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The Marketing of Meat Goats in the US: What, Where, and When?¹

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Abstract

Using nationwide survey data, this study investigates US meat goat producers' selection of marketing channels, factors affecting selections, and targeting of ethnic holiday markets. Results show the two most commonly cited marketing channels are *direct sales to consumers* and *live auctions*. Only a relatively small portion of the population uses other marketing channels. Ethnic holiday markets are targeted by 22% of the producers—Easter being the most popular choice. Multivariate probit results show that farm and farmer characteristics, types of animals sold, and regional variables impact marketing channel selection.

Keywords: marketing channels, meat goat

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¹ The views expressed here are not necessarily those of Economic Research Service or the U.S. Department of Agriculture.

Introduction

The United States meat goat industry has rapidly increased in size over the past couple of decades, from 415,196 head of meat and other goats on over 29,354 farms in 1987² (excluding wool and milk goats) to 2,053,228 head of goats on more than 101,910 farms in 2012.³ Although the industry has expanded, it continues to lack a well-structured marketing system (Glimp 1995; Onyango et al. 2015). As such, meat goat producers need information on how to most effectively market their products. Jones and Raper (2012) discuss the need for producers to have answers to the what, where, and when questions for effective product marketing. A number of previous studies have addressed meat goat marketing dynamics and price seasonality in the US and around the world (Aduku et al.; 1991; Pinkerton, Scarfe, and Pinkerton 1991; Degner and Lin 1993; Glimp 1995; Frasor 2004; Larson and Thompson 2005; Pandit and Dhaka 2005; Jones, McCarter, and Cheney 2012; Jones and Raper 2012) and some other aspects of meat goat production (Gillespie, Nyaupane, and McMillin 2013; Onyango et al. 2015; Gillespie et al. 2016; Osti et al. 2016; Qushim, Gillespie, and McMillin 2016). However, we find no previous attempts to extensively analyze the “what, where, and when” questions of meat goat marketing. This study addresses these questions and will be useful in further enhancing the economic sustainability and competitiveness of the US meat goat industry.

The meat goat industry is unique in at least three dimensions of marketing as compared to the major US livestock industries, beef, pork, and poultry. First, a significant portion of US meat goat and goat meat demand is for live goats that consumers slaughter and process themselves. In these cases, consumers generally go directly to the farmers to purchase goats (Stanton 2006). Second, meat goat demand is seasonal, as it is more heavily consumed during certain ethnic holidays (Coffey 2006). Table 1 summarizes the type and quality of goat meat demanded by consumers during various ethnic holidays. Third, most US meat goat production occurs in Texas and in the Southeast whereas the major US meat goat slaughter and processing facilities and goat meat consuming population are located on the west and east coasts (Pinkerton, Scarfe, and Pinkerton 1991).

Being a relatively new industry with unique marketing characteristics, the US meat goat industry needs information on current marketing practices so that it can determine strategies for enhanced industry competitiveness. A number of previous studies have addressed producer selection of marketing channels for various agricultural enterprises (e.g., Schmitz, Moss, and Schmitz 2003; Gillespie, Basarir, and Schupp 2004; Park 2009; Nyaupane and Gillespie 2010; Kim, Curtis, and Yeager 2014), but we are aware of none that have addressed marketing channels in the US meat goat industry. The objectives of this study are to determine: (1) the major meat goat marketing channels in the US and the factors affecting producer selection among marketing channels and (2) the interrelationship between the attributes of meat goats produced and the targeting of ethnic holidays for sales.

² USDA-APHIS 2005.

³ USDA-NASS Census of Agriculture 2012.

Table 1. Type and Quality of Goat Meat Demanded during Ethnic Holidays

Ethnic holidays	Date	Preference	Optimum Weight (lbs)
Western Roman Easter	March-April	Mild fed kids, 3 months or younger	30
Eastern Orthodox Easter	April-May	Mild fed kids, 3 months or younger	35
Mother's Day	May	Suckling kids or larger	60
Cinco de Mayo	May 5	Suckling kids	15-30
Ramadan	June-July	Male or female with all milk teeth, ≤12 months, whole or castrated	60
Id al Fitr	July-August	Male or female with all milk teeth, ≤12 months, whole or castrated	60
Navadurga, Dashain	October	Castrated male	60-120
Eid al-Adha	September-October	Yearlings	60-100
Muharramn	October-November	Male or female with all milk teeth, ≤12 months, whole or castrated	60
Diwali	October-November	Castrated male	60-120
Christmas and New Year	Dec.25 & Jan. 1	Milk fed kids	18-30
Caribbean holidays and Chinese market for goat		Young, smelly bucks, older animals of all sexes	60-80

Source. <http://sheepgoatmarketing.info/calendar.php>

The US Meat Goat Industry and Ethnic Demand

The US population increased significantly from 152.3 million in 1950, to 308.7 million in 2010, to 322.7 million in January, 2016; and immigration has been a primary contributor (Shrestha and Heisler 2011; US Census Bureau 2016). The foreign-born population residing in the US in 2015 was 14% and is projected to increase to 18% by 2065 (Cohn 2015). Hispanics and Asians comprised 18% and 6% respectively of the total in 2015, and are expected to rise to 24% and 14%, respectively, by 2065 (Cohn 2015). A significant increase in immigrants from goat meat consuming nations has increased the demand for meat goats in the US and demand will likely continue as the growth in the immigrant population continues (Solaiman 2007). The US foreign-born population increased from 9.7 million in 1960 to 31.1 million in 2000, and to 41.3 million in 2013 (Pew Research Center 2015). In 1966, 84% of the US immigrants were from Europe and Canada, with the percentage dropping to 14% by 2013. During that same period, immigrants from goat meat consuming areas such as Mexico, South and East Asia, and other Latin America countries increased from 6%, 4%, and 4% of total immigrants to 28%, 26%, and 24% of total immigrants, respectively (Pew Research Center 2015).

Although domestic meat goat production has increased considerably over the last few decades, the US continues to partially supply its demand by importing frozen goat meat from Australia and New Zealand (Stanton 2012). Goat meat imports increased from 1,749 metric tons in 1991 to 8462 metric tons in 2003; to 15,752 metric tons in 2011—equivalent to approximately 1,052,340 live goats (Stanton 2012). Since most consumers prefer fresh meat over frozen, there is significant potential for growth and development of domestic meat goat production (Knudson 2006). With the varying nature of consumer preferences and their willingness to pay (Knight et al. 2006; Ibrahim 2011), supplying the most preferred product to the market will not only guarantee consumer satisfaction but also provide meat goat producers an opportunity for greater economic return.

Meat Goat Marketing Channels

According to Stanton (2006), in a typical US meat goat supply chain, meat goats are first marketed to nearby live auction markets. Dealers purchase goats for sale to meat packers, wholesale businesses, or further sale via regional auctions. Meat packers then sell meat cuts or carcasses to retailers and wholesale businesses arrange for further processing of animals. This typical scenario is by no means universal for all farms and locations, as some producers market live goats directly to consumers and market goat meat, etc.

Considering the various marketing alternatives discussed by Stanton (2006), a thorough evaluation of the industry and direct communication with selected producers⁴, seven major meat goat marketing channels were identified for examination in this study: (a) dealers, brokers, or meat packers; (b) wholesale and retail businesses; (c) selling of goat meat (there are several options investigated in this study); (d) live auctions; (e) market pooling; (f) direct sale to consumers; and (g) cooperatives.

A typical meat goat marketing system involves producers selling goats via local auctions, from where livestock dealers purchase goats and deliver them to regional auctions and/or sell them directly to other distributing agents such as meat packers or wholesale businesses. These distributing agents sell the meat to retailers, which is eventually sold to consumers (Stanton 2006). Selling via live auction reduces marketing effort and thus transaction costs, with the additional benefit of timely and reliable payment, but producers have no control over price. As this option introduces substantial price risk, producers using this market outlet can reduce potential risk associated with auction markets via larger regional auctions and/or contacting several local auctions to better navigate the marketing scenarios (Jones, McCarter, and Cheney 2012).

Livestock dealers and brokers are similar as both may go directly to the farm to purchase goats, with the latter generally working on commission. Meat packers operate slaughterhouses and supply meat to wholesale and retail customers. If producers choose to bypass dealers, brokers, or meat packers, they can act as wholesalers or retail businesses themselves (Ziehl et al. 2006) and sell inspected meat directly to restaurants, retail meat shops, and individuals. Using this channel,

⁴Several meat goat producers around Baton Rouge, Louisiana, were contacted to review the draft questionnaire, and three of them agreed. We arranged one-to-one personal interviews with them and discussed the overall representativeness of questionnaire, including marketing outlets.

producers make all arrangements for slaughter, processing, and transport of meat to buyers. Challenges with this route are finding dependable inspected slaughter facilities and establishing legal, reliable methods of delivering meat to buyers. Furthermore, it requires one to solicit clients, to maintain good business relationships with them, arrange shipments, and periodically negotiate with new customers such as chefs. In addition to slaughtering and processing at a USDA or state-inspected facility, strict procedures have to be maintained in transporting (<40⁰F) and storing the meat (Stanton 2006). Although more effort is generally required in selling to wholesalers and retail businesses, higher prices generally result (Stanton 2006).

A viable option for relatively smaller sized farms is to pool animals where one or two producers act as market coordinators and animals are pooled together from multiple small-sized farms. This not only increases the negotiating power of producers but also facilitates the sales to volume buyers. Another option is to sell animals directly to consumers, either via ‘on-farm’ sales (local customers come to the farm and choose animals) or the ‘freezer trade,’ where goats are transported to slaughterhouses for slaughter and processing. Formal cooperatives can be another option for producers for marketing their animals to volume buyers. Establishment costs, maintenance of member loyalty, quality assurance, and associated commissions are major considerations when establishing a cooperative (Stanton 2006). In a broad perspective, producers may choose to either sell live goats off the farm via various outlets or be involved in processing, wholesaling, and retailing of goat meat to individual consumers, stores, and/or restaurants.

First, we examine to what extent producers use each of these marketing channels and the factors impacting producer use in each method. This is followed by an analysis of the types of goats sold throughout the year in accordance with the targeting of ethnic holidays.

Data and Methods

A mail survey was sent to 1,600 US meat goat producers during July–August of 2012, utilizing Dillman, Smyth, and Christian’s (2009) Tailored Design Method. Producer names were collected online. Search phrases such as “*meat goat producers in Louisiana*”, “*meat goat association, LA*”, or “*meat goat farms, Louisiana*” were entered for each state resulting in 4-5 Google pages that were thoroughly assessed for web-links and listing of meat goat farms. Most producers listed were members of statewide meat goat associations, however, some did not belong to associations and had their own websites; and others were listed as meat goat producers on www.eatwild.com. The first round of mailing included a cover letter, a ten-page questionnaire, a complementary pen, and a postage-paid return envelope. After one week, a postcard reminder was sent to non-respondents. This was followed by a second cover letter, survey, and return envelope to non-respondents two weeks later. One week later, a final reminder (second postcard) was sent. After removing 190 producers who did not produce meat goats in 2011 and fifty-two non-deliverables, an adjusted response rate of 43% was received for a total of 584 completed responses. Several other studies have also used this data to analyze various aspects of meat goat production, for example Gillespie, Nyaupane, and McMillin (2013), Gillespie et al. (2016), Osti et al. (2016) etc.

To determine the marketing channels producers used, the following question was asked: “Which of the following marketing channels do you use to sell goats? (Check all that apply).” Possible choices included: (a) Dealers, brokers, or meat packers, (b) Wholesale and retail businesses, (c) I

sell goat meat, (d) Live auctions, (e) Market pooling, (f) Direct sale to consumers; and (g) Cooperatives. One question designed to identify farmers selling live goats, was followed with the following responses: “If you answered that you sell goat meat [(c)], through what outlets do you market the meat?,” with the following possible choices: (a) Farmers markets, (b) Direct to consumers, (c) Grocery stores, (d) Restaurants, and (e) Other. Some readers may initially find it difficult to distinguish between “Direct sales to consumers,” and “I sell goat meat”. It is noteworthy to mention that in the first question with marketing outlet “Direct sale to consumers,” producers sell the animals “on-farm”. In some cases, they may then deliver the sold animal to a slaughterhouse for the buyer. In the outlet “I sell goat meat,” producers act as processor, wholesaler, and retailer to slaughter animals in inspected slaughterhouses and to sell meat (following strict protocols) in various outlets such as farmers markets, direct to consumers, grocery stores, restaurants etc. (Stanton 2006; Ziehl 2006).

To meet the second objective, a follow-up question was asked: “Do you target your goat production for specific ethnic holiday markets?” with possible choices of “Yes” and “No.” Producers responding “Yes” to the question were directed to another follow-up question: “For which of the following holiday seasons do you generally focus sales? (Circle all that apply).” Possible choices included: (a) Easter, (b) Ramadan, (c) Eid al-Adha, (d) Hispanic holidays, (e) Christmas and/or New Years, (f) Dashain, (g) Caribbean holidays, and (h) Other. Easter is a Christian holiday that celebrates the resurrection of Jesus Christ. Easter generally falls during March or April. Ramadan (May/June) is observed by Muslims as a month of fasting (food is served before dawn and after sunset). Eid al-Adha (August/September) is also an Islamic festival and is widely regarded as ‘Festival of the Sacrifice’ or ‘Sacrifice Feast.’ Dashain (October) is arguably the largest festival for Hindus. It is celebrated as the symbol of victory of good over evil. Most of these ethnic holidays have their own characteristic demands for specific types of meat goats. Information on different types of meat goat sales was collected by the following question: “Please list the total numbers of goats you sold in each of the following categories during 2011.” Possible choices included: “(a) Suckling kids, (b) Weaned kids (≤ 30 lbs), (c) Wethers (>30 lbs), (d) Bucks (31- 120 lbs), (e) Bucks (>120 lbs), (f) Does (31-100 lbs), (g) Does (>100 lbs), and (h) Other.” Suckling kids are unweaned goat kids ranging from four to twelve weeks old. Weaned kids, also called market kids, are separated from their mothers but have no adult teeth (all milk teeth). Wethers are castrated male goats; bucks are adult male goats, and does are adult female goats (Stanton 2006). The remainder of the survey included questions related to production practices, breeding practices, producer perceptions of market prices of different quality goats, important challenges facing the industry, producer goal structure, selection of breeding stock, and socio-demographic information of the producer.

Representativeness of the Sample Population

Estimates from the USDA-NASS Census of Agriculture (2012) show that there were 100,910 meat goat farms (not including angora or milk goats) in the US with 2,053,228 meat goats in inventory, so the average meat goat farm inventory was about twenty goats. Our sample farms included an average of sixty-one goats (See Table A1, Appendix) of which sixteen were breeds that could have been used for hair (i.e., mohair, cashmere), dairy, or other purposes. Therefore, our farms are larger-scale than the average agricultural census farm.

However, before concluding that our sample of commercial meat goat farms is not representative, several things should be considered. First, USDA-APHIS (2005) states that meat goat experts believe the 2002 agricultural census captured only 55% to 65% of the meat goat producer population. USDA-APHIS (2011), analyzing 2007 Census of Agriculture data, showed that 52.4% of US meat goat farms had <10 goats in inventory, accounting for 9.1% of total goat inventory. USDA-APHIS (2011) shows that the focus of 72.4% of those with <10 goats was “other,” listed for livestock shows, pack animals, pets, and brush control. They found that the larger the farm, the less likely the farm was focused on “other” functions, with only 4.9% of farms holding 100-499 goats focusing on “other” functions.

If farms with <10 goats cannot be truly considered to represent commercial meat goat operations, then the USDA-NASS Census of Agriculture (2012) average of 20 goats per farm cannot be considered representative of commercial meat goat production. We argue that our sample meat goat producers were behaving as commercial producers since they were members of meat goat associations and/or were advertising their products via the Internet. Furthermore, our sample was represented by farms in all states in the US except for AK, CT, HI, MT, NV, RI, and WY, which together represented <2% of US meat goat farms in 2007 (USDA-NASS Census of Agriculture 2007).

Producer Selection of Marketing Channels

Coase (1937) discussed transaction costs, which are the costs associated with the economic exchange, as the major determinants in the decision-making process of a firm. Williamson (1979) further argued that transaction costs are so central to the economic activities of a firm that the relative advantages of one mode of organizational activity to the others are decided by their associated cost structure. Categories of transaction costs include those associated with bargaining, collecting information, searching for inputs to purchase or markets through which to sell a product, and policing (or enforcing) to ensure that both parties to a transaction are complying with the agreed-upon terms of the contract, whether formal or informal. Hobbs (1997) and De Bruyn et al. (2001) found that transaction costs significantly affected producer selection of livestock marketing channels. In this study, we assume that meat goat marketing channels differ in their relative transaction cost structures and producers consider these costs in their marketing decisions.

We describe the producer’s utility associated with marketing channel selection as:

$$(1) \quad U_{ij} = V_{ij} + \varepsilon_{ij},$$

where meat goat farm i chooses the marketing channel j that provides the highest utility among J alternatives. The deterministic component of the utility is V_{ij} and ε_{ij} is the random component. Assuming farm profit as a latent consideration of a producer in selecting a marketing channel, his/her marketing channel selection decision is modeled in this study as being a function of farm and farmer characteristics, which may be associated with specific transaction costs.

Since the selection of marketing channel(s) can be described as a system of equations for multiple discrete outcomes (1 if selected; 0 if not selected), the probability distribution of

selection can be estimated using the multivariate probit model. In accordance with Cappellari and Jenkins (2003), the probability of a producer selecting given marketing channels can be described as:

$$(2) \begin{aligned} y_{im}^* &= \beta'_m x_{im} + \varepsilon_{im}, \quad m = 1, \dots, M \\ y_{im} &= 1 \text{ if } y_{im}^* > 0, 0 \text{ otherwise} \end{aligned}$$

where y_{im} represents the outcomes for M different choices of marketing channels that a producer is likely to select, β'_m represents the coefficients for marketing channels, and x_{im} is a set of explanatory variables used in the analysis. Furthermore, ε_{im} , $m = 1, \dots, M$, are error terms with multivariate normal distribution, each with zero mean and variance-covariance matrix of V Cappellari and Jenkins (2003). There are $M=7$ marketing channels.

Independent Variables Used in the Marketing Channel Selection Models

Factors hypothesized to impact a producer's choice of market for selling goats include farm characteristics, producer demographics, production systems, and production region. *Number Goats* is the total number of meat goats raised on the farm, serving as a proxy for farm size. Schmitz, Moss, and Schmitz (2003) and Gillespie, Basarir, and Schupp (2004) found that larger-scale beef producers were more likely than smaller-scale producers to select alternative markets over the conventional auction. Schmitz, Moss, and Schmitz (2003) argued that larger-scale producers could take advantage of an increased number of marketing alternatives and lower per-unit transaction costs (such as those associated with bargaining, information collection, and market search) as compared to smaller-scale producers. In this study, it was expected that larger-scale producers would more likely market to volume buyers such as dealers, wholesalers, and meat packers with transportation and marketing costs spread over volume sales.

Percent Sale Slaughter is the percentage of goat sales for slaughter or as meat. Lower percentages of sales to slaughter suggest that higher percentages of goats are sold for breeding, show, and other purposes. Breeding and show goats tend to generally be sold directly to consumers either via private treaty or consignment sales (invited sales at auctions) (Jones, McCarter, and Cheney 2012). Prices received for breeding stock and show goats are generally higher than those for slaughter goats (Jones, McCarter, and Cheney 2012). These higher prices likely serve to offset the higher transaction costs (such as those associated with bargaining, searching for markets, and collecting market information) associated with selling individual animals with specific characteristics desirable for breeding or for show. Furthermore, producers are likely to consider minimizing "shrinkage" that is caused by extensive handling and transporting of animals so that the quality of breeding animals is maintained using on-farm direct sales.

Producer demographics for operator *Age* and *Bachelor* are included. Nyaupane and Gillespie (2010) found crawfish producer age to be positively associated with sales direct to processors and negatively associated with sales to wholesalers in crawfish marketing. Gillespie, Basarir, and Schupp (2004) found that cattle producers holding college degrees were more likely to market via private treaty and strategic alliances. In this study, *Age* is a continuous variable representing

the producer's age in 15-year intervals, and *Bachelor* is a dummy variable indicating whether a producer held at least a college bachelor's degree.

Income diversification variables *Off Farm Job* and *Farm Income Goat* are included. *Off Farm Job* is a dummy variable indicating the producer held an off-farm job. Producers with off-farm jobs are generally expected to have less time available to devote to farm activities. Thus, they are expected to be less likely to sell meat goats direct to consumers or to sell goat meat due to the higher transaction costs associated with the time required for each sale with these outlets. On the other hand, they are expected to be more likely to use marketing outlets that entail lower producer transaction costs, such as cooperatives and market pooling. In these cases, major marketing responsibilities which may include searching for markets and/or low-priced bulk inputs for producers, collecting information on markets, and negotiating terms of agreement are taken by the market coordinator(s). Gillespie, Basarir, and Schupp (2004) found that producers receiving greater shares of their income from off-farm jobs were more likely to use conventional auctions in cattle marketing. *Farm Income Goat* is a continuous variable indicating the percentage of annual net farm income derived from the meat goat operation, a measure of farm diversification. Farm diversification may serve as a risk management tool (Robison and Barry 1987) and has been shown to impact marketing channel selection (Davis and Gillespie 2007; Nyaupane and Gillespie 2010).

Three major production systems used on US meat goat farms were included in this analysis. With the extensive system (*Extensive*) as described by Coffey (2006), goats are not handled much and are kept on large tracts of pasture or rangeland, mostly "fending for themselves." They forage for food and care for young with minimal assistance. In a pastured but not rotated system, goats are pastured without using a management intensive rotational grazing system. In a pastured and rotated system, pastures are cross-fenced into paddocks so that animals can be rotated to fresh pasture on a regular basis to maximize forage productivity. We represent these two systems as *Pastured* system. In a dry lot system (*Dry Lot*), goats are kept in an area where there is no growing forage. Goats are fed with purchased feed and/or hay (Coffey 2006). The percentage of animals in the extensive system serves as the base.

Regional dummy variables *Southeast* (including AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV), *Northeast* (including CT, DE, IA, IL, IN, MA, MD, ME, MI, MN, MO, NH, NJ, NY, OH, PA, RI, VT, and WI), and *West* (including AK, AZ, CA, CO, HI, ID, KS, MT, ND, NE, NM, NV, OR, SD, UT, WA, and WY) were used to explore geographical differences in meat goat marketing. *Texas/Oklahoma* (TX and OK) was used as the base. According to Census of Agriculture (2012), Texas ranks first in terms of both total meat goat producing farms and number of meat goats produced, whereas Oklahoma ranks fourth and fifth in both categories, respectively, thereby representing 37% of total US meat goat production in 2012. The total number of responses we received from Texas and Oklahoma do not exactly resemble the national statistics (Appendix B), which is likely because the online availability of statewide producer addresses are not necessarily proportional to the total number of producers in those states. Land quality, market availability, prices, and other factors differ by region; therefore producer selection of marketing channels may also differ by region. Previous studies including regional variables in marketing channel research include Park and Lohr (2006) and Park (2009).

Results

Table 2 shows the use of different marketing channels by US meat goat producers. The two most commonly used marketing channels were *Direct Sale to Consumer* (79%) and *Live Auctions* (65%), whereas others were used by relatively smaller portions of the population. Fifteen percent of the producers used *Dealers, Brokers, or Meat Packers*, 11% sold goat meat, 5% used *Market Pooling*, 3% sold to *Wholesale and Retail Businesses*, and 3% used *Cooperatives*. Of those selling goat meat, 94% sold directly to the consumer⁵, 21% sold at farmers markets, 14% sold to restaurants, 4% sold to grocery stores, and 7% sold to others. It is important to understand that percentage use of marketing channels does not necessarily represent the number of animals sold via that marketing outlet. For instance, it is likely that many producers sold only a few goats via *Direct Sale to Consumers* but indicate its use as a marketing outlet in the questionnaire.

Table 2. Percentage Use of Marketing Channels

Marketing Channels	Percent
Direct sale to consumer	79
Live auction	65
Dealer, brokers, or meat packers	15
I sell goat meat	11
Market pooling	5
Wholesale and retail businesses	3
Cooperatives	3

Table 3 shows the percentages of producers targeting their meat goat sales for different ethnic holiday markets. Only 22% of producers targeted their meat goat sales to any specific ethnic holiday market. Most producers (18%) targeted Easter, followed by Ramadan and Christmas/New Year's (11% each). The result showing Easter as a dominant ethnic holiday market is consistent with Gipson (1996) who argued that the total number of goats slaughtered (primarily 'Easter kid') doubled two weeks before Easter, a primary result of demand generated by the Greek and Italian ethnic populations. Hispanic holidays were targeted by 9% of the producers. The holiday markets Eid al-Adha, Caribbean holidays, Dashain, and others were targeted by considerably smaller percentages of the population, 3%, 1%, <1%, and <1%, respectively. Overall, relatively few farmers targeted their sales to specific holiday markets.

⁵ We asked the question in such a way that farmers were given separate response categories for farmers markets and direct to consumer sales. It is conceivable, however, that some respondents who sold only at farmer's markets could have also checked "sold direct to consumers" since farmer's markets are set up for farmers to sell direct to the consumer.

Table 3. Percentage of Producers Targeting Sales to the Specific Ethnic Holidays

Ethnic Holidays	Percent Targeting
Easter	18
Ramadan	11
Christmas and/or New Year	11
Hispanic holidays	9
Eid al-Adha	3
Caribbean holidays	1
Dashain	<1
Other	<1

Note. A total of 22% producers targeted ethnic holidays

Table 4 provides the means and standard deviations of the total numbers of goats sold by producers under different categories. Does weighing 31–100 pounds were the most commonly sold animal category with an average of more than 10 animals per farm, followed by wethers weighing >30 pounds with an average of more than 9 animals per year. An average of 7.5 bucks, weighing 31–120 pounds were sold by farms. Smith, Carpenter, and Shelton (1978) and Madruga, Arruda, and Nascimento (1999) discussed animal age to be one of the major determinant factors of goat meat quality and found that meat produced from six months to one-year-old animals is superior in juiciness, palatability, and tenderness. Colomer-Rocher et al. (1992) found a reduction in percentage bone content with an increase in animal weight. These findings suggest that the age and weight of an animal impact the quality and quantity of meat produced, and potentially influence consumer demand. Our observation of higher sales of animals in the 31–120 lbs. category is consistent with the meat qualities preferred by most consumers as well the larger volume of meat production as suggested by previous studies. Higher sales of wethers is probably because of their improved meat juiciness, flavor, and tenderness (El-Hag et al. 2007) as well as their preference by some ethnic consumers, such as Hindus.

Table 4. Summary of Total Goats Sold in 2011

Categories	Mean	S.D.
Suckling kids	1.0	5.5
Weaned kids (\leq 30 lbs)	4.2	15.9
Wethers (>30 lbs)	9.4	22.0
Bucks (31-120 lbs)	7.5	18.1
Bucks (>120 lbs)	1.3	4.3
Does (31-100 lbs)	10.4	20.0
Does (>100 lbs)	4.9	10.6
Others	0.9	10.0

Farms sold an average of 4.9 does weighing >100 pounds and 4.2 weaned kids weighing ≤ 30 pounds. A few bucks weighing >120 pounds were sold (1.3 animals). The reduction in juiciness and tenderness of meat in older animals (Smith, Carpenter, and Shelton 1978; Schönfeldt et al. 1993; Pratiwi, Murray, and Taylor 2007) could have played a significant role in the lower sales of heavier animals. Although it is surprising to see relatively small numbers of suckling kids sold despite the fact that Easter (for which suckling kids are highly demanded) is a leading ethnic holiday selected, the small portion of the producers targeting ethnic markets (22%) and no records available for total animals sold during each season may have led to this disparity.

Factors Affecting Producer Selection of Meat Goat Marketing Channels

Table A1 (see Appendix) presents summary statistics of each of the independent variables included in the multivariate probit model. Multivariate probit results in Table A2 (See Appendix) suggest that larger-scale producers were generally greater users of dealers, brokers, and meat packers. It is not surprising to see larger-scale producers selling via volume buyers as they can reduce per-animal transaction costs associated with individual animal or small-volume sales and reduce per animal transportation costs. Producers selling higher percentages of animals for slaughter were greater users of dealers, brokers, and meat packers; live auctions; and cooperatives; sold more goat meat, and were less likely to sell directly to consumers. In cases where animals are differentiated from others due to their superior breeding or show ability, use of direct marketing to consumers is expected.

Older producers were less likely to use live auctions. Producers holding bachelor's degrees were greater marketers via dealers, brokers, or meat packers and wholesale and retail businesses and lesser users of live auction markets. This suggests that more highly educated producers were more likely to sell via marketing outlets where they could receive market premiums. Producers holding off-farm jobs were less likely to sell goat meat and more likely to market via cooperatives. As discussed earlier, producers holding off-farm jobs would generally have less time for involvement in value-added activities. Selling goat meat requires considerable effort in building professional/business relationships with buyers as well as arranging for transportation, slaughter, packing, storing, etc. (Knudson 2006), all of which are associated with higher transaction costs. On the other hand, producers holding off-farm jobs may benefit from marketing via cooperatives where they can share marketing responsibility and sell with other producers in volume.

Producers receiving higher percentages of net farm income from the goat enterprise (*Farm Income Goat*) were more likely to sell goats via wholesale and retail businesses. Relative to using extensive-range production systems, the probability of selling goats via a live auction market increased if producers were using pastured systems (*Pastured*). Selling via dealers, brokers, and meat packers increased if the producer used a dry lot system relative to an extensive system.

Results for the regional variables show that, compared with producers in *TX* and *OK*, producers in the *Northeast* and *West* were more likely to sell goat meat to producers in the *West* and were more likely to use cooperatives to sell their goats. Having higher concentrations of the foreign-born population residing in *Northeast* and *West* (particularly on the coasts) (Grieco et al. 2012), it is not surprising to see producers utilizing the opportunity to maximize returns by selling goat meat direct to consumers in those regions. *Northeast* was automatically dropped from the

regression for the market pooling and cooperatives regressions due to perfect collinearity. On the other hand, none of the variables showed significant impacts on producer use of market pooling; therefore those results are not reported.

Discussion and Conclusions

Using nationwide survey data, this study examines the various aspects of meat goat marketing in the United States. Results showed that *Direct Sale to Consumer* and *Live Auction* were the most heavily used marketing channels by US meat goat producers, at 79% and 65%, respectively. These results do not necessarily suggest that these channels moved the greatest volumes, but indicate that most producers used them for marketing at least some of their goats. Higher price premiums, reduced transportation cost, and an opportunity to develop long-term business relationships with local consumers likely played roles in producers selling direct to consumers, whereas an opportunity for volume sales, lower transaction costs associated with identifying buyers, and reliable markets could be some of the primary reasons for using live auction markets. Fewer producers, 15%, and 11%, were found to market via dealers, brokers, or meat packers, and to sell goat meat, whereas the remaining marketing channels were used by less than 5% each.

Multivariate probit results show farm size, type of animal sold, producer demographics, production systems, and regional variables to be significant determinants in producer selection of marketing channels. Larger-scale producers tended to use marketing channels such as dealers, brokers, and meat packers likely because they have the volume required by these buyers. Producers selling greater percentages of slaughter goats were more likely to sell via dealers, brokers and meat packers and were less likely to sell directly to consumers. This is consistent with the general tendency of producers to sell breeding stock via consignment sales and private treaty (Jones, McCarter, and Cheney 2012).

Only 22% of producers targeted their production for specific ethnic holiday markets. Of those, more than 80% targeted Easter. The lower use of ethnic holiday markets could possibly suggest two scenarios – either most of these producers are unaware of the opportunity associated with these ethnic markets or they ignore it because the cost associated with targeting breeding does not make it economically favorable. On the other hand, targeting production could largely depend on the density of local ethnic consumers as well as the availability and efficiency of other marketing outlets, many of which are still developing.

As immigration into the US from meat goat-consuming countries continues, it is expected that demand for goat meat will continue to expand. The US meat goat industry can benefit from further developing an efficient marketing / distribution system for meat goats, paying close attention to reducing transaction costs, benefitting from the economies of scale associated with marketing in volume, and providing incentives for quality. Further examining the marketing systems of the more established livestock industries (i.e., beef and pork) would be helpful in designing a more efficient marketing system for the US meat goat industry. Continued development of the meat goat marketing system will require significant effort by industry leaders. Livestock economists and animal scientists involved in research and extension efforts at land grant universities can provide assistance in evaluating ways in which the current system can become more efficient.

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Appendix A

Table A1. Summary Statistics of Independent Variables Used in the Analyses

Variables	Description	Mean	S.D.
<i>Number Goats</i>	Total number of meat goats on the farm	60.84	71.77
<i>Percent Sale Slaughter</i>	Percentage of goat sold for slaughter or as meat	44.61	36.56
<i>Age</i>	Producer age (years)	51.91	0.91
<i>Bachelor</i>	<i>Dummy</i> = Whether producer holds at least a college bachelor's degree	0.45	0.50
<i>Off Farm Job</i>	<i>Dummy</i> = Whether the producer holds an off-farm job	0.61	0.49
<i>Farm Income Goat</i>	Percentage of annual net farm income derived from goat operation	39.86	1.71
<i>Extensive</i>	Percentage of meat goats raised under this system	10.54	28.28
<i>Pastured</i>	Percentage of meat goats raised under this system	76.43	35.59
<i>Dry Lot</i>	Percentage of meat goats raised under this system	13.03	41.43
<i>Southeast</i>	<i>Dummy</i> = Whether the producer resides in the states: AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, or WV	0.36	0.48
<i>Northeast</i>	<i>Dummy</i> = Whether the producer resides in the states: CT, DE, IA, IL, IN, MA, MD, ME, MI, MN, MO, NH, NJ, NY, OH, PA, RI, VT, or WI	0.39	0.49
<i>West</i>	<i>Dummy</i> = Whether the producer resides in the states: AK, AZ, CA, CO, HI, ID, KS, MT, ND, NE, NM, NV, OR, SD, UT, WA, or WY	0.14	0.34
<i>Texas/Oklahoma</i>	<i>Dummy</i> = Whether the producer resides in the states: TX, or OK	0.11	0.31

Table A2. Multivariate Probit Runs on Producer Selection of Marketing Channels

Variables	Dealers, Brokers, or Meat Packers	I Sell Goat Meat	Direct Sale to Consumer	Live ions	Wholesale and Retail Businesses	Cooperatives
<i>Number Goats</i>	0.0031*** (0.0011)	0.0001 (0.0013)	-0.0006 (0.0011)	0.0012 (0.0010)	0.0012 (0.0016)	0.0001 (0.0020)
<i>Percent Sale Slaughter</i>	0.0086*** (0.0020)	0.0048** (0.0023)	-0.0099*** (0.0018)	0.0048*** (0.0016)	-0.0009 (0.0037)	0.0074** (0.0035)
<i>Age</i>	0.0063 (0.0886)	-0.0453 (0.0974)	0.0091 (0.0788)	-0.1614** (0.0710)	0.0028 (0.1546)	0.2400 (0.1603)
<i>Bachelor</i>	0.2581* (0.1464)	0.2402 (0.1635)	0.1456 (0.1357)	-0.3352*** (0.1190)	0.4616** (0.2614)	0.1331 (0.2525)
<i>Off Farm Job</i>	0.1898 (0.1646)	-0.5332*** (0.1741)	0.0327 (0.1463)	-0.0369 (0.1292)	-0.1835 (0.2722)	0.6719** (0.3186)
<i>Farm Income Goat</i>	0.0166 (0.0426)	0.0166 (0.0481)	0.0094 (0.0397)	0.0054 (0.0349)	0.1800** (0.0741)	-0.0057 (0.0742)
<i>Pastured</i>	0.0013 (0.0027)	0.0032 (0.0032)	0.0006 (0.0023)	0.0049** (0.0021)	-0.0061 (0.0041)	-0.0054 (0.0036)
<i>Dry Lot</i>	0.0060* (0.0037)	-0.0013 (0.0049)	0.0025 (0.0035)	0.0032 (0.0029)	-0.0084 (0.0071)	-0.0021 (0.0055)
<i>Southeast</i>	4.5077 (77.9386)	0.6245 (0.4885)	0.0761 (0.2418)	-0.2457 (0.2112)	4.4570 (1755.8050)	-0.0692 (0.2859)
<i>Northeast</i>	4.6164 (77.9385)	1.1933*** (0.4797)	-0.2251 (0.2350)	-0.2132 (0.2112)	5.0424 (1755.8050)	
<i>West</i>	4.1464 (77.9387)	1.1055** (0.5029)	0.3558 (0.2989)	-0.3669 (0.2460)	4.9867 (1755.8050)	0.5362** (0.3188)
Constant	-6.5660 (77.9402)	-2.3916*** (0.6657)	1.1870*** (0.4373)	0.5806 (0.3838)	-6.8688 (1755.8060)	-3.2067*** (0.8275)
Observations	511					

Log Likelihood = - 991.52, Wald $\chi^2(65) = 172.87$, Log Likelihood Ratio Test ($\chi^2(15) = 52.22$)

Note. ***, **, and * indicate variables significant at $P < 0.01$, $P < 0.05$, and $P < 0.10$ levels respectively

Appendix B

Number of Survey Respondents by States

States	Respondents	States	Respondents
AL	7	MO	45
AR	39	MS	7
CA	7	NC	64
CO	14	NE	4
FL	5	NY	6
GA	18	OH	22
IA	45	OK	15
ID	9	OR	9
IL	30	PA	9
IN	18	SC	7
KS	20	TN	16
KY	7	TX	48
LA	27	VA	9
MD	11	WA	8
ME	7	WI	3
MI	24	WV	5
MN	3	Other*	16

*Note. "Other" category includes states with <3 respondents (AZ, DE, MA, MT, NH, NJ, NM, SD, UT, and VT).