant	Jekanowski, Williams, and Schiek 2000; Brown 2003
<i>HHSIZE</i>	-	
<i>CHLDLT6</i>	+	
<i>FRMBK</i>	+	Brown 2003
<i>BEEFMEALS</i>	+	
<i>WARE</i>	-	
<i>BIGBOX</i>	-	
<i>GOURM</i>	+	Maynard, Burdine, and Meyer 2003***
<i>BUTCHER</i>	+	Maynard, Burdine, and Meyer 2003*
<i>FMMKT</i>	+	Darby et al. 2006; Onken, Bernard, and Pesek 2011
<i>FARMER</i>	+	Maynard, Burdine, and Meyer 2003*
<i>LEAN</i>	-	
<i>FRESH</i>	+	Darby et al. 2006**; Martinez et al. 2012**; Brooker et al. 1988**
<i>EASE</i>	-	
<i>TEND/TEXT</i>	+	
<i>JUICY</i>	+	
<i>FLAV</i>	+	Brooker et al. 1988**; Darby et al. 2006**
<i>COLOR</i>	-	Brooker et al. 1988**
<i>PRICE</i>	-	Brooker et al. 1988
<i>NATUR</i>	+	Martinez et al. 2010**
<i>GRASS</i>	+	
<i>GRAIN</i>	-	
<i>HUMANE</i>	+	Martinez et al. 2010**
<i>SAFE</i>	+	Martinez et al. 2010**; Brooker et al. 1988**; Loureiro and Hine 2002**

*Studies that focused on local beef

**These studies did not use identical variables as this study, but their findings were used to hypothesize on the likely sign for the variable

Table 4. Outlet Choice Variable Definitions and Means

Variable Name	Variable Definition	Mean N=264
Dependent Variables		
y_m	1 if will buy at alternate outlet, 0 otherwise	-----
<i>GOURM</i>	1 if will buy at gourmet store, 0 otherwise	0.455
<i>BUTCHER</i>	1 if will buy at butcher shop, 0 otherwise	0.443
<i>FARMM</i>	1 if will buy at farmers' market, 0 otherwise	0.377
<i>FARMER</i>	1 if will buy directly from farmer, 0 otherwise	0.466
Explanatory Variables		
<i>AGE</i>	Age of respondent in years	51.334
<i>FEMALE</i>	1 if female, 0 otherwise	0.574
<i>COLLEGE</i>	1 if respondent graduated from college, 0 otherwise	0.431
<i>INCOME1</i>	1 if household income \$40K or less, 0 otherwise	0.115
<i>INCOME2</i>	1 if household income \$40K to \$50K, 0 otherwise	0.522
<i>INCOME3</i>	1 if household income \$50K to \$70K, 0 otherwise	0.064
<i>DUMMYINC</i>	1 if observation based on MEDHHINC, 0 if income reported by respondent	0.514
<i>URB1</i>	1 if rural or small town, 0 otherwise	0.353
<i>URB2</i>	1 if suburban, 0 otherwise	0.385
<i>HHSIZE</i>	Household size in number of individuals	2.881
<i>OUTLET_m</i>	1 if has shopped at alternative outlet in past year, 0 otherwise	-----
<i>PGOURM</i>	1 if bought beef from gourmet store in past year, 0 otherwise	0.287
<i>PBUTCHER</i>	1 if bought beef from butcher shop in past year, 0 otherwise	0.138
<i>PFARMM</i>	1 if bought beef from farmer's market in past year, 0 otherwise	0.091
<i>PFARMER</i>	1 if bought beef from farmer in past year, 0 otherwise	0.070
<i>MEATSTK</i>	1 if asked about purchasing TN steak, 0 otherwise	0.549
<i>GRASS</i>	Importance of grass fed label when purchasing beef, 1=not, 2=somewhat, 3=very	2.185
<i>GRAIN</i>	Importance of grain fed label when purchasing beef, 1=not, 2=somewhat, 3=very	2.120
<i>PRICE</i>	Importance of price when purchasing beef, 1=not, 2=somewhat, 3=very	2.423
<i>HUMANE</i>	Importance of humanely treated label when purchasing beef, 1=not, 2=somewhat, 3=very	2.635
<i>ENVIRO</i>	Importance of keeping food prices low versus minimal environmental impact, 1=food prices more important, 2=about same, 3=safety and nutrition more important	2.079
<i>WTAGE</i>	1/median age of household in the county	0.026

Table 5. Outlet Choice Hypothesized Signs and Supporting Studies

Variable	Outlet Type	Hyp. Signs	Studies Supporting Hypothesis
<i>AGE</i>	GOURM	+	
	BUTCHER	+	Grannis, Thilmany, and Sparling 2001
	FARMM	-	
<i>FEMALE</i>	FARMER	+	
	GOURM	+/-	Lusk and Cevallos 2004; Grannis, Thilmany, and Sparling 2001
	BUTCHER	+/-	Lusk and Cevallos 2004; Grannis, Thilmany, and Sparling 2001
<i>COLLEGE</i>	FARMM	+	
	FARMER	+	
	GOURM	+	
<i>INCOME1</i>	BUTCHER	+	
	FARMM	+	
	FARMER	-	
<i>INCOME2</i>	GOURM	-	
	BUTCHER	-	
	FARMM	-	
<i>INCOME3</i>	FARMER	-	
	GOURM	+	
	BUTCHER	+	
<i>DUMMYINC</i>	FARMM	+	
	FARMER	+	
	GOURM	+	Grannis, Thilmany, and Sparling 2001; Medina and Ward 1999
<i>URB1</i>	BUTCHER	+	Grannis, Thilmany, and Sparling 2001; Medina and Ward 1999
	FARMM	+	Grannis, Thilmany, and Sparling 2001; Medina and Ward 1999
	FARMER	+	Grannis, Thilmany, and Sparling 2001; Medina and Ward 1999
<i>URB2</i>	GOURM	-----	
	BUTCHER	-----	
	FARMM	-----	
<i>URB2</i>	FARMER	-----	
	GOURM	-	
	BUTCHER	-	
<i>URB2</i>	FARMM	-	
	FARMER	+	Grannis, Thilmany, and Sparling 2001
	GOURM	+	
<i>URB2</i>	BUTCHER	+	
	FARMM	+	
	FARMER	-	
<i>URB2</i>	FARM	-	

Table 5. Continued

Variable	Outlet Type	Hyp. Sign	Studies Supporting Hypothesis
<i>HHSIZE</i>	GOURM	-	
	BUTCHER	-	
	FARMM	-	
	FARMER	-	
<i>OUTLET_m</i>	GOURM	+	
	BUTCHER	+	
	FARMM	+	
	FARMER	+	
<i>MEATSTK</i>	GOURM	+	
	BUTCHER	+	
	FARMM	+	Medina and Ward 1999
	FARMER	+	
<i>GRASS</i>	GOURM	+	
	BUTCHER	+	Grannis, Thilmany, and Sparling 2001
	FARMM	+	
	FARMER	+	
<i>GRAIN</i>	GOURM	-	
	BUTCHER	-	Grannis, Thilmany, and Sparling 2001
	FARMM	-	
	FARMER	-	
<i>PRICE</i>	GOURM	-	
	BUTCHER	-	
	FARMM	+	
	FARMER	+	
<i>HUMANE</i>	GOURM	+	
	BUTCHER	+	
	FARMM	+	
	FARMER	+	
<i>ENVIRO</i>	GOURM	+	
	BUTCHER	+	Grannis, Thilmany, and Sparling 2001
	FARMM	+	
	FARMER	+	

Table 6. Reasons for Selecting Tennessee Beef

Potential Reasons for Selecting Tennessee Beef	Mean Influence Rating 1=no influence, 2=some influence, 3=great influence		
	Overall (N=199)	Steak (N=114)	Ground Beef (N=85)
Purchasing TENNESSEE BEEF makes me feel like I am supporting farmers in my state.	2.78	2.80	2.76
Purchasing TENNESSEE BEEF makes me feel like I am supporting the state's economy.	2.75	2.74	2.76
TENNESSEE BEEF is likely fresher than out-of-state beef	2.59	2.55	2.64
TENNESSEE BEEF has to be transported shorter distances, so it is better for the environment	2.45	2.42	2.49
I know more about where Tennessee beef comes from, so I feel it is safer	2.38	2.27	2.53**
Knowing how the beef was produced	2.37	2.33	2.41
Tennessee beef is likely higher quality than out-of-state	2.29	2.20	2.40*
Price of TENNESSEE BEEF compared with other	2.18	2.11	2.27
Knowing the farmer who produces the beef	2.03	2.00	2.06
The experience purchasing directly from the farmer	2.02	2.02	2.01
Being able to visit the farm where the beef was produced	1.88	1.83	1.95

**Indicates statistically different means at the 95% confidence level, * at the 90% confidence level using a t-test.

Table 7. Reasons for Not Selecting Tennessee Beef

Possible Reason	Percent Citing as Reason (N=260)
Trust beef products from major beef producing states more than locally produced beef	8.46
Don't believe Tennessee beef is better quality	15.00
Prefer corn fed beef over beef that's grazed	24.16
Can afford to pay a higher price for Tennessee beef, but aren't willing to pay more	60.77
Can't afford to pay more for Tennessee beef	53.08

Table 8. Estimated Coefficients and Marginal Effects for Tennessee Beef Probits ^a

Variable	Steak Probit (N=264)		Ground Beef Probit (N=245)	
	Estimated Coefficient	Marginal Effects	Estimated Coefficient	Marginal Effects
<i>INTERCEPT</i>	5.798*** (1.865)	----- -----	-2.244 (1.535)	----- -----
<i>STEAKPRICE</i>	-0.342*** (0.041)	-0.085*** (0.007)	----- -----	----- -----
<i>GBPRICE</i>	----- -----	----- -----	-0.784*** (0.131)	-0.191*** (0.024)
<i>AGE</i>	-0.020*** (0.008)	-0.005*** (0.002)	0.004 (0.008)	0.001 (0.002)
<i>FEMALE</i>	-0.173 (0.203)	-0.043 (0.051)	0.181 (0.227)	0.044 (0.055)
<i>COLLEGE</i>	-0.100 (0.207)	-0.025 (0.051)	-0.016 (0.268)	-0.004 (0.065)
<i>INCOME1</i>	0.221 (0.400)	0.055 (0.100)	-0.107 (0.396)	-0.026 (0.096)
<i>INCOME2</i>	0.402 (0.366)	0.101 (0.091)	0.266 (0.434)	0.065 (0.106)
<i>INCOME3</i>	-0.881** (0.380)	-0.220** (0.093)	0.295 (0.421)	0.072 (0.103)
<i>DUMMYINC</i>	-0.276 (0.310)	-0.069 (0.078)	-0.251 (0.377)	-0.061 (0.092)
<i>URB1</i>	0.160 (0.270)	0.040 (0.067)	0.182 (0.271)	0.044 (0.066)
<i>URB2</i>	-0.136 (0.270)	-0.034 (0.067)	-0.164 (0.255)	-0.040 (0.062)
<i>HHSIZE</i>	-0.068 (0.081)	-0.017 (0.020)	-0.945 (0.102)	-0.023 (0.025)
<i>CHLDLT6</i>	0.022 (0.432)	0.006 (0.108)	0.797** (0.392)	0.194** (0.094)
<i>FRMBK</i>	0.273 (0.211)	0.068 (0.052)	0.146 (0.215)	0.036 (0.052)
<i>BEEFMEALS</i>	0.125 (0.203)	0.031 (0.051)	0.002 (0.218)	0.001 (0.053)
<i>WARE</i>	-0.027 (0.232)	-0.007 (0.058)	-0.198 (0.257)	-0.048 (0.063)
<i>BIGBOX</i>	-0.356 (0.227)	-0.089 (0.056)	-0.330 (0.223)	-0.080 (0.054)
<i>GOURM</i>	0.357 (0.263)	0.089 (0.065)	0.179 (0.289)	0.044 (0.070)
<i>BUTCHER</i>	-0.619** (0.288)	-0.155** (0.071)	0.662* (0.345)	0.161** (0.083)
<i>FMMKT</i>	-0.465 (0.417)	-0.116 (0.103)	0.350 (0.446)	0.085 (0.108)

Table 8. Continued

Variable	Steak Probit (N=264)		Ground Beef Probit (N=245)	
	Estimated Coefficient	Marginal Effects	Estimated Coefficient	Marginal Effects
<i>FARMER</i>	0.055 (0.452)	0.014 (0.113)	0.088 (0.559)	0.022 (0.136)
<i>LEAN</i>	-0.074 (0.161)	-0.018 (0.040)	-0.021 (0.177)	-0.005 (0.043)
<i>FRESH</i>	-0.419 (0.313)	-0.105 (0.077)	0.885** (0.421)	0.216** (0.101)
<i>EASE</i>	-0.117 (0.139)	-0.029 (0.035)	0.024 (0.151)	0.006 (0.037)
<i>TEND/TEXT</i>	-0.478* (0.278)	-0.119* (0.069)	0.038 (0.173)	0.009 (0.042)
<i>JUICY</i>	0.321 (0.244)	0.080 (0.061)	0.058 (0.187)	0.014 (0.046)
<i>FLAV</i>	0.541* (0.311)	0.135* (0.076)	0.132 (0.304)	0.032 (0.074)
<i>COLOR</i>	-0.082 (0.192)	-0.020 (0.048)	-0.230 (0.205)	-0.056 (0.049)
<i>PRICE</i>	-0.412*** (0.161)	-0.103*** (0.039)	-0.164 (0.181)	-0.040 (0.044)
<i>NATUR</i>	0.089 (0.158)	0.022 (0.039)	0.384** (0.181)	0.094** (0.043)
<i>GRASS</i>	-0.050 (0.203)	-0.012 (0.051)	0.147 (0.211)	0.036 (0.051)
<i>GRAIN</i>	0.512*** (0.208)	0.128*** (0.052)	0.109 (0.208)	0.027 (0.051)
<i>HUMANE</i>	0.255 (0.159)	0.064 (0.039)	0.229 (0.174)	0.056 (0.042)
<i>SAFE</i>	-0.076 (0.165)	-0.019 (0.041)	0.410** (0.182)	0.100** (0.044)
LLR Test (33df)	115.70***		86.360***	
% Correctly Classified	78.41%		80.41%	
Pseudo R ²	0.346		0.339	

^a Denotes ***significant at $\alpha=0.01$, **significant at $\alpha=0.05$, *significant at $\alpha=0.10$.

Table 9. Estimated WTP and Premiums from Probit Models

	Steak	Ground Beef
N	264	245
WTP	\$14.28 (0.123)	\$5.03 (0.0435)
Premium	\$5.03 (0.123)	\$1.67 (0.0435)
T-test (H_0 : Premium=0) ^a	40.74***	38.39***
Percent Premium	54.39%	49.68%

^a Test conducted at the 95 percent confidence level with 263 df (Steak) and 244 df (Ground beef) respectively.

Table 10. Estimated Multivariate Probit Model for Outlet Choices ^a

Variable	Estimated Coefficients (N=209)			
	<i>GOURM</i> Coefficient	<i>BUTCHER</i> Coefficient	<i>FARMM</i> Coefficient	<i>FARMER</i> Coefficient
<i>INTERCEPT</i>	-0.719 (0.893)	-0.342 (0.818)	0.005 (0.781)	-0.134 (0.808)
<i>AGE</i>	-0.004 (0.006)	0.004 (0.006)	-0.005 (0.006)	-0.0003 (0.006)
<i>FEMALE</i>	-0.093 (0.201)	-0.032 (0.216)	-0.292 (0.193)	-0.218 (0.210)
<i>COLLEGE</i>	0.362* (0.211)	0.035 (0.212)	-0.049 (0.201)	0.122 (0.205)
<i>INCOME1</i>	0.279 (0.402)	0.521 (0.342)	0.495* (0.302)	0.352 (0.311)
<i>INCOME2</i>	0.288 (0.372)	-0.241 (0.366)	-0.305 (0.343)	-0.251 (0.332)
<i>INCOME3</i>	0.211 (0.427)	-1.079** (0.552)	-0.505 (0.410)	-0.077 (0.406)
<i>DUMMYINC</i>	-0.273 (0.354)	0.087 (0.317)	-0.026 (0.295)	-0.001 (0.287)
<i>URB1</i>	0.487* (0.260)	-0.079 (0.251)	-0.124 (0.235)	0.125 (0.247)
<i>URB2</i>	0.234 (0.234)	-0.008 (0.249)	0.048 (0.229)	0.267 (0.250)
<i>HHSIZE</i>	-0.102 (0.083)	0.026 (0.076)	-0.058 (0.072)	-0.033 (0.076)
<i>PGOURM</i>	1.025*** (0.205)	----- -----	----- -----	----- -----
<i>PBUTCHER</i>	----- -----	1.498*** (0.363)	----- -----	----- -----
<i>PFARMM</i>	----- -----	----- -----	1.107*** (0.235)	----- -----
<i>PFARMER</i>	----- -----	----- -----	----- -----	3.650*** (0.417)
<i>MEATSTK</i>	-0.132 (0.190)	-0.096 (0.183)	-0.063 (0.175)	0.019 (0.183)
<i>GRASS</i>	0.240* (0.144)	-0.081 (0.143)	0.179 (0.133)	0.155 (0.155)
<i>GRAIN</i>	0.067 (0.133)	0.384** (0.160)	0.059 (0.136)	0.162 (0.169)
<i>PRICE</i>	-0.269** (0.121)	-0.019 (0.131)	-0.014 (0.111)	-0.081 (0.126)
<i>HUMANE</i>	-0.007 (0.202)	-0.159 (0.186)	-0.214 (0.173)	-0.204 (0.167)

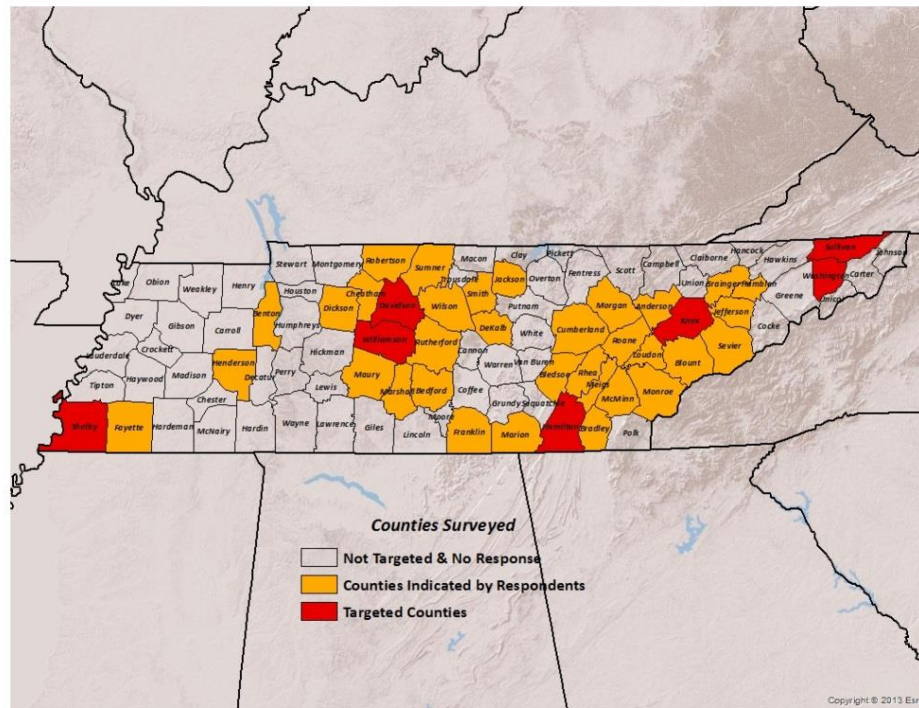
Table 10. Continued

Variable	Estimated Coefficients (N=209)			
	<i>GOURM</i> Coefficient	<i>BUTCHER</i> Coefficient	<i>FARMM</i> Coefficient	<i>FARMER</i> Coefficient
<i>ENVIRO</i>	0.203 (0.155)	-0.110 (0.162)	0.233* (0.134)	0.067 (0.149)
ρ_{21}	0.731*** (0.072)			
ρ_{31}	0.801*** (0.075)			
ρ_{41}	0.691*** (0.109)			
ρ_{32}	0.893*** (0.047)			
ρ_{42}	0.880*** (0.051)			
ρ_{43}	0.837*** (0.053)			
LLR Test	945.554***			

^a Denotes ***significant at $\alpha=0.01$, **significant at $\alpha=0.05$, *significant at $\alpha=0.10$.



Figure 1. Counties Targeted for Survey



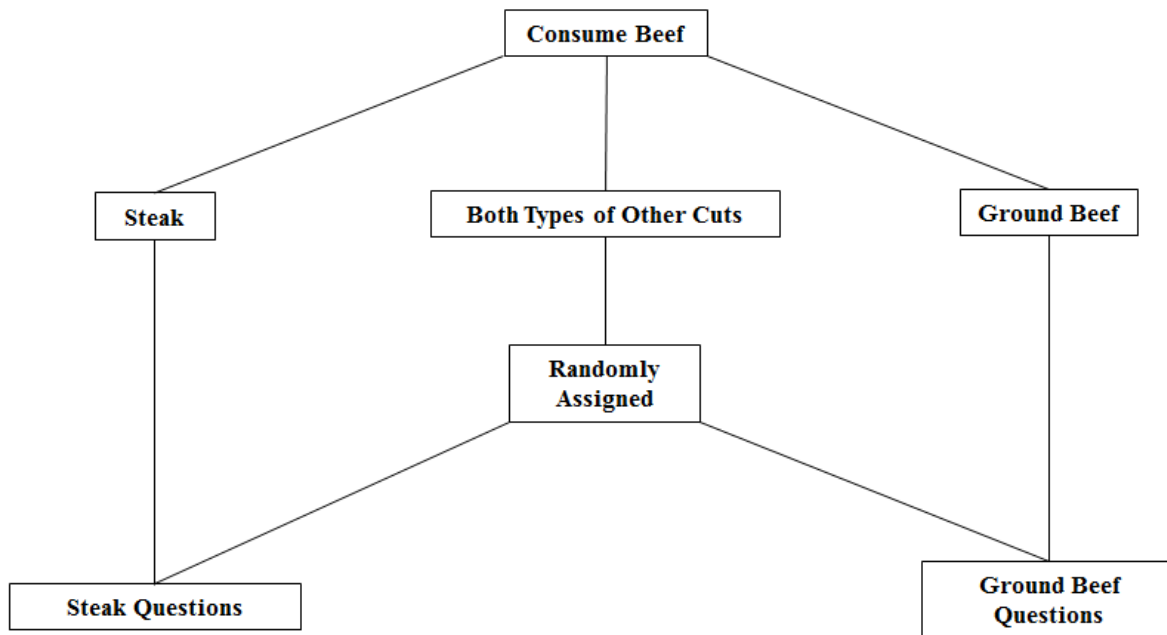


Figure 3. Assignment of Respondents to Steak or Ground Beef Questions

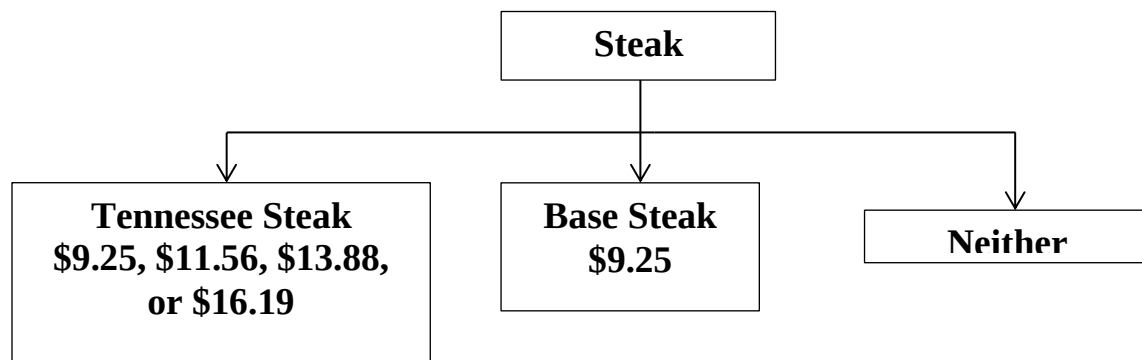


Figure 4. Choice Sets for Tennessee Steak

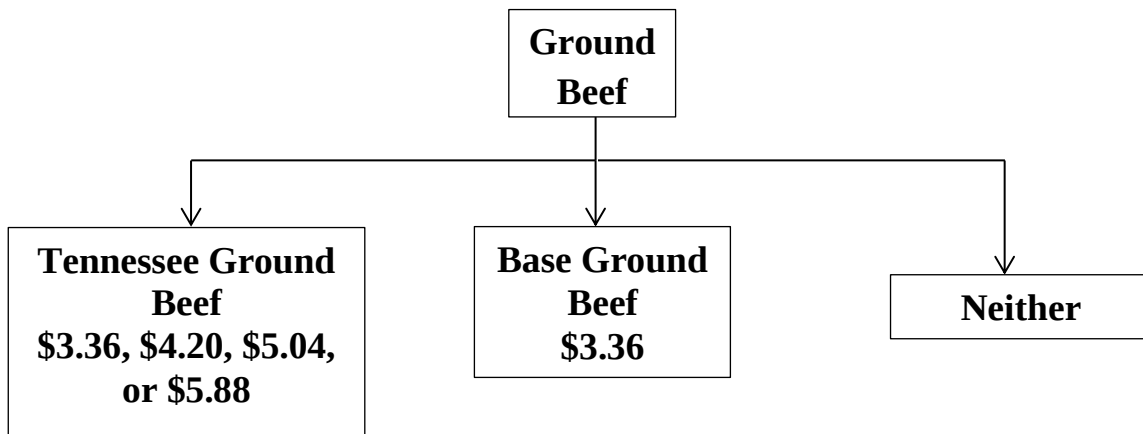


Figure 5. Choice Sets for Tennessee Ground Beef

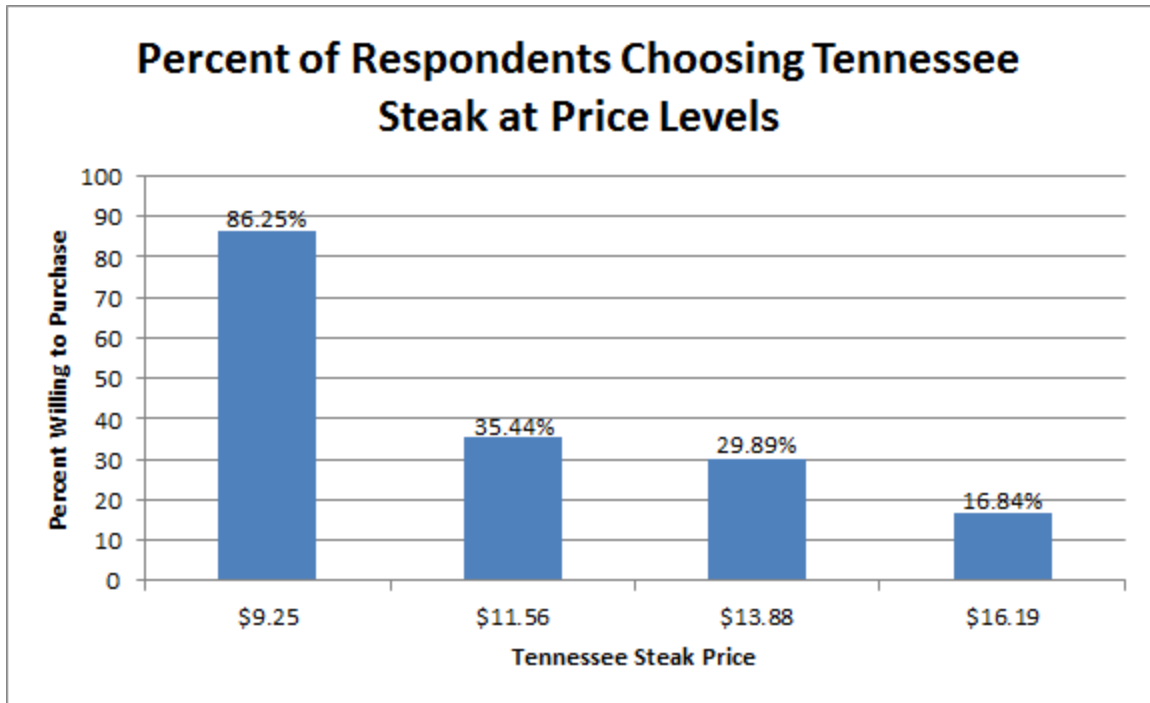


Figure 6. Percent of Respondents Choosing Tennessee Steak at Price Levels

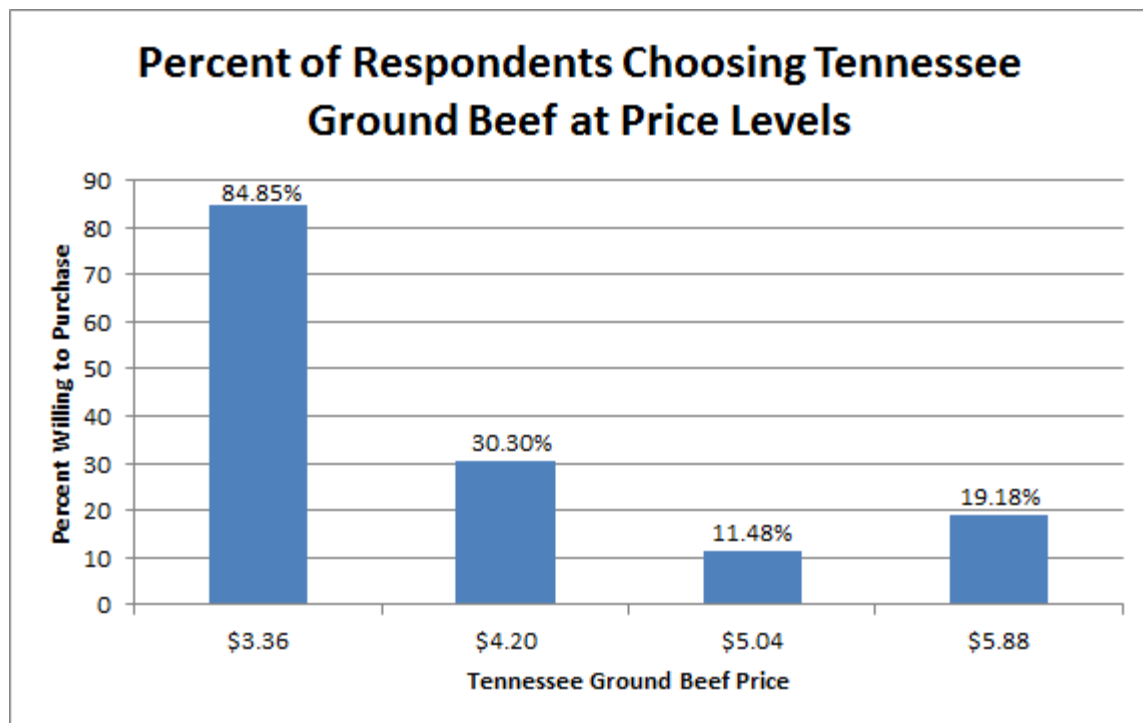


Figure 7. Percent of Respondents Choosing Tennessee Ground Beef at Price Levels

APPENDIX B: Survey Instrument

Telephone Survey for TENNESSEE BEEF

<Q1>

Beef is the term for meat from cattle. Beef is often eaten as steak, roast, or ground beef. Do you or any other members of your household eat beef?

- 1 Yes
- 0 No
- 8 Don't know / refused

IF (Q1 = 1) SKIPTO Q25

IF (Q1 = 8) SKIPTO Q25

<Q1health>

Can you tell me whether any of the following reasons influences you household's consumption of beef?

Health conditions (for example, cholesterol or food allergies)

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1taste>

[Can you tell whether this influences you household's consumption of beef?]

Beef's taste or texture

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1cost>

[Can you tell whether this influences you household's consumption of beef?]

The cost of beef

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1vege>

[Can you tell me whether this influences you household's consumption of beef?]

Are you vegetarian?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1relig>

[Can you tell me whether this influences you household's consumption of beef?]

Your religion?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1safety>

[Can you tell me whether this influences you household's consumption of beef?]

Food safety concerns?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1envir>

[Can you tell me whether this influences you household's consumption of beef?]

Concern about the effects of beef production on the environment?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q1other>

[Can you tell me whether this influences you household's consumption of beef?]

Any other reason?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q25>

If your household has three meals a day, that amounts to 21 meals per week. In a typical week, how many MEALS does your household prepare AT HOME? Stop me when I get to the right number.

- 1 1 meal per week
- 2 2 to 4 meals per week
- 3 5 to 7 meals per week
- 4 8 to 10 meals per week
- 5 11 to 13 meals per week
- 6 14 to 16 meals per week
- 7 17 to 19 meals per week
- 8 20 or more meals per week
- 9 Don't know / refused

NOTE1: 8 is a REAL ANSWER !!!

NOTE2: "Meals" mean events (e.g., a supper), not the number of meals X the number of persons eating the meal

NOTE3: Take out doesn't count. "Brown bag" lunches do count.

IF (Q1=0) SKIPTO Q21

<Q2>

At how many of those meals is beef served?

Stop me when I get to the right number.

- 1 None
- 2 1 meal per week
- 3 2 or 3 meals per week
- 4 4 or 5 meals per week
- 5 6 or 7 meals per week
- 6 8 or 9 meals per week
- 7 10 or more meals per week
- 8 Don't know

NOTE: "Meals" mean an event (e.g., a supper), not the number of meals X the number of persons eating the meal

IF (Q2=1 | Q2=8) SKIPTO Q21

<Q3groc>

In the past year, have you purchased beef to eat at home from any of these types of vendors?

A Grocery Store?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

NOTE1: WALMARTS and FRESH MARKETS ARE NOT GROCERY STORES

NOTE2: "Purchased beef" includes frozen burgers or meatballs; excludes canned products (e.g., hash, soup) and excludes prepared dinners (e.g., Lean Cuisine or Hungry Man)

<Q3Wareh>

[In the past year, have you purchased beef to eat at home from...]

A Warehouse store (e.g., Sam's or Costco)?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q3BigBox>

[In the past year, have you purchased beef to eat at home from...]

A "Big Box" store like Walmart or Target superstore?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q3Gourme>

[In the past year, have you purchased beef to eat at home from...]

A Gourmet or organic market, like a Fresh Market or Whole Foods?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

NOTE: This category includes Earth Fare, Trader Joe's and similar stores. It does not include a "meat only" store like "Mother Earth Meats in Maryville.

<Q3Mail>

[In the past year, have you purchased beef to eat at home from...]

An Internet or mail order service?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q3Butch>

[In the past year, have you purchased beef to eat at home from...]

A Butcher shop?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

NOTE: Includes meat/poultry only stores like Mother Earth Meats

<Q3FarmM>

[In the past year, have you purchased beef to eat at home from...]

A Farmer's Market?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

NOTE: Does not include directly from a farm/ farmer

<Q3Farmer>

[In the past year, have you purchased beef to eat at home from...]

Directly from a farmer, but not at a farmer's market?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q3Other>

[In the past year, have you purchased beef to eat at home from...]

Any other place?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

IF (Q3Other<>1) SKIPTO Q4

<Q3OName>

What would that place be?

<Q4>

Of the options just mentioned, at which do you USUALLY purchase beef for your household?

<Q5>

When you purchased beef directly from a farmer, did you buy individual cuts or packages of meat? Or did you buy in bulk as in a side, quarter, half or whole animal?

- 1 Individual cuts
- 2 Bulk beef
- 3 Both
- 8 Don't know
- 9 Refused

<Q6Steak>

In the past month, has your family consumed

Steak at home?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

NOTE: Includes: ribeye, porterhouse, sirloin, filet, filet mignon, t-bone, or strip steak; Excludes: "round" steak

<Q6Ground>

In the past month, has your family consumed
Ground beef at home?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q6Other>

In the past month, has your family consumed
Other beef cuts, like roast, ribs, or round steak at home?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

IF (Q6steak<>1 & Q6ground<>1 & Q6other <>1) SKIPTO Q21

IF (Q6steak = 1 & Q6ground <>1) SKIPTO Q7

IF (Q6steak <>1 & Q6ground = 1) SKIPTO Q11

IF (Q6steak = 1 & Q6ground = 1) ToShow = RANDNUM (1 3)

IF (ToShow = 1 | ToShow = 2) SKIPTO Q7

IF (ToShow = 3) SKIPTO Q11

<Q7>

In a typical week, how many meals does your household prepare at home where STEAK is
served? Please stop me when I get to the right number.

- 1 1 meal or less per week
- 2 2 or 3 meals per week
- 3 4 or 5 meals per week
- 4 6 or 7 meals per week
- 5 8 or 9 meals per week
- 6 10 or more meals per week
- 8 Don't know

Note: "Meals" mean an event (e.g., a supper), not the number of meals X the number of persons
eating the meal

Note: Takeout food is excluded.

<Q8Lean>

There are several factors that you might consider when you purchase a STEAK TO COOK AT
HOME. Please tell me how important each of these 8 factors is.

A steak's leanness

Would you say it is

- 1 Not important
- 2 Somewhat important or
- 3 Very important
- 8 Don't know / no opinion

<Q8Fresh>

[There are several factors that you might consider when you purchase a STEAK TO COOK AT HOME. To you, how important is ...]

A steak's freshness

Would you say it is

- 1 Not important
- 2 Somewhat important or
- 3 Very important
- 8 Don't know / no opinion

<Q8Ease>

[There are several factors that you might consider when you purchase a STEAK TO COOK AT HOME. To you, how important is ...]

Ease of preparation

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q8Tender>

[There are several factors that you might consider when you purchase a STEAK TO PREPARE AT HOME. To you, how important is ...]

A steak's tenderness

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q8Juicy>

[There are several factors that you might consider when you purchase a STEAK TO COOK AT HOME. To you, how important is ...]

A steak's juiciness

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q8Flavor>

[There are several factors that you might consider when you purchase a STEAK TO COOK AT HOME. To you, how important is ...]

A steak's flavor

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q8Color>

[There are several factors that you might consider when you purchase a STEAK TO COOK AT HOME. To you, how important is ...]

The color of the meat

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q8Price>

[There are several factors that you might consider when you purchase a STEAK TO COOK AT HOME. To you, how important is ...]

The price per pound

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q9Natur>

There are some characteristics of steak that might be IDENTIFIED ON THE PRODUCT LABEL. Please tell me whether these characteristics are not important, somewhat important or very important to you.

The label says that the animal from which the steak comes is NATURALLY RAISED, with no antibiotics or hormones used in raising the animal.

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q9Grass>

[There are some characteristics of steak that might be PRINTED ON THE PRODUCT LABEL. Please tell me whether this characteristic is not important, somewhat important or very important.]

The steak's from an animal that has been GRASS FED, that is, the animal eats grass, but no grain.

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q9Grain>

[There are some characteristics of steak that might be IDENTIFIED ON THE PRODUCT LABEL. Please tell me whether this characteristic is not important, somewhat important or very important.]

The steak's from an animal that has been GRAIN FED, that is, the animal eats mostly grain.

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q9Local>

[There are some characteristics of steak that might be IDENTIFIED ON THE PRODUCT LABEL. Please tell me whether this characteristic is not important, somewhat important or very important.]

The animal was LOCALLY PRODUCED

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q9Humane>

[There are some characteristics of steak that might be IDENTIFIED ON THE PRODUCT LABEL. Please tell me whether this characteristic is not important, somewhat important or very important.]

The animal was TREATED HUMANELY

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q10Intro>

TENNESSEE BEEF means the animals must have been born, raised, and finished within the borders of the State of Tennessee. I'm now going to ask you to choose between TWO Choice-grade, 12-ounce, Boneless Ribeye Steaks. Before making your decision, consider your household's budget for food, keeping in mind if you spend more on steak, you'll have less money to spend on other food products. Both steaks are the same weight and have IDENTICAL freshness, cut, color, marbling, meat texture, fat, tenderness, juiciness, and flavor. Steak 1 is \$9.25 per pound. Steak 2 is produced in Tennessee, labeled as Tennessee Beef and is ____ PER POUND.

<Q10>

Which steak would you choose,

- 1 Steak 1 at \$9.25 or
- 2 Steak 2, the TENNESSEE beef at [PRICE]
- 3 Neither
- 8 Don't know / refused

IF (Q10 = 1) SKIPTO Q20

IF (Q10 = 2) SKIPTO Q15

IF (Q10 = 3) SKIPTO Q10Neith

IF (Q10 = 8) SKIPTO Q20

<Q10Neith>

Why would you select neither of the two steak options?

<Q11>

In a typical week, how many meals does your household prepare at home where GROUND BEEF is served? Please stop me when I get to the right number.

- 1 1 meal or less per week
- 2 2 or 3 meals per week
- 3 4 or 5 meals per week
- 4 6 or 7 meals per week
- 5 8 or 9 meals per week
- 6 10 or more meals per week
- 8 Don't know

NOTE: "Meals" mean an event (e.g., a supper), not the number of meals X the number of persons eating the meal

NOTE: Ground beef could be prepared in any manner, but excludes frozen dinners and canned products. Frozen hamburger patties and meatballs do count.

NOTE: Delivery or take out is excluded. "Brown bag" lunches are included.

<Q12Lean>

There are several factors that you might consider when you purchase GROUND BEEF TO COOK AT HOME. I'll list 8 factors. Please tell me how important each is to you.

The ground beef's leanness. Would you say it is

- 1 Not important
- 2 Somewhat important
- 3 Very important?
- 8 Don't know / no opinion

<Q12Fresh>

[There are several factors that you might consider when you purchase GROUND BEEF TO COOK AT HOME. To you, how important is...]

The ground beef's freshness. Would you say it is

- 1 Not important
- 2 Somewhat important or
- 3 Very important?
- 8 Don't know / no opinion

<Q12Ease>

[There are several factors that you might consider when you purchase GROUND BEEF TO PREPARE AT HOME. To you, how important is...]

Ease of preparation

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q12Text>

[There are several factors that you might consider when you purchase GROUND BEEF TO PREPARE AT HOME. To you, how important is...]

The ground beef's texture

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q12Juicy>

[There are several factors that you might consider when you purchase GROUND BEEF TO PREPARE AT HOME. To you, how important is...]

The ground beef's juiciness

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q12Flav>

[There are several factors that you might consider when you purchase GROUND BEEF TO PREPARE AT HOME. To you, how important is...]

The Ground beef's flavor

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q12Color>

[There are several factors that you might consider when you purchase GROUND BEEF TO PREPARE AT HOME. To you, how important is...]

The color of the meat

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q12Price>

[There are several factors that you might consider when you purchase GROUND BEEF TO PREPARE AT HOME. To you, how important is...]

The price per pound

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

<Q13Natur>

There are some characteristics of GROUND BEEF that might be IDENTIFIED ON THE PRODUCT LABEL. Please tell me whether these characteristics are not important, somewhat important or very important to you.

The label notes that the animal from which the ground beef comes is

NATURALLY RAISED, with no antibiotics or hormones used in raising the animal.

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q13Grass>

[There are some characteristics of GROUND BEEF that might be IDENTIFIED ON THE PRODUCT LABEL. To you, is this characteristic is not important, somewhat important or very important.]

The GROUND BEEF is from an animal that is GRASS FED, that is, the animal eats grass, but no grain.

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q13Grain>

[There are some attributes of GROUND BEEF that might be IDENTIFIED ON THE PRODUCT LABEL. To you, is this characteristic is not important, somewhat important or very important.]

The ground beef is from an animal that has been GRAIN FED, that is, the animal eats mostly grain.

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q13Local>

[There are some attributes of GROUND BEEF that might be IDENTIFIED ON THE PRODUCT LABEL. To you, is this characteristic is not important, somewhat important or very important.]

The ground beef is from an animal that was LOCALLY PRODUCED

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q13Hum>

[There are some attributes of GROUND BEEF that might be IDENTIFIED ON THE PRODUCT LABEL. To you, is this characteristic is not important, somewhat important or very important.]

The ground beef is from an animal that was TREATED HUMANELY

- 1 Not important
- 2 Somewhat important
- 3 Very important
- 8 Don't know / no opinion

NOTE: Respondent must assume labeling is 100% accurate

<Q14Intro>

TENNESSEE BEEF means the animals must be born, raised, and finished within the borders of the State of Tennessee. I'm now going to ask you to choose between TWO types of GROUND BEEF. Before making your decision, consider your household's budget for food keeping in mind if you spend more on GROUND BEEF, you'll have less money to spend on other food products. Both of the GROUND BEEF options are 85% meat, 15% fat. They are IDENTICAL in leanness, freshness, color, meat texture, juiciness, and flavor. Ground beef 1 is \$3.35 per pound. Ground beef 2 is produced in Tennessee, labeled as Tennessee Beef and is ____ PER POUND.

<Q14>

Which ground beef would you choose,

- 1 Ground beef 1 at \$3.36 per pound or
- 2 Ground beef 2, the TENNESSEE beef at [PRICE]
- 3 Neither
- 8 Don't know

IF (Q14 = 1) SKIPTO Q20

IF (Q14 = 2) SKIPTO Q15

IF (Q14 = 3) SKIPTO Q14Neith

IF (Q14 = 8) SKIPTO Q20

<Q14Neith>

Why would you select neither of the two ground beef options?

SKIPTO Q21

<Q15>

There are a number of reasons you might choose Tennessee beef. Please tell me if any of these reasons had no influence, some influence, or a great deal of influence on your choice.

<Q15A>

Please tell me how much this reason influenced your choice of Tennessee beef.

Tennessee beef is likely higher quality than out-of-state beef.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q15B>

Please tell me how much this reason influenced your choice of Tennessee beef.

I know more about where Tennessee beef comes from, so I feel it is safer.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q15C>

Please tell me how much this reason influenced your choice of Tennessee beef.

Purchasing Tennessee beef makes me feel like I am supporting the state's economy.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q15D>

Please tell me how much this reason influenced your choice of Tennessee beef.

Purchasing Tennessee beef makes me feel like I am supporting farmers in my state.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q15E>

Please tell me how much this reason influenced your choice of Tennessee beef.

Tennessee beef has to be transported shorter distances, so it is better for the environment.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q15F>

Please tell me how much this reason influenced your choice of Tennessee beef.

Tennessee beef is likely fresher than out-of-state beef.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q16>

I'm going to read some other considerations you might have had when deciding whether to purchase Tennessee Beef.

<Q16A>

Please tell me whether the reason had no influence, some influence or great influence on your choice.

Knowing the farmer who produced the beef.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q16B>

Please tell me whether the reason had no influence, some influence or great influence on your choice.

Knowing how the beef was produced.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q16C>

Please tell me whether the reason had no influence, some influence or great influence on your choice.

The experience of purchasing directly from the farmer.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q16D>

Please tell me whether the reason had no influence, some influence or great influence on your choice.

Being able to visit the farm where the beef was produced.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q16E>

Please tell me whether the reason had no influence, some influence or great influence on your choice.

The price of Tennessee beef compared with other beef.

- 1 No influence
- 2 Some influence
- 3 Great influence
- 8 Don't know/ No opinion

<Q15G>

Are there other reasons you may choose Tennessee beef?

- 1 Yes
- 0 No
- 8 Don't know/ refused

IF (Q15F = 1) SHOW "What are those reasons?"

<Q17Groc>

Please tell me whether you would likely shop for Tennessee Beef at these types of outlets.

Would you shop for Tennessee Beef at a grocery store

- 1 Yes
- 0 No
- 8 Don't know

<Q17BigBx>

Would you shop for Tennessee Beef at a
Big Box store, like a Walmart or Target Superstore?

- 1 Yes
- 0 No
- 8 Don't know

<Q17WareH>

Would you shop for Tennessee Beef at a
Warehouse store? [like a Sam's or Costco]

- 1 Yes
- 0 No
- 8 Don't know

<Q17Gourm>

Would you shop for Tennessee Beef at a
Gourmet or organic market? [like a Fresh Market or Whole Foods]

- 1 Yes
- 0 No
- 8 Don't know

<Q17Butch>

Would you shop for Tennessee Beef at a
Butcher shops?

- 1 Yes
- 0 No
- 8 Don't know

<Q17Inter>

Would you shop for Tennessee Beef through
The internet or catalog order?

- 1 Yes
- 0 No
- 8 Don't know

<Q17FarmM>

Would you shop for Tennessee Beef at
A Farmer's Market?

- 1 Yes
- 0 No
- 8 Don't know

<Q17Farm>

Would you shop for Tennessee Beef

Directly from a farmer? [but not at a farmers market]

- 1 Yes
- 0 No
- 8 Don't know

NOTE: This would be by contacting the farmer directly or visiting an on-farm market.

<Q17Other>

Would you shop for Tennessee Beef

At any other type of outlet?

- 1 Yes
- 0 No
- 8 Don't know

IF (Q17Other=1) SHOW "Where would that be?" 13 10 20

<Q18>

What type of packaging would you prefer for your Tennessee Beef?

- 1 Vacuum packaged
- 2 Shrink wrapped
- 3 Butcher paper wrapped, or
- 4 No preference?
- 8 Don't know

<Q19Fresh>

Beef is sold to consumers at different temperatures. Would you purchase TENNESSEE BEEF it was...

Fresh (never frozen)?

- 1 Yes
- 0 No
- 8 Don't know

<Q19Froz>

Would you purchase Tennessee beef it was...

Frozen (fresh frozen)?

- 1 Yes
- 0 No
- 8 Don't know

NOTE: Fresh frozen means there's been no lag between butchering and freezing.

<Q19Thaw>

Would you purchase Tennessee beef it was...
Thawed from a fresh frozen product?

- 1 Yes
- 0 No
- 8 Don't know

NOTE: "Thawed..." means beef is at refrigerator temperature when sold to the consumer, but was previously fresh frozen.

<Q19Cook>

Would you purchase Tennessee beef it was...
Pre-cooked and ready to eat?

- 1 Yes
- 0 No
- 8 Don't know

NOTE: "Thawed..." means beef is at refrigerator temperature when sold to the consumer, but was previously fresh frozen.

<Q20>

There are a number of possible reasons you DIDN'T select the TENNESSEE BEEF product. Please tell me whether these reasons are true of you.

<Q20A>

[There are a number of possible reasons you DIDN'T select the TENNESSEE BEEF product. Please tell me whether these reasons are true of you.] Would you say you

Trust beef products from major beef producing states more than locally produced beef?

- 1 Yes
- 0 No
- 8 Don't know / no opinion

<Q20B>

Would you say you

Don't believe Tennessee beef is better quality?

- 1 Yes
- 0 No
- 8 Don't know / no opinion

<Q20C>

Would you say you

Prefer corn fed beef over beef that's grazed.

- 1 Yes
- 0 No
- 8 Don't know / no opinion

<Q20D>

Would you say you

Can afford to pay a higher price for Tennessee Beef, but aren't willing to pay more?

- 1 Yes
- 0 No
- 8 Don't know / no opinion / refused

<Q20E>

Would you say you

Can't afford to pay more for Tennessee Beef?

- 1 Yes
- 0 No
- 8 Don't know / no opinion / refused

<Q21>

In this last section, I'll ask about you and your opinions. I'll read two factors. Please tell me, in your opinion, which is more important, or whether they're equally important.

<Q21Env>

Which is more important, in your opinion?

Keeping food prices low or reducing the environmental impact of food production?

- 1 Keeping food prices low
- 2 Second factor
- 3 equally important
- 8 Don't know / no opinion

<Q21Hum>

Which is more important, in your opinion?

Keeping food prices low or ensuring humane treatment of animals used in food production?

- 1 Keeping food prices low
- 2 Second factor
- 3 equally important
- 8 Don't know / no opinion

<Q21Inc>

Which is more important, in your opinion?

Keeping food prices low or ensuring that farmers receive a fair income?

- 1 Keeping food prices low
- 2 Second factor
- 3 equally important
- 8 Don't know / no opinion

<Q21Safe>

Which is more important, in your opinion?

Keeping food prices low or providing safe, healthy, and nutritious food choices?

- 1 Keeping food prices low
- 2 Second factor
- 3 equally important
- 8 Don't know / no opinion

<Q21Local>

Which is more important, in your opinion?

Keeping food prices low or supporting your local economy?

- 1 Keeping food prices low
- 2 Second factor
- 3 equally important
- 8 Don't know / no opinion

<DEMO1>

To conclude the interview, we have a few background questions to help us understand beef consumer choices. These responses are confidential.

[WHAT IS THE GENDER OF THE RESPONDENT?]

- 1 MALE
- 2 FEMALE
- 8 DON'T KNOW

<Q22>

What is your age, please?

[RECORD -98 IF DON'T KNOW]

[RECORD -99 IF REFUSED]

<Q23>

How many people are in your household?

[RECORD -98 IF DON'T KNOW]

[RECORD -99 IF REFUSED]

<Q24>

Are you the person primarily responsible for shopping for your household's food?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q26>

Were you raised on a farm or have you ever farmed?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q27>

What is the highest level of school that you have completed?

- 1 Less than high school
- 2 high school graduate/GED
- 3 some college, an associate's degree or technical school
- 4 college graduate (16 years)
- 5 post-graduate (≥ 17 years)
- 6 other
- 8 Don't know / refused

<Q28>

Is the area you live in a

- 1 Rural area
- 2 Small town
- 3 Suburb
- 4 Urban area
- 6 Other
- 8 Don't know / refused

<Q29>

What county do you live in?

1 Anderson	21 DeKalb	41 Hickman	61 Meigs	81 Stewart
2 Bedford	22 Dickson	42 Houston	62 Monroe	82 Sullivan
3 Benton	23 Dyer	43 Humphreys	63 Montgomery	83 Sumner
4 Bledsoe	24 Fayette	44 Jackson	64 Moore	84 Tipton
5 Blount	25 Fentress	45 Jefferson	65 Morgan	85 Trousdale
6 Bradley	26 Franklin	46 Johnson	66 Obion	86 Unicoi
7 Campbell	27 Gibson	47 Knox	67 Overton	87 Union
8 Cannon	28 Giles	48 Lake	68 Perry	88 Van Buren
9 Carroll	29 Grainger	49 Lauderdale	69 Pickett	89 Warren
10 Carter	30 Greene	50 Lawrence	70 Polk	90 Washington
11 Cheatham	31 Grundy	51 Lewis	71 Putnam	91 Wayne
12 Chester	32 Hamblen	52 Lincoln	72 Rhea	92 Weakley
13 Claiborne	33 Hamilton	53 Loudon	73 Roane	93 White
14 Clay	34 Hancock	54 McMinn	74 Robertson	94 Williamson
15 Cocke	35 Hardeman	55 McNairy	75 Rutherford	95 Wilson
16 Coffee	36 Hardin	56 Macon	76 Scott	97 Other
17 Crockett	37 Hawkins	57 Madison	77 Sequatchie	-98 Don't know
18 Cumberland	38 Haywood	58 Marion	78 Sevier	-99 Refused
19 Davidson	39 Henderson	59 Marshall	79 Shelby	
20 Decatur	40 Henry	60 Maury	80 Smith	

<Q30>

Do you have any household members under the age of 18?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Q31>

Do you have any household members under the age of 6?

- 1 Yes
- 0 No
- 8 Don't know
- 9 Refused

<Qphone>

Have I reached you on a cell phone or home phone?

- 1 Cell
- 2 Home (includes landline and voice over internet)
- 8 Don't know / refused

<QphoneH>

Do you have a home phone also?

- 1 Yes
- 0 No
- 8 Don't know / refused

NOTE: "home phone" includes landline and voice over internet (VOI)

<QphoneC>

Do you have a cell phone also?

- 1 Yes
- 0 No
- 8 Don't know / refused

NOTE: A cell phone, where the contract is in their employer's name does not count

<DEMO9>

I am going to read a list of income categories for household income from all sources before taxes for the year 2012. Please stop me when I get to yours.

- 1 less than \$20,000
- 2 \$20,000 to \$29,999
- 3 \$30,000 to \$39,999
- 4 \$40,000 to \$49,999
- 5 \$50,000 to \$59,999
- 6 \$60,000 to \$69,999
- 7 \$70,000 to \$79,999
- 8 \$80,000 to \$89,999
- 9 \$90,000 to \$99,999
- 10 \$100,000 to \$109,999
- 11 \$110,000 to \$119,999
- 12 \$120,000 or more
- 99 Don't know / refused

END OF SURVEY

VITA

Leah Moore Dobbs was born Leah Nicole Moore in Dayton, Ohio in 1990. After moving to Tennessee, Leah graduated from Oakland High School in Murfreesboro, Tennessee in 2009. Leah attended the University of Tennessee, Knoxville and graduated with a Bachelor of Science degree in Environmental Studies with a concentration in economics in May 2013. During her undergraduate education, Leah held a number of internships, including working in marketing at the University of Tennessee Press, analyzing data for the University of Tennessee Sustainability Office, interning for the East Tennessee Clean Fuels Coalition, and science writing for the Oak Ridge Leadership Computing Facility at Oak Ridge National Laboratory. After marrying Eric Dobbs in July 2013, Leah Moore Dobbs enrolled in graduate school in August 2013 to study Agricultural and Natural Resource Economics at the University of Tennessee, Knoxville and began working as a graduate research assistant under Dr. Kim Jensen.