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AN ANALYSIS OF
TENNESSEE FEEDER CATTLE PRODUCER ATTITUDES
TOWARD DIFFERENT MARKETING METHODS

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

ROBERT WAYNE HOLLAND, JR.

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ABSTRACT

Cattle are Tennessee's number one agricultural enterprise in terms of production, accounting for approximately 25 percent of the cash receipts from marketing. The methods available for marketing of feeder cattle have undergone numerous changes.

Studies in 1971 and 1985 indicated that a reduction in the number of Tennessee's weekly auction markets would enhance the efficiency of the state's livestock marketing system. Other recent studies have indicated that the economic advantages of electronic marketing may reduce the importance of traditional marketing methods. However, weekly auctions are still the primary market outlet for Tennessee feeder cattle. Therefore, feeder cattle producers may base their choice of a market on other criteria.

The specific objectives of this study were to determine why producers use or do not use certain types of marketing alternatives, to determine relationships between producer characteristics and amount of cattle sold through each market type, and to determine the relationships between producer characteristics and reasons for the choice of markets. This study was based on survey results from a 1992 mail questionnaire in which producers were asked to rate the level of importance of advantages and disadvantages of weekly auctions, graded sales, video board sales, satellite video sales, and direct selling. Descriptive statistics, regression analysis, and ordered probit models were used to analyze the survey results.

The results indicated that nearly 75 percent of the feeder cattle sold by responding producers were marketed through weekly auction sales.

The average number of head sold per year was nearly 30, while the mean number of brood cows and acres of pasture was 39 and 137, respectively.

Producers did not consider tradition or habit to be an important reason for liking a particular type of market. Producers gave highest importance ratings to higher prices, market location, and favorable weighing conditions. Consignment requirements, distance to market, minimum lot size, and possibility of getting a bad check were considered the most important disadvantages of some market types.

Regression analysis showed that as the number of cattle sold increased, the percent sold through weekly auctions decreased and that producers who considered beef cattle to be their principal farm enterprise were more likely to sell a smaller percentage of their cattle through weekly auctions. As the number of head sold at less than 500 pounds increased, the percent of cattle sold through graded sales decreased. As the number of head sold and as the age of the producer increased, the percent sold through video board sales increased. Producers who considered dairy cattle to be their principal farm enterprise sold a larger percent of cattle through video board sales. As the age of the producer increased, the percent of cattle sold through direct sales decreased and producers who considered beef cattle to be the principal farm enterprise sold a larger percent of their cattle through direct sales.

Probit analysis was used to develop relationships between producer characteristics and producer importance ratings of advantages and disadvantages of weekly auctions, graded sales, and direct selling. The results of the probit models failed to indicate significant relationships.

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CHAPTER I

INTRODUCTION

Throughout the development of the domestic livestock marketing system, tremendous change and growth have occurred. However, or possibly as a result, the marketing system has been troubled by inefficient and high cost operating units. Among the aspects of the marketing system targeted for improvement have been the operational efficiency and pricing. As a result, increased volume consolidation, improved management decisions, and technology adoption have directly influenced the system over many years. Several integral changes in the United States' overall beef industry have also influenced the movement toward more efficient markets. Such industry changes include increased beef cattle production and the increased number of fed cattle produced [Goodwin, p. 9].

Assuming that the current competitive feeder cattle marketing system continues, Armstrong (1968) predicted that the more efficient methods of marketing would likely develop. However, due to numerous and diverse individual and specific situations and opinions, feeder cattle marketing methods would continue to vary. Therefore, differences in geographic characteristics and producer and buyer preferences would lead to the adoption and availability of a variety of methods [Armstrong, p. 77].

Cattle Development in the United States

Domestic meat animals are not native to the United States. They were introduced to the western hemisphere by Columbus during his second voyage to the West Indies in 1493. Unsuccessful attempts were made to establish livestock in what is known today as Florida in 1513, but it was not until 1565 that cattle actually survived in the area. Coronado's expedition to northern Spain in 1540 was responsible for the movement of cattle into what are now the states of Arizona, California, and New Mexico [Taylor, p. 558].

Although the Spanish had established cattle production in the Southwest, it was not until 1607 that cattle transported from England survived in Virginia. The Plymouth Colony of Massachusetts established cattle from the same source in 1624 as did New York the following year. Due to such rapid and widespread growth of the animals, almost every journey from England during the 1630's included cattle [Taylor, p. 559].

These herds were primarily maintained for draft and milk purposes. Only the older animals were used for slaughter. Even at slaughter, the most valuable part of the animal was the hide [Williams, p. 5]. However, with increases in population and territorial expansion, more animals were being used for consumption. In 1636, the first meat packing plant was established in Springfield, Massachusetts by William Pynchon [Taylor, p. 559].

By the 1700's, cattle were an established part of U. S. agricultural production. Movement of the animals for marketing purposes became a common practice. The Brighton Market near Boston became the first recorded public market for cattle in the United States in 1756.

Later in the same century, production of cattle grew from the east coast to the new areas of the developing country known today as Pennsylvania, Kentucky, Tennessee and Mississippi [Taylor, p. 559].

Although cattle were the first livestock to be fed for marketing purposes, their production for the primary purpose of slaughter did not gain significant popularity until the turn of the eighteenth century. Grain fed beef production began in Ohio in 1817. During this same year, grain fed beef animals were first moved some 1000 miles from Ohio to New York for slaughter. It is reported that some animals that began the drive at weights of 900-1000 pounds lost 100-150 pounds during the drive. Advancements in cattle production and slaughtering were met by corresponding advances in marketing over the following decades with the origination of the first public auction and the opening of the Union Stockyard and Transit Company in Chicago [Taylor, pp. 560-561].

Markets and Livestock Marketing Systems

Plumb identifies a market in its simplest form as a place in which to barter or trade, where two or more persons come together to buy and sell or exchange commodities. He also sights Webster's quote of an old English saying, "three old ladies and a goose make a market," as correctly describing the simplest form of a livestock market [Plumb, p. 1].

Organized markets date far back into English history. Eleventh century notation refers to the market as a feature of a social economy. The European "Fair" is synonymous with today's notion of a market, where the fair was a periodical occurrence and modern-day markets may be

conducted day to day. The fair also attracted people for social as well as business reasons and entertainment was a part of the organized activities [Plumb, p. 2].

The earliest recording of livestock movement and trade relates to the efforts of cattle drovers during the premiere stages of colonial development. The process of droving cattle over hills and mountains and through "rugged terrain" evolved from the initial drove which originated in Circleville, Ohio in 1805. The professional drovers who developed from that day are somewhat synonymous with the registered dealers of today. The drovers often purchased livestock from the farmer and then sold the animals once the drive was completed. Dealer-drovers remained the thrust behind the livestock marketing system until rail transportation in the mid-west met the demand of developing stockyards during the mid 1800's. The first privately owned stockyard was opened in Chicago in 1848. Nine years later, the first commission firm representing producers for a fee opened in Chicago [Williams, pp. 5-15].

Auction sales involving livestock have been a notable part of marketing cattle for many years. It is reported that auctions took place thousands of years ago. Auction sales first took place in The United States in New York City in 1676. The auction method of selling livestock resulted from a group of men who established the Madison County Importing Company in London, Ohio in 1853. A committee was sent by the company to England to buy cattle and return them to the United States for sale. Fifteen bulls, nine cows, twelve hogs, and twenty sheep compiled the first sale. It was with this sale that the company realized a monthly commercial livestock market would be a profitable

venture. Their first auction sale was held on March 5, 1856 [Plumb, pp. 260-264].

Improvements after the Civil War were evident in the livestock industry. Growth in the railroad system resulted in an expansion of terminal markets, especially in locations where production was far from slaughter and distant hauling was required. The terminals proved to be a quality source for feeder buyers [Williams pp. 17-20]. In fact, the large terminal markets of the day were referred to by some as the "'price-registering barometer' of the American livestock marketing industry" [Fowler, p. 33].

Post Civil War activity was also witness to the establishment of stockyards in major packing areas. Expansion of territory and technology throughout the 1800's led to improvements in the livestock marketing system. The constant change transformed the industry into a nationwide system with participants ranging from country dealers and local drives to shipment by rail for packers and terminals to thousands of retail outlets [Williams, p. 22].

Producers, however, were not ideally served by the system and they began to search for methods that would provide better prices. At the turn of the century, producers began to form cooperatives to pool their livestock. This alternative marketing method enabled the producers to obtain volume loads. However, much to the farmers' dismay, the cooperative efforts did not provide all of the benefits that had been anticipated [Williams, pp. 22-24].

Along with the development of the producers' cooperative agencies and associations, auction markets were beginning to be an established

part of the marketing system. Early twentieth century developments such as automobiles, roads and highways, increases in the population, and expanding cities, paralleled the development of country livestock markets. Producer associations and the auction movement provided strength for the local country markets. McGregor, Iowa is noted as the location of the first local market. Established in 1872, the market was a local buying operation that re-sold livestock primarily to large packing companies [Williams, p. 23-24].

Although the marketing of cattle today is quiet different from the days of the trail drives, the path of change has been primarily one of gradual improvements over time without sudden disruptions. However, improvements may be considered drastic when comparing today's methods to those of the 1940's and 1950's. The extraordinary advances in communication and technology in the feeder cattle business since the 1950's has created a turbulent change in the overall marketing system [Farris, p. 1].

Feeder Cattle Marketing

Armstrong (1968) referred to the specialization in the production and marketing of feeder cattle that are designed specifically for further feedlot finishing as relatively new. This practice of cattle feeding was influenced by rapid declines in calf slaughter during the 1960's and increases in the number of cattle going through feedlots prior to slaughter [p. 8]. The changes in the marketing methods available to feeder cattle producers were attempts to meet the changing demands of the feedlots. This was the case in the southern states where

large growth in specialization by feeder cattle dealers and concentration yards occurred [Armstrong, p. 30].

Compared to the beef slaughtering and processing industries, the feeder cattle industry is described by Armstrong as most nearly approaching the economic definition of a purely competitive industry. The feeder cattle industry basically consists of many small, independent producers that are located throughout a large geographic area. Their common product, beef animals, is relatively homogeneous and no producer has a sufficient volume to affect the market price. Barriers to entry and exit for the industry are rather low and resources seem to move easily into and out of the industry. Small amounts of structural change seem to occur in the industry due, in part, to the fact that feeder cattle in the Southeast are primarily produced on many farms as a secondary enterprise causing large variations in size, grades, breeds, and management practices [Armstrong, pp. 31-32].

It was not until 1935 in Shounes, Tennessee (Johnson County) that the first recorded auction of feeder cattle in the state occurred. The Extension Service played an active role in establishing this first sale. Producers in the area organized the local cattleman's association in 1953, transforming the Mountain Breeders Association into a cooperative [Randell, p. 33].

Marketing of livestock by the producer has always been a major aspect of the farm operation. Decisions concerning the marketing of livestock often have a direct influence on the operation's profit or loss. Technological advancement in transportation and communication has caused developments in the traditional marketing methods over the years.

Due to such developments, past methods have been altered, enhanced and hopefully improved. Today, feeder cattle producers have several alternative methods for marketing their animals. As will always be the situation with current marketing methods, these present alternatives are a result of the changing conditions of the industry over time [Fowler, p. 35].

Review of Marketing Methods

The numerous aspects that are involved in the marketing of feeder cattle are directly affect the survival of feeder cattle operations. For such reasons, it is important that today's feeder cattle producer evaluate all available marketing alternatives with respect to efficiency and equity [Johnson, pp. 9-10].

The lack of a uniform and well defined vocabulary applied to the different marketing methods available understandably leads to confusion. Therefore, the following section provides a brief description of the marketing alternatives used in this study. The description of these methods is followed by a review of terminal markets, a once significant alternative marketing method not included in this study.

Weekly Auction Markets

Johnson vaguely refers to the auction market method of selling livestock as "an assembly or collection point for livestock being offered for sale where the necessary services associated with the selling activity are furnished by the operator" [p. 17]. Auction sales are supervised by the Federal Government in accordance with the

provisions of the Packers and Stockyards Administration. Normally single firm operations, auction sales negotiate a price that is determined by a series of offers or bids and counter offers led by an auctioneer. Participation in such sales is completely open to the public [Johnson, pp. 17-18].

Armstrong notes that auction markets experienced tremendous growth during the 1930's. It was during this period that sellers began trying alternative methods in order to avoid terminal markets, take advantage of improved farmer-owned truck transportation, and find a marketing method suitable for under-finished cattle. As a result, specialized feeder cattle auctions became popular in the Southeast during the 1950's [Armstrong, p. 71].

Rhodes et al. gives the ability of auction markets to facilitate the sale of individual animals in small lots as its single most important advantage [p. 8]. This seems to explain the preferred use of auction markets by feeder cattle producers who tend to manage relatively small scale operations. Marketing costs associated with auction sales that are incurred by producers are normally relatively high due to commission and yardage fees. The cattle sold via auction method are subject to more handling and movement which often results in more stress, disease susceptibility, and shrink. The seller has little control over the selling price of an animal at an auction sale. The decision to sell is essentially made when the cattle leave the farm and are delivered to the market, which is before the price is actually determined [Rhodes et al., p. 15].

At weekly auction sales, feeder cattle are brought to the auction

facility where they are either penned until sale time or weighed and then penned. Auctions that weigh the animals when they are unloaded are referred to as "in-weight" sales. Conversely, those sales that weigh the animal immediately before they enter the sale ring are referred to as "out-weight" sales. In some instances, if a producer has a number of calves of similar characteristics, they may be sold as a group. Grouping normally depends on the policy of the individual market. The weekly auction sale is convenient for producers because it allows them to select an appropriate time to sell [Rawls, 1988, p. 11].

The facilities used for weekly auctions normally consist of sufficient holding pens for a large number of animals, certified weighing conditions, and an appropriate ring for showing the animal for sale to the competitive bidders. The weekly auction market also maintains clerical, management, and labor services which make it a suitable location for other types of sales such as Graded Sales [Stevens and Haas, p. iv].

Graded Sales

Graded sales have historically been organized by producer associations and market operators primarily for the sale of feeder cattle and the purpose of "engaging selective merchandising practices to attract both a large number of consigned cattle and a large number of buyers" [Rhodes et al., p 15]. The sales are normally held on specially scheduled dates that follow significant marketing periods such as in the fall and early spring. The market manager or operator normally makes efforts to promote the event by contacting a number of committed buyers

prior to the sale [Rhodes et al., p. 15]. The group selling characteristic of graded sales is primarily an alternative to individual selling. Special graded feeder sales have historically provided a means for obtaining larger, more homogeneous lots of cattle for sale [Meyer, p. 24]. Graded feeder cattle sales also tend to promote breeding, feeding, management and marketing practices that attract competitive buyers [Buchanan].

For graded sales, individual producers consign their cattle and upon delivery to the sale location, each animal (head) is graded by a certified United States Department of Agriculture grader and weighed. The calves are then placed in pens with calves of similar grade, weight, and breed that belong to other producers. This commingling allows calves of uniform weight and grade to be offered for sale in large groups. The groups are then sold at open competitive auction and each producer is paid based on the weight of the animal and the group selling price [Meyer, p. 24].

Offering cattle for sale in uniform lots, as in graded feeder sales, tends to increase prices, reduce marketing cost, and improve the producer's returns [Stevens and Haas, p. ii]. The first cattle pool on record was held in 1925 on an Indian Reserve in Nevada. In the Southeast, West Virginia and Tennessee were early implementors of feeder cattle pooling in the 1930's [Stevens and Haas, p. 2].

Video Board Sales

For the purpose of this study, a video board sale encompasses video sales of several different types and characteristics. As a basis

for description, video sales refer to methods of selling cattle by using video cassette recorders to tape a picture of the animals while they remain on the farm. The cattle are normally consigned to the sale and then, graded and photographed by video camera on the farm. A written description is also made of the animals at the time the video is taken. Buyers are then assembled in a facility which may be a conference room, hotel, or a traditional weekly auction barn where the video pictures of the cattle are projected and the terms and conditions of the sale are discussed. An auctioneer then accepts competing bids in a traditional public auction style. The cattle are arranged for delivery from the producer's farm to a pre-specified location. This allows the seller to reject unacceptable final bids without incurring expenses for transporting to market. However, a prepaid consignment fee is normally forfeited when sellers exercise the option to "no sale" their cattle. The video auction is attractive because the pictorial representation enhances the description and terms expressed by the seller and the market operator. A large number of animals can be sold in lots in a short period of time and no facilities are needed to hold the animals. Large volume tends to increase bidding competition and prices may be enhanced somewhat [Rhodes et al., pp. 15-16].

A video board sale may be conducted by one producer or any number of producers that can provide large groups of uniform calves. The video tape has traditionally been shown to an assembled group of pre-notified potential buyers. A detailed list of information about the animals is given in a sale catalog or booklet which is available prior to or on the sale day. Specified details about weights, weighing conditions,

location, estimated average weight per head, per head weight ranges, number of head per lot, management practices applied, and delivery are normally given in the booklet or catalog. An auction is the normal method used to determine the selling price for each lot. Telephone bids were originally recorded on a large blackboard to determine the buyer. This method of recording bids on a board consequently gave the name "board sales" [Williamson, p. 8003.4].

The video sale may also be conducted entirely by telephone. In this case, there is not a central location where the video is shown and participants gather for the sale. The auctioneer may call for bids via a conference phone connection in his or her office while the sale manager or the operator directs the sale by the same method from another location. All of the potential buyers may also be linked to the same conference line. The video cassette is mailed to sale participants prior to the sale date. Participants may actually view the video as the auction process is carried out or they may have viewed the video prior to the auction. The producers of the cattle being sold may also be connected by phone to the sale so that they can "no-sale" their cattle for the final bid made [Rawls, 1988, p. 12].

Reference to the video board sale in this study is characterized by a video picture being taken of the animal lots prior to the sale date while the cattle remain on the farm until delivery, a stipulation in the sale catalog. For the purpose of this study, a video board sale may or may not involve telephone connections and may or may not consist of an assembled body at a centralized location.

Satellite Video Sales

Satellite video sales are similar in many respects to the video board sales previously described. The distinguishing characteristic between these two methods is that satellite sales use satellite beams from a satellite dish to transmit the video pictures of the sale animals to many remote locations during the sale. The video board sale provides similar video pictures of the animals offered for sale while they remain on the farm by mailing an actual video cassette to many potential buyers prior to the sale [Charlier].

Superior Livestock Auction (SLA) is the largest satellite video cattle auction in the United States [Bailey, Peterson, and Brorsen, p. 465]. For this reason, the operation and characteristics of SLA adequately depict and represent the description of a satellite video auction for this study. SLA uses a satellite dish and a camera crew to provide pictorial representations of animals to many sale locations across the country. A sale catalog is distributed prior to the sale which indicates the broadcast time, satellite galaxy, and channel.

To become a buyer, interested parties normally must register with the market management prior to the sale and be issued an identification number. Only these pre-registered buyers with a bidding number are allowed to participate in the auction. Potential buyers wishing to bid by telephone are issued an authorization code and a telephone number to call to place their bid. Telephone "operator-ringmen" receive the call-in bids, check the caller's authorization code with a list of approved numbers, and instantly indicate the bid to the auctioneer. Bids are accepted only from those who have been pre-approved.

Purchases normally require a per head partial payment that is due at the conclusion of the sale. Those who purchase via satellite must wire transfer funds on the following business day. Payment for cattle is due on delivery unless the buyer is not present at delivery in which event payment is due to the market management no later than one business day following delivery by transfer of funds or a check mailed overnight on the day of delivery. Cattle are normally sold on a "sliding scale" with a given weight window on the top side of the base weight with all weights measured by certified scales. This means that an animal can weigh up to a pre-specified amount (weight window) over the base weight without changing the selling price. However, if the actual weight exceeds the base weight by more than the pre-specified amount, the price will be adjusted according to the slide amount for each pound over the weight window [Superior Livestock Auction].

Charlier offers a comparison of SLA to a traditional stockyard in Fort Worth, Texas. While the stockyard provides for unloading animals at the sale location and has a sale ring and holding pens, satellite video sales allow for the animals to remain on the farm until after they have been sold. Therefore, similar to video board sales, producers save transportation costs because the animals are sold while they remain on the farm. This feature keeps animals from being exposed to animals from other farms which reduces stress, risk of injury, and sickness. Unsatisfactory sale prices can also be rejected by a producer without the trouble of loading the animals and returning them to the farm [Charlier].

Direct Selling

The direct selling of feeder cattle by the producer does not involve an organized market because selling takes place on the premises of the farm, ranch, or some other non-market station by private treaty [Johnson, pp. 18-19]. In some parts of the country, these private negotiations between the buyer and the seller are referred to as the most common method used to establish beef prices. This is most often the case when a producer has established a reputation for superior quality herds [Armstrong, p. 70].

Direct selling is theoretically the most efficient system for feeder cattle producers when sufficient competition is available from buyers and when the producer has adequate information as to the market value. Direct selling normally reduces the number of times livestock are handled as well as the cost for shrink, commission, assembly, transportation, and the risk associated with disease [Stubblefield, p. 29].

Direct marketing is also referred to as private treaty selling or country selling of feeder cattle. In one-on-one sales negotiations between a seller and a buyer, price and terms of trade may vary greatly. Larger cattle producers are normally better equipped for direct marketing because they tend to be able to sell enough cattle at one time to attract competitive buyers and they can justify keeping current as to price fluctuations, market conditions, and salesmanship skills. For the same reasons, direct selling does not normally work well for smaller producers [Rhodes et al., p. 7].

Some buyers often prefer to buy feeder cattle directly from the

farm on which they were produced, because they generally have fewer health problems than cattle from auction sales. Producers also like to sell from the farm to save a commission or consignment fee. In addition, the producer does not have to commit to an unknown sale price before the animals leave the farm. However, price negotiations between producer and buyer on the farm are normally based on reported sale prices from auctions and graded sales [Rawls, 1988, p. 12].

Terminal Markets

Although terminal markets are not a method considered in this study, past significance and operating style warrant their recognition and description. The process of feeding cattle primarily for slaughter purposes began to experience wide acceptance and growth during the 1950's. It was during this time that terminal public markets were one of the most popular outlets used for marketing fed cattle. By 1985, the significance of terminal markets to the feeder cattle market had diminished greatly. Only a small percent of terminal markets remain today and they are mostly in the midwestern states and primarily handle slaughter animals. Although terminal markets served as the outlet for nearly 70 percent of the livestock marketed in 1950, they served only about 5 percent in 1985 [Futrell and Wisner, p. 136].

Terminal markets provide physical facilities that house animals consigned by producers to a commission firm. Firm officials then represent the producer as the seller for a fee. A price is then negotiated by the commission representative and a buyer. This negotiation typically takes place in the pen that holds the animals

inside the stockyard facilities [Taylor, p. 405].

Statement of the Problem

Tennessee has a strong historical record as a significant contributor to the United States beef and livestock industries. The state ranked eleventh nationwide in the number of beef cattle in 1991. Cattle remain the state's largest agricultural enterprise in value of production. The cattle system accounted for 24.4 percent of the 1991 cash receipts from farm marketing [Tennessee Agriculture 1991]. While the overall marketing of these animals is of great importance to the state, the marketing methods that make up the system are quiet diverse in several respects.

The methods available for the marketing of feeder cattle have experienced numerous changes over the past several years. The traditional marketing methods of terminal markets, auction sales, and direct selling have been replaced, expanded, and enhanced, respectively, by constant technological advances in communications. Such changes have caused several marketing methods to become popular alternatives for Tennessee feeder cattle producers over the past decade. The use of electronic media to market livestock has been responsible for several of the changes in traditional marketing methods. New methods are often justified on the basis of developing a more efficient marketing system. Studies have provided information concerning more efficient exchange systems for livestock based on the economics of the predominant methods that have come into recent existence due to technological advances. These types of methods are often referred to as "nontypical". However,

no recent study concerning producer attitudes toward the different marketing methods available has been found.

A study of Tennessee auction markets by Hicks and Badenhop (1971) concluded that the state had too many auction markets to develop an efficient, low-cost livestock auction system. The results of their research suggested that an efficient system could result if the then 74 auctions were reduced to a maximum of 35, with 18 the preferred number. A later study of similar nature by McClain and McLemore (1987) reported results consistent with the Hicks and Badenhop study. McClain and McLemore found that 19 auction markets across the state would be the most efficient number. The 74 weekly auction markets that had operated in 1971 had been reduced to 54 at the time of the McClain and McLemore study (1983). As of December 31, 1991, the United States Department of Agriculture's Packers and Stockyards Administration reported that 44 weekly auction markets for feeder cattle were operating in Tennessee [Tennessee Department of Agriculture].

Movement toward more efficient market operations, along with studies indicating the economic benefit for market participants from technological advances in computers and electronic marketing, predicted a much different market make-up than what Tennessee is currently experiencing. Schrader bluntly noted that electronic marketing did not receive the magnitude of acceptance over the 15 years prior to his 1984 report that was expected. To this candid concession, Purcell noted that several researchers in the field were struggling to determine why the expected acceptance had not occurred. One reason noted for the lack of expected acceptance was the lack of ability to adequately consider the

perceivable difference in the academic and private sectors. Purcell also noted that participants should not be expected to evaluate and consider the academically discovered "system wide inefficiencies and problems in a system they use everyday" [Purcell, 1984, p. 866].

The actual attitudes that Tennessee feeder cattle producers have for the different marketing methods available to them tends to directly influence their decision in choosing a method. Attitudes serve as indicators of relative support for market alternatives [Fu et al., p. 910].

In order for the Tennessee feeder cattle industry to be prepared to most efficiently accommodate the needs and desires of its participants, an indication of why the participants act as they do would be beneficial. Therefore, a study of what producers see as advantages and disadvantages of the different marketing methods is an integral part of how the industry relates to these attitudes. Analysis of producer attitudes should provide the industry with information needed to determine the course of future trends and to allow industry participants to anticipate and adjust to current and future changes. Knowledge of producer attitudes toward marketing methods should especially help market operators accommodate these attitudes.

Objectives of the Study

The general objective of this study was to analyze producer attitudes toward the different marketing methods available for feeder cattle in Tennessee. The feeder cattle marketing system has experienced tremendous growth and change over the past several years. The results

of this study should provide useful information concerning feeder cattle producers' preferences for the marketing methods available in the state.

This study was designed to analyze and assess the extent of use of five different marketing alternatives by feeder cattle producers based on their assessment of advantages and disadvantages associated with each market. The specific objectives of this study and report were:

1) To determine why producers use or do not use certain types of marketing alternatives;

2) To determine relationships between producer characteristics and amount sold through each type of market; and

3) To determine relationships between producer characteristics and reasons for the choice of markets.

CHAPTER II

REVIEW OF LITERATURE

Most feeder cattle exchange systems studies can be grouped primarily into categories that concentrate on the economics of systems in current use and that suggest and study relatively new or "nontypical" systems. Methods by which feeder cattle are marketed have been the subject of many research projects. Industry participants' opinions toward the different available methods have often been evaluated to provide information concerning what marketing advantages and disadvantages are viewed as important.

Studies in a variety of disciplines have conducted analyses of individuals' attitudes. For most studies, including this one, attitudes serve as a representation of a "person's ideas, convictions, or liking with regard to a specific objective or idea" [Churchill]. Attitude studies are valuable indicators of agricultural producers' behavior. In this case, the producer's behavior is toward the marketing methods available.

Evaluations of attitude information typically use some type of statistical analysis often involving qualitative choice models. Because of the increasing acceptance and adoption of these types of studies, information concerning the two popular qualitative choice models of logit and probit analysis is relevant.

Studies of Cattle Producers' Marketing Preferences

Studies have been conducted concerning different producer perceptions of marketing methods and systems. Stevens et al. (1952) found that producers preferred a particular outlet for marketing their feeder cattle, because it was simply the market where a better price was thought received than was possible through another method. This was the most often stated reason regardless of the market alternative preferred [p. 36].

Jackson (1969) reported that 55.4 percent of the producers surveyed in his study indicated convenience as the most important reason for using a particular method. Higher prices received and least cost associated with marketing were respectively the next most popular reasons for choosing a market. Jackson also noted that larger operations were more likely to consider price and efficiency as important factors for choosing a market [p. 15]. Similarly, Graybill (1959) attributed substantial use of auction markets in the South to two primary characteristics: convenience or availability, and the smaller number of animals sold per farm [p. 12].

Stephenson and Menkhous (1977) found that ranch size was an important characteristic for selecting a marketing method by Wyoming producers. However, the most common reason indicated that price was the most important determinant in making a marketing decision. Convenience and the ability to sell odd lots and culls were also popular reasons cited by the Wyoming ranchers for selecting a particular market outlet [p. 10, 12].

Economics of Systems in Current Use

Since the 1940's, bulletins, articles, and papers reporting economic studies of marketing methods in use throughout the United States have been prepared. Bulletins and reports by Couvillion et al. (1975), Hubbard and Fletcher (1981), and Williamson (1983), as well as papers and articles by Ward (1976), and Rawls (1993) have all provided descriptions and characteristics of existing marketing alternatives in regions and individual states of the Southeast. Research has also been reported dealing with cost structures of auction markets in the Southeast by Spielman (1982), and McLemore et al. (1983).

Couvillion et al. studied the marketing activities of Mississippi beef producers. Eight different methods were evaluated as outlets through which to market feeder cattle and calves. The study found that the major system utilized for the sale of stocker feeder calves was the auction market. Primary marketing periods were determined as were typical hauling distances and the form of transportation used by producers. Couvillion et al. found that May-June and August-October were the two most noted periods for marketing. The study also found that producers sold their cattle with little consideration of expected prices.

Williamson used a systematic approach in his brief description and discussion of some marketing alternatives available to feeder cattle producers. The report concentrated on three general categories: private treaty, auction systems, and vertical or partial integration. Included in the descriptions was an outline of procedures and principles to be followed when using particular methods. Private treaty negotiations

were classified as immediate delivery which involves sales direct to feeders, order buyers, and dealers. Forward contracting is also cited as a form of private treaty selling. Williamson's review of auction methods included several advantages and operational aspects of weekly auction sales. Sales involving commingled lots were also described. Suggestions were provided for the improvement of special sales for feeder cattle. Organization and individual sales as well as board sales and tele-auction sales were also described in the article. In the report, Williamson explained the operation of different marketing methods in a manner adequate for producers to consider them as alternatives.

Rawls (1993) provided a detailed list of advantages and disadvantages of feeder cattle marketing alternatives for Tennessee producers. The methods discussed include private treaty, weekly auctions, graded feeder sales, and video board auctions. A listing of typical advantages and disadvantages for each of the methods reviewed was provided. Competition, price, convenience, and volume were some reasons given in the report as an advantages and disadvantage of a particular marketing method. The report serves as a reference for producers considering alternative marketing methods.

Ward related the importance of marketing decisions to the success of a feeder cattle operation. The article stressed the need for producers to keep current with the changes that occur in the marketing system. Several different marketing alternatives available to producers were described, but the article concentrated on the advantages for individual producers and marketing programs that involve cooperatives.

Ward encouraged the development of innovative marketing programs through cooperatives in order that producers and consumers benefit. Improvements in the current system, development of an industry-wide exchange system, development of a coordinated cooperative system, and economic integration were given as alternatives for producers to consider in order to develop a producer controlled marketing system.

Hubbard and Fletcher (1981) examined the market structure that existed between the producer and the first buyer of beef cattle in Georgia. The study also investigated market alternatives and producers' criteria by which choices among these outlets were made. Based on survey results from operators in 33 Georgia counties, the study found that first handlers of beef animals were located within close proximity to the beef producer. Producers primarily provided their own transportation to markets. The study found that livestock auction markets were the dominant first handler. Convenience was also noted as the producers' most popular reason for selecting a market. Hubbard and Fletcher also found that larger producers stressed price as an important factor in deciding on a market.

Spielman conducted a cost analysis of the livestock auction markets in Tennessee to determine the degree of operational efficiency. Economies of size in Tennessee livestock auction markets were explained. The study found that average total cost (ATC) declined for auctions up to intermediate size. The largest component of the auctions' ATC was found to be salaries which accounted for 50 percent of the ATC. Insurance and utilities were responsible for the second and third largest expenditures respectively. Results of the study indicated that

most of the available cost economies could be achieved if markets would expand output to 30,000 animal marketing units per year.

Similar to the Spielman report, McLemore et al. evaluated size economies for the same system by using two different statistical methods. Both OLS and frontier function analysis revealed that economies of size were present in the industry. The former approach estimated short run average cost and provided statistically significant estimates. The later approach, however, provided a more theoretically appealing long run average total cost estimate. Based on OLS estimates, the study found that Tennessee auctions could experience significant cost economies by increasing volume. Conversely, the frontier function analysis concluded that economies of size were important at smaller output levels. The study concluded that OLS estimates indicate possible economies of size over a wider range of volume in the long run.

Other studies of current methods have concentrated on the organization of the alternatives with suggestions of measures to enhance their operations. These include Hicks and Badenhop (1971), Antonovitz and Raikes (1983), and McClain and McLemore (1987).

The Hicks and Badenhop study was based on 1968 data and concluded that Tennessee's livestock marketing system was one of high cost and numerous inefficiencies. The high cost and inefficient system was reportedly due to an over-abundance of auction markets in the state. The study recommended a 75 percent reduction in the number of auctions. This reduction would result in 17 to 19 strategically located auctions. Locations indicated by the study on a regional basis included six in West Tennessee, seven in Middle Tennessee, and five in East Tennessee.

The Antonovitz and Raikes study concentrated on the marketing decisions that producers of feeder cattle make concerning direct marketing. Two models were used to present a direct marketing strategy designed to improve returns. The study concluded that the method of contacting three or fewer potential buyers, by habit, was not the best procedure for obtaining the highest return. The results showed that higher returns were possible if producers would contact at least four packers.

McClain and McLemore identified optimal size, number, and location of auction markets in Tennessee using a separable programming model. The combined costs of assembling and marketing livestock were minimized in the study. The study found that these combined costs could be lowered by a reduction in the state's total number of auctions and increasing average sales volume of the remaining markets. The study involved a basic model that simultaneously determined optimal sizes, number, and locations of auction markets by minimizing the combined costs of transportation, market operation, and buyers' operation. The model identified an optimal system of 19 markets with average annual volume of 80,562 animal marketing units. An alternative model was also formulated following previous studies but excluded buyers' costs. The solution derived for this model suggested an optimal Tennessee market consisting of 47 markets with an annual volume of 26,859 animal marketing units.

Evaluation of Nontypical Systems

Various studies have computed the operating cost for non-traditional or "non-typical" marketing methods. Some studies also make

efficiency or cost comparisons between various nontypical systems and traditional systems. Such reports include Chiervzzi and Buccola (1981), Sullivan and Linton (1981) Bailey and Peterson (1991), and Bailey et al. (1991).

Chiervzzi and Buccola compared the costs involved in marketing slaughter cattle in Virginia through computerized and conventional auction systems. The study found that per-head costs of marketing cattle by computer were less than the cost of marketing through conventional auctions. The report concluded that the less costly electronic marketing system supports the thought that the market encourages competition and access to market information therefore promoting price discovery.

Sullivan and Linton evaluated the performance of a special market board sale for feeder cattle in Alabama. The study measured price differences at the market board sale and auction markets. The impact that the market board sales have on overall market cost reductions was also examined in the study. The study found that information provided by producers concerning lot size, breeds, delivery weights and dates, sex, time of sale, and grade significantly influenced feeder cattle prices. Greater weight variation within a lot was associated with a lower price. Sex and weight had similar price affects in both auctions and board sales. The study also found that market board sales increased the technical efficiency involved in the marketing of feeder cattle.

Bailey et al. compared price differences among the largest domestic satellite video auction sale and three individual regional auctions of comparable sales volume. The report also offered a detailed

description and information concerning video cattle auctions. The study found that the net prices received and paid in the video sale were above the prices reported the following week at the regional markets considered.

Bailey and Peterson used the same market comparisons in their study of the factors that influence the prices in both a satellite video sale and three traditional auction markets. Their test for structural pricing differences found that lot characteristics, market information, merchandising strategies, and prices were virtually the same in both systems. The study revealed that optimal lot size was larger through the satellite video sale than through traditional auction sales. Animal breed was found to be a significant determinant of price as was the appearance or absence of cattle with horns. Lighter fleshed, larger frame animals were also found to command higher prices than animals of the opposite make-up. The study also found that there was no significant price difference between lots sorted and not sorted by sex.

Several studies concerning nontypical systems with a special emphasis on a variety of issues related to electronic marketing have also been conducted. Among these are studies by Russell and Purcell (1980), Henderson (1984), Forster and Roberts (1987), Purcell and Bell (1988), Schrader (1984), Sporleder (1984), Hamm et al. (1985), and Dykes et al. (1991).

Russell and Purcell reported survey results concerning the establishment of an electronic marketing system for Virginia slaughter cattle. The study also determined organizational structure and operational procedures required to establish an electronic marketing

system that would be acceptable to buyers and sellers. The mirror-image survey results suggested specific characteristics that an electronic marketing system would include or omit in order to be adopted by producers and packers. The study revealed that producers and packers agreed that auction markets should have an electronic system when cattle are sold by description. They also agreed on having an objective third party grader, allowing the market manager or the board of directors to settle all disputes, and selling each lot of animals separately rather than allowing the high bidder to take their choice and repeating the selling process.

Henderson provided a definition of electronic marketing as it applies to agriculture and reviewed some of the factors of electronic marketing that caused increased interest in the system. Conventional and video tele-auctions, teletype auctions, telephone clearinghouses, and computerized trading networks were given as the types of markets that compose the basics of electronic marketing. The report noted that significant interest in electronic markets resulted from the thought that pricing advantages could be achieved. The report found that electronic system offered the potential to minimize pricing problems and improve agriculture coordination without imposing higher exchange costs on participants.

Forster and Roberts provided a comparison of the performance between electronic and double auction markets. The performance measures used in the study included price levels, price stability, and quantities. Both electronic and double auctions were conducted through experimental markets. The study found that the measures of performance

studied were significantly higher in the electronic marketing than in the oral market. The results called for further investigation into electronic marketing. One perceived advantage of the electronic system was its ability to remove personality from the bidding process and enhance the exchange of information.

Purcell provided a description of the progress and potential of electronic marketing in agriculture. A history of the system was followed by reasons for electronic marketing development and a description of the different types of systems that have developed. Benefits of electronic marketing were given along with several outlook implications. Purcell noted that electronic marketing emerged with a teletype network in the 1960's and was enhanced by a computerized communication system for Texas cotton markets in the mid 1970's. "Thin-markets" for cotton in Texas and the need for efficiency and competitiveness were cited as reasons for the use of electronic markets. Increased competition, lower costs for product movement, higher market prices, and better buyer and seller access were some of the benefits recognized from electronic marketing.

Schrader investigated the impact of electronic trading on agricultural product prices and reviewed empirical evidence from such trading systems that had previously been implemented. The study found that electronic trading could provide more favorable net prices to both buyer and seller due, in part, to lower transfer costs than in the traditional markets considered. The study did notice signs of a price leader role in the electronic trading market. The report recognized the lack of support for a system with such favorable opportunities.

Uncertainty, possible short-run costs, and the simple failure to recognize a problem with the current methods were given as possible reasons for a lack of participation and adoption.

Sporleder studied the long run impacts of electronic trading systems on selected structural variables. Implications were drawn concerning pricing efficiency with respect to these selected variables. The study found that several structural variables in a commodity market are potentially changed by electronic trading systems. These changes are primarily aimed toward enhanced pricing efficiency. The study concluded that electronic trading could cause larger geographic areas over which buyers could obtain larger volume. This suggested a potential long-run buyer concentration in a larger market.

Hamm et al. studied the behavior of buyers as they participate in electronic marketing systems and provided a framework for analyzing the impact on price from anonymous bidding. The study implied that anonymous bidding tends to increase competition among buyers. Prices were higher as a result of buyers that continued to bid at the conclusion of the auction because all bids were anonymous. This continued bidding is not characteristic of traditional auctions where the feature of anonymity is absent. A price leader role was identified in the electronic bidding market. The study also found that competing in an ascending auction is enhanced by maintaining anonymous bidding

Attitude Studies

A variety of studies have also been conducted with objectives associated with analyzing opinions, attitudes, and preferences of

producers and operators of agricultural enterprises. Jensen and Bevins (1991) used mean responses, t-tests, and frequencies of occurrence to examine dairy farmers' opinions of milk marketing in Tennessee with regard to cooperative verses non-cooperative participation. The study found that cooperative members were virtually satisfied with the performance and services of their respective cooperative. Perceived low milk prices and high assessments and deductions were determined important factors in the decision to change buyers. Selling into an assured market and to a stable operation were significant reasons for not changing buyers.

Turner et al. (1983) analyzed factors that affect producer attitudes toward an electronic market for multiple commodities. Dummy variables were used to reflect producers' positive or negative reactions to yes/no questions concerning electronic marketing. The study found that a majority of the participants were open to electronic marketing which suggested that producers felt as though a better marketing method was available. The study found that the strength of continued interest in electronic marketing was uncertain. The article reported that initial adopters of electronic markets would be characterized by optimism and inclination toward risk. Diversified operations were also found to be more likely to react in a positive manner to electronic markets. Inclination toward risk primarily by young, aggressive producers with intentions to expand their opportunities were found to be significant in determining adoption of electronic marketing.

Russell and Purcell (1984) used a mirror-image survey to examine the attitudes and perceptions of the buyers and sellers who had used

Electronic Marketing Association's (EMA) computerized trading system as a non-profit producer controlled entity. The study investigated the relation of producer attitudes toward EMA and the volume sold. The attitudes were studied as factors of adoption of new systems. The study found that the probability of accepting the market by industry groups increases when a strong producer group with an established reputation is in the market. The study also found that accurate descriptions of the products must be made because of the uncertainty of the new system. Market operators were also advised by the study to insure that an adequate supply of quality products and competitive bids were available.

Studies That Involve Logit Analysis

Literature involving the two most often preferred qualitative choice models is widespread. Probit and logit analysis have been reviewed and explained in a variety of studies. Under certain circumstances each model has an appropriate and efficient use. Therefore, the models themselves as well as prior studies involving both models were reviewed for this study.

Baudin and Solberg (1985) estimated a logit model to analyze the substitution of lumber products in the industrial sectors of Norway. Study results showed that price competition among products is an important factor in the two different sectors studied while unit labor costs were important in only one sector.

Lines and Zulauf (1985) conducted an analysis of the relationship between debt-to-asset ratios and selected socioeconomic characteristics by using a polytomous multivariate logit regression. The information

for this study was obtained from a sample of Ohio farm operators. The study found that gross farm sales, operator age, and the percent of land farmed that was owned were significant independent variables. The study also noted that the major source of farm income and percent of family income coming from off-farm sources were not significant discriminators of the farm operators' debt-to-asset ratios.

Clements and Jamnick (1989) used a maximum likelihood logit model to indicate that private woodlot owners' forest management decisions are related to owner and ownership characteristics. They also discussed examples of how the model can be used to develop policies to encourage management or as a screening tool for forest extension personnel.

Bojamic and Calontone (1990) presented a framework integrating economic and marketing approaches to price bundling which includes demand and cost considerations. A logit model was used to estimate the effect of service design on the demand for services provided by state parks.

Zepeda (November 1990) examined the factors that explain the adoption of a capital-intensive verses a management-intensive technology in the dairy industry. The study was conducted by the estimation of a multinomial logit model of the technological choices made by California dairy farms.

Harper et al. (1990) used logit analysis to evaluate survey data concerning rice stink bug management by Texas rice producers. The study attempted to identify the factors that influence the decision to apply insecticides for stink bug control. Analyses of the adoption of the insect sweep net and treatment thresholds were also made. Results

indicate that activities by the Extension Service can have a significant effect on the adoption of new technologies.

Zepeda (July 1990) utilized a multinomial logit model to predict bovine somatotropin (B.S.T.) adoption. Hypotheses were tested concerning the characteristics associated with knowledge and receptiveness toward B.S.T. The data for this study came from survey responses collected from California milk producers.

Ribaudo and Piper (1991) used a logit model to determine the probability of participation in recreational fishing. Based on national data, a water quality index was used to reflect regional water quality in the logit model. The results of the study suggest that changes in fishing activity due to improvements in water quality on a regional scale can in fact be measured.

Schnitkey et al. (1992) used multinomial logit models to examine farmers' information preferences for marketing, production, and financial decisions. The study found that farmers have a preference for information in written form and that farm size, farm type, age, and computer use were significant variables explaining this preference.

Comparison Studies of Probit and Logit Analysis

Capps and Kramer (1985) compared probit analysis with logit analysis by analyzing food stamp program participation at the household level by using a nationwide sample of households. The comparison of the two models was based on estimated parameter values, signs, magnitudes, test statistics, goodness-of-fit to sample data, predictive ability to independent data samples, and non-nested testing procedures. The study

found that the two alternative models performed equally well for the discrete binary variables utilized.

Turvey (1991) also concluded no real differences in the predictive accuracies of logit and probit models. The logit model offered 69.7 percent and the probit model offered 69.4 percent prediction accuracy in the binary variable model. Logistic and normal cumulative probability distributions intersect at 50 percent probability but they differ in the tails. For example, the logistic distribution is defined over a finite range of observations so that a closed-form solution can be obtained. However, the probit model, in its assumption of normality, assumes a range from positive to negative infinity.

Studies That Involve Probit Analysis

Hill and Kau (1973) used probit analysis to estimate the causal relationships in the dichotomous threshold model concerning decisions by farmers to purchase grain dryers. The concept of the threshold model allowed for investigations of the relationship between farm characteristics and actual purchases. The study found that the size of the farm enterprise and joint production or marketing decisions influenced the purchase decisions studied.

Turner and Epperson (1983) used the probit procedure for their binary choice model which analyzed factors that affect producer attitudes toward electronic marketing. Based on the economic theory of choice, probit analysis was chosen for the study to generate bounded probability estimates for each producer participating in the study. Producer perception of fair farm prices was a significant negative

factor influencing producer attitudes toward electronic marketing. A producer intending to expand the farm operation also was determined to be a significant factor of a producer's attitude while age was found to be inversely related. Use of trade magazines was a positive indicator of preferring electronic markets. Grain storage capacity also resulted in a direct relation to attitudes. As capacity increases, the probability of a positive response toward electronic marketing also increases. More optimistic producers were also found to be more responsive to the market. Years of education and gross farm income were found to be insignificant factors.

Rahm and Huffman (1984) presented a model of adoption behavior to explain differences in farmers' decisions to adopt reduced-tillage practices and the efficiency of their adoption decisions. Probit probability specifications of the adoption equation were fitted to the data. Results showed that the probability of adopting reduced tillage practices in Iowa were affected by soil characteristics, cropping systems, and the scale of operation. However, when adoption of the method was not economically feasible, human capital variables tend to affect the decision to adopt.

Fu et al. (1988) analyzed the attitudes of peanut producers toward different marketing alternatives. A multivariate probit (joint estimation) model for ungrouped data was used to obtain profiles of producers favoring private treaty markets and proposed organized markets. The results indicated significant support for all three of the alternatives presented in the study. The characteristics of the producers associated with the support of the alternatives were

consistent with the characteristics associated with early adopters of technological advancements and new methods.

Mohammad et al. (1989) used a probit model to estimate a decision model for a dichotomous choice variable for adoption of a conservation tillage technology in Kentucky. Probit analysis was used to calculate parameter estimates of the decision model. These parameter estimates were used to calculate probability estimates for the adoption of the production technology practice considered. The study found that soil characteristics, scale of operation, and the cropping system have significant affects on the probability of adopting reduction tillage. The study found that when adoption is not always economically feasible, human capital characteristics increase the efficiency associated with the adoption decision.

Popkin et al. (1989) used large nationally representative data sets from 1977 and 1985 to study the changes in food consumption patterns for women between the ages of 19 and 50. With a dependent variable of daily quality of food consumed from a selected set of food groups, a probit model was used to disaggregate two possible sources of change. The two sources of change considered are changes due to shifts in population and changes in behavior. The article notes that probit was the selected model because, among other reasons, its estimator is based on the assumption that the error term is an accordance with a normal distribution which is the same distributional assumption that is normally made for continuous variables.

The study found that "numerous" factors affect the probability of consuming foods that consisted of lower fat or higher fiber composition.

It was also determined that several geographic and ethnic variables contributed to food consumption behavior. Also discovered was an increased probability for Food Stamp Program participants to consume whole milk and a decreased probability of low-fat or skim milk consumption.

Makus et al. (1990) used a probit model to quantify the factors influencing the probability that a selected group of agricultural decision makers used futures or options for commodity marketing. The study covered three different marketing years. The study found that four producer characteristics and activities had the largest relation to the probabilities of using or not using futures and options. Region of production activity was also found to be a significant variable while farm status, government participation, and age were not.

CHAPTER III

METHODOLOGY

Source of Data

A four-page questionnaire was developed to obtain information regarding feeder cattle producer attitudes toward different marketing methods, the percentage of cattle sold via each method, and several producer and farm characteristics. The survey tool, [Appendix B], included a section devoted to each of the five alternative marketing methods considered. The five methods or types of markets studied were weekly auctions, graded sales, video board sales, satellite video sales, and direct sales. Producers were asked to give the percent of cattle that they sold through each method in 1991. Subsections dealing with each of the five methods elicited producers' attitudes toward typical advantages and disadvantages or reasons for using or not using that particular method. For each of the typical reasons associated with advantages and disadvantages, as well as an "other" category producers were directed to rate the importance of the reason why they do or do not like a particular method. The following levels of importance that were provided for producers to best describe their rating of each reason were: MI= most important, VI= very important, I= important, SI= somewhat important, NI= not important, and X= irrelevant. The questionnaire also concluded with ten questions concerning characteristics of the producers and farm or ranch operations.

The survey tool was developed to elicit the percent of cattle sold through each marketing method, the producer's rating of importance of

"likes" and "dislikes" about each method, and producer and farm or ranch characteristics. The questionnaire was mailed by the Tennessee Agricultural Statistics Service to a sample of Tennessee beef cattle producers of various size and location. The sample size was limited to 1000 due to budgetary constraints. The mailings took place during the late summer and fall of 1992. Another copy of the questionnaire and a different cover letter were mailed three weeks after the initial mailing to those producers who had not yet responded.

The 1000-producer sample was stratified based on the total number of feeder cattle produced. The data were stratified into three groups based on size. A proportional stratified design was used to devise the sample list. The population size for producers of 1 to 49 head was 26,679. The population size for the remaining two categories was 5,120 for 50 to 99 head, and 2,829 for more than 100 head. The stratified sample selected was approximately 2.8 percent of the population size for each category. This computation resulted in the following number of producers compiling the 1000 producer sample in each of the respective categories: 711 producers for the 1 to 49 head category, 148 producers from the 50 to 99 head category, and 81 producers from the more than 100 head category. Although the sample consisted of 1000 producers, only 989 were actually mailed a questionnaire. The eleven questionnaires were not mailed because the potential recipiants were determined to be deceased or out-of-business after the sample was selected.

Of the 989 producers who were mailed a questionnaire, 224 completed and returned the questionnaire resulting in a 23 percent response rate. Due to a variety of response problems, only 185 surveys

were usable. The questionnaires were coded and entered in LOTUS 1-2-3. From the spreadsheet, the data were imported to the Statistical Analysis System (SAS) for computational purposes.

The 1987 Census of Agriculture reported that 43,616 farms in Tennessee were responsible for the production of 894,348 head of beef cows. In terms of the 1987 census, the 1000-producer sample for the study represented nearly 2.3 percent of Tennessee beef cattle producers [United States Department of Commerce].

Producer and Farm Characteristics

The current study was intended to determine producer perceptions concerning feeder cattle marketing alternatives and to assess potential relationships between those perceptions and producer's characteristics. The characteristics, or independent variables, identified by the questionnaire were: number of brood cows owned, number of stocker calves bought, type of equipment used for hauling, number of feeder animals sold by weight categories, principal farm enterprise, existence of off-farm employment and percent of income from off-farm jobs, and education and age of the operator. Each of the characteristics was assigned a variable name for easy reference in the equations and models. These variables are defined in Table 1.

Number of Brood Cows Owned

The number of brood cows owned provides information relating to the size of the operation. This variable also provides an indication as to the degree to which the producer is involved in the production aspect

Table 1. Definitions of Characteristic Variables.

Variable Name	Description
BROOD	Number head of brood cows owned in 1991
BRBEF	Number of brood cows that were beef type
BRDRY	Number of brood cows that were dairy type
STCKR	Number of stocker calves bought in 1991
ACRES	Total number of acres of pasture owned and rented
SOLD	Number head of feeder cattle and calves sold
HGOOS	0= No, 1= Yes: Use gooseneck trailer for hauling
HBUMP	0= No, 1= Yes: Use bumper-hitch trailer for hauling
HPICK	0= No, 1= Yes: Use pick-up truck for hauling cattle
HTON	0= No, 1= Yes: Use 1 to 2 1/2 ton truck for hauling
<500	Number head of feeder cattle and calves weighing less than 500 pounds sold during 1991
5-700	Number head of feeder cattle and calves weighing between 500 and 700 pounds sold during 1991
>700	Number head of feeder cattle and calves weighing more than 700 pounds sold during 1991
PRNENT	Principal farm enterprise, coded as 1 through-17
BEEF	Principal farm enterprise - beef; 0 - NO, 1 - YES
DAIRY	Principal farm enterprise - dairy; 0 - NO, 1 - YES
YUJOB	0 If YOU do not have, 1 If YOU do have an off-farm job
SPJOB	0 If your SPOUSE does not have an off-farm job, 1 if your SPOUSE does have an off-farm job
INC	Percent of total family income from off-farm jobs
EDUC	Number of years of formal education corresponding to: 1= 8 or less, 2= 9 - 12, 3= some college, 4= college graduate, and 5= graduate or professional school
AGE	Age of the operator in years

of the industry. The number of brood cows also indicates the source of a producer's stock. A further breakdown of the number of brood cows indicates whether production is primarily of beef or dairy animals. Production of primarily beef or dairy cattle may affect the marketing method chosen.

Number of Stocker Calves Bought

The number of stocker calves bought provides an indicator of the source of a producer's herd. This variable indicates the method that a producer uses to obtain feeder animals. The number of stocker calves bought may influence the use of certain marketing methods.

Number of Acres of Pasture

The number of acres of pasture owned and rented is another variable that indicates the size of the operation. This measure of size indicates the availability of resource base for the feeder cattle enterprise.

Number of Feeder Cattle and Calves Sold

The number of feeder cattle and calves sold during 1991 provides a good indicator of the size of an operation based on the amount of selling activity measured in head units. The number sold also indicates the significance of a producer's selling activity. The number of feeder cattle and calves sold may influence the marketing method chosen. The response in this area indicates whether a producer sells an appropriate amount of animals on an annual basis to participate in certain sales

methods.

Type of Equipment Used to Haul Cattle

The type of equipment that a producer uses to haul cattle indicates the capacity that is available for transporting or relocating stock. It also determines the extent to which operationsmay be limited in their ability to utilize some marketing methods. This variable could limit or force a producer to prefer certain marketing methods.

Number of Feeder Cattle and Calves Sold by Weight

The number of feeder cattle and calves sold in the weight categories of less than 500 pounds, 500 to 700 pounds, and greater than 700 pounds gives a breakdown of the total number of animals sold according to weight. This categorization may identify producers who specialize in the sale of feeder animals in certain weight categories. Such specialization may influence the reasons for using or not using certain methods.

Principal Farm Enterprise

The principal farm enterprise indicates what the producer considers the primary role of the farm operation. A producer who indicates beef cattle as the principal enterprise is likely to have different perceptions about marketing methods from a producer who is principally engaged in a different enterprise. The principal enterprise may also indicate the level of importance that beef cattle have in the overall agricultural operation.

Off-farm Employment and Percent of Income from Off-farm Jobs

An indication of the amount of time devoted to farm interests should be available based on off-farm employment information. Also, the percent of income derived from off-farm jobs provides information concerning the level of financial reliance placed on the feeder animal enterprise. Whether one or both spouses has an off-farm job may indicate how significant their farm participation is to their overall financial situation.

Number of Years of Formal Education

The producer's number of years of formal education may be related to ability to understand and accept innovative marketing methods. Higher levels of formal education are normally associated with a greater acceptance of "nontypical" methods.

Age of Operator

The age of the producer may influence the reasons that certain marketing methods are preferred. It is hypothesized that younger producers are more likely to participate in the nontypical methods, while older producers normally prefer more familiar approaches.

Research Procedure

To meet the objectives of this study, different research techniques and statistical methods were considered. Three distinct statistical analysis were performed in this study. First, descriptive statistics were computed to determine average rating levels for reasons

why producers like or do not like certain methods. The six levels of importance for rating the typical advantages and disadvantages were coded by assignment of values 1 through 6 for the categories "irrelevant" through "most important." Statistical means were also calculated for producer and farm characteristics. Second, Ordinary Least Square analysis (OLS) was used to compute regressions considering each producer's percent of cattle sold through a particular method as a function of selected producer characteristics. This calculation allowed for the estimation of relationships between producer characteristics and the percent sold through each market type. Third, a qualitative response model was chosen to identify the probability of a producer's choice of particular methods based on the same set of producer characteristics used in the OLS regressions.

Evaluation of Sample Characteristics and Responses

In order to address the descriptive objectives of this study, means were calculated using the Statistical Analysis System. First, the set of means was calculated for producer characteristics. These results indicate the average level (value) for each of the descriptive producer and farm characteristics in the survey. A second set of mean calculations were made for the ratings of each the advantages and disadvantages associated with using a particular marketing method. These means provide an indication about the average importance placed on an individual advantage or disadvantage by producers.

Market Participation in Terms of Percent Sold

The sample for this study was chosen from a list of Tennessee beef cattle producers. Therefore, the survey participants actively sell feeder cattle. Feeder cattle producers choose, among alternatives, a type of market through which to sell their cattle. The characteristics of the seller and his/her farm operation may be related to the type of market selected. The percent of cattle that a producer sells through each market is a good indication of a producer's choice of a market.

Ordinary least squares (OLS) regression analysis in its basic form refers to the process of estimating the parameters of an equation that identifies relationships between the dependent variable and one or more explanatory (independent) variables [Churchill p. 504]. OLS regression was chosen to estimate relationships between producer characteristics and the percent of their cattle sold through each type of market. The dependent variable, PSM_i, is the percent of cattle sold through the ith market (Table 2).

Variable Selection

All of the characteristic variables included on the questionnaire were considered for inclusion in the OLS and qualitative choice models. A measure of size is understandably important to the determination of a producers' choice of a market. The questionnaire used in this study solicited a number of size characteristics including the number of brood cows owned, the number of acres owned and rented, and the number of head sold. Table 45 (Appendix C) shows the correlation coefficients as a measure of the strength of the relation between the size variables. The

Table 2. Descriptions of Dependent Variables Used in OLS Regressions for the Percent of Cattle Sold Through Each Market Type.

Variable Name (i)	Description
PSM_a	Percent of Cattle Sold in 1991 through Weekly Auctions
PSM_g	Percent of Cattle Sold in 1991 through Graded Feeder Cattle Sales
PSM_v	Percent of Cattle Sold in 1991 through Video Board Sales
PSM_s	Percent of Cattle Sold in 1991 through Satellite Video Sales
PSM_d	Percent of Cattle Sold in 1991 Directly to Buyers from the Farm.

correlation coefficients indicate that the variables are highly collinear. That is, they tend to measure the same thing. Therefore, only one measure of size was used for the analysis. Because the number of head sold is a direct characteristic of a producer's marketing activity, it was chosen as the measure of size to be included in this study and is referred to by the variable name SOLD.

The questionnaire solicited the number of animals sold by the three weight categories of less than 500 pounds, 500 to 700 pounds, and more than 700 pounds. The weight categories provide an indication of the type of animals that the producer sells. That is, the primary production of animals at weights less than 500 pounds implies that the producer is a cow/calf operator and sells weaned or weaning calves. A producer who feeds animals to weights of 700 pounds or more may be involved in backgrounding or stockering. A producer who sells animals at weights less than 500 pounds may possibly have different objectives and attitudes toward marketing methods for his/her cattle than a producer of animals weighing more than 700 pounds. To determine whether a producer is primarily interested in producing animals of a certain size category, a ratio of the number of head sold in each weight category was calculated. The ratio for the number of animals sold at weights less than 500 pounds and more than 700 pounds to the total number of animals sold are included as independent variables in the analysis as NO5 and NO7, respectively.

The amount of importance that a farm operation plays in the overall financial situation of the farm family may be evident by the indication of off-farm employment. If a producer has an off-farm job,

their production of feeder cattle may be a "hobby" or a "sideline activity." Therefore, a producer with off-farm employment may not rely as heavily on the feeder cattle business for survival as a producer who has no off-farm income. Similar notions are applicable to whether or not the producer's spouse has an off-farm job. A producer who has the assurance of some financial support being derived from off-farm employment, either by the producer or the spouse, may have different objectives and attitudes toward marketing methods. It is understandable that attitudes may differ among feeder cattle producers who have sources of income from off-farm jobs and producers who rely only on income from farming activities. Indication of the producer having an off-farm job is identified by the dummy variable assignment of 0= no and 1= yes for the variable YUJOB. This yes/no assignment applies to the SPJOB variable for the indication of the spouse having an off-farm job.

The number of years of formal education that a producer has is expected to influence marketing decisions. As education level increases, the producer is more likely to understand and adopt innovative and "nontypical" methods. Higher education levels may also be related to a producer's management practices. A producer's level of education should be related to their attitude toward marketing methods, because a higher education is normally associated with the ability to interpret and understand information. In the case of this study, information may be related to the technology associated with video and satellite sales. The levels for the number of years of formal education were denoted by the variable name EDUC according to: 1= 8 or less, 2= 9 - 12, 3= some college, 4= college graduate, and 5= graduate or

professional school.

The age of a producer is expected to be related to attitudes concerning market activity. Because older producers are often considered less receptive to change than younger producers, older feeder cattle producers normally would be expected to prefer traditional marketing methods while younger producers are more likely to participate in "nontypical" methods. Age is represented in the regression analysis by the variable name AGE.

The farming operation that a producer considers to be the "principal enterprise" may influence attitudes toward marketing activity. Producers that consider beef cattle to be the principal enterprise are likely to have different concerns involving the marketing of their cattle than are feeder cattle producers who are principally engaged in some other agricultural enterprise. While producers that indicate dairy cattle as their principal farm enterprise are engaged in the cattle business, their perception of the beef industry may be expected to differ from the perception of other producers. Indication of beef and dairy principal enterprises are denoted by the variables BEEF and DAIRY, respectively. The variables are interpreted by the dummy variable assignments of 0= no and 1= yes.

The number of stocker calves that a producer buys may indicate the primary source of the animals sold. A producer that is involved with feeder cattle from the point of view of a "stocker" (buyer-seller operation) will likely consider different marketing criteria than will a cow-calf operator. The degree to which a producer is primarily a "stocker" can be determined from the ratio of the number of stocker

calves bought to the total number of head sold. This characteristic is identified by the variable name STCKBT.

As a result of the evaluation of all the available characteristics, ten variables were chosen as independent variables for the regression analysis. Therefore, the regression equation may be written as:

$$PSM_i = \beta_0 + \beta_1 SOLD + \beta_2 500LB + \beta_3 700LB + \beta_4 JOB + \beta_5 SPOUSE + \beta_6 EDUC + \beta_7 AGE + \beta_8 BEEF + \beta_9 DAIRY + \beta_{10} STKBT + \epsilon_i,$$

where the variables are described in Table 3.

Producer Ratings of Market Advantages and Disadvantages

Data Interpretation

Before any qualitative choice models and procedures can be adequately considered, a clear interpretation of the data must be made. The levels of importance that producers can choose to describe their feeling toward typical advantages and disadvantages of a given marketing method are reflected by sequenced categories ("irrelevant" = 1, "not important" = 2, "somewhat important" = 3, "important" = 4, "very important" = 5, and "most important" = 6). These dependent variables can assume only discrete values. When a discrete dependent variable can take on more that two values such as 1, 2, 3, 4, 5, or 6, the variable can be classified as categorical or non-categorical. Categorical variables, those that have categorized units, can be further classified as unordered, sequential, or ordered. As is the case for the data in

Table 3. Definitions of Independent Variables Used in OLS Regressions and Probit Models.

Variable Name	Description
SOLD	Number head of feeder cattle and calves sold
NO5	The ratio of the number head of feeder cattle and calves sold at weights less than 500 pounds to the total number of head sold during 1991
NO7	The ratio of the number head of feeder cattle and calves sold at weights greater than 700 pounds to the total number of head sold during 1991
YUJOB	0 If Producer does not have, 1 If Producer does have an off-farm job
SPJOB	0 If SPOUSE is not employed off-farm job, 1 if SPOUSE is employed off-farm
EDUC	Number of years of formal education corresponding to: 1= 8 or less, 2= 9 - 12, 3= some college, 4= college graduate, and 5= graduate or professional school
AGE	Age of the operator in years
BEEF	Principal farm enterprise is beef; 0 = NO, 1 = YES
DAIRY	Principal farm enterprise is dairy; 0 = NO, 1 = YES
STCKBT	Ratio of stocker calves bought to the number of feeder cattle and calves sold in 1991

this study, ordered variables correspond to groups or values that increase or decrease from one to another. The typical example of ordered-categorical-discrete dependent variables comes from research that considers attitudes or preferences that are measured on a dummy variable, 1,2,3, . . . n, scale [Maddala, pp. 13-15]. Therefore, the ratings of importance of advantages or disadvantages of market types in this study may appropriately be considered as ordered-categorical-discrete dependent variables. This distinction is important to the consideration of a proper qualitative choice model.

Qualitative Choice Models

Three frequently used qualitative choice models are linear probability, probit, and logit [Pindyck and Rubinfeld, p. 269]. According to Schnitkey et al., linear probability analysis yields estimates similar to logit and probit but is generally inefficient [p. 487]. Turvey explains that the inefficiency is related to the heteroscedastic variance of the error term using OLS [p. 44]. The linear probability model also suffers from inconsistent estimated standard errors which invalidates the associated R^2 and the statistical tests on the coefficients. Therefore, the predictive ability of the linear probability model is of little value [Turvey, p. 44]. Probit and logit techniques overcome the inefficiency and difficulties of the linear probability model by use of monotonic transformations to guarantee that predictions lie within the unit interval [Capps and Kramer, p. 50].

The logit and probit models were considered for this study. The

two models are quite similar although the logit has slightly more skewness in the tails [Lines and Zulauf, p. 94]. The logit model is appealing in that probability estimates are easily obtained and are guaranteed to fall within the unit interval. The logit model assumes a cumulative logistic distribution function while the probit assumes a cumulative normal distribution. The logistic and normal cumulative probability distributions intersect at 50 percent probability yet they differ in the tails, because the logistic distribution is defined over a finite range of observations so that a closed-form solution is obtainable. The probit model, with its assumption of normality, assumes a positive to negative infinite range. The procedures for estimating the two models are similar with the exception of the more difficult definition of the probit density function. Both models are asymptotically efficient and consistent so standard log-likelihood test statistics are usable [Turvey, p. 46].

According to Judge et al.(1988), choosing between the probit and logit models for binary variables may best be accomplished on the simple basis of convenience. This will usually lead to the adoption of the probit model when adequate computer software is available. In any event, the difference between the logit and probit, for binary dependent variables, is normally thought minimal [Judge et al., 1988 p. 788 and Kmenta, p. 555]. When the data on the dependent variable consist of more than two choice options, the choice is worthy of more consideration and deliberation. The logit is considered computationally more simple but is plagued by assumptions that are likely to be violated if the alternatives are close substitutes. The difference in the two models

may be summarized by the fact that although the probit model is considered computationally more difficult, it remains more flexible and does not carry the possible weakness of the assumption of independence of irrelevant alternatives as does the logit model [Judge et al., 1985, pp. 773-778].

Independence of Irrelevant Alternatives

The logit model carries with it a heavy behavioral assumption referred to as the independence of irrelevant alternatives. That is, logit assumes that the choices between any two alternatives are assumed to be made totally independent of the remaining alternatives. Under this assumption, the odds of a choice are assumed not affected by the presence of any additional alternatives. With the six available alternatives representing attitude levels toward a given advantage or disadvantage, logit assumes that the odds of choosing either of the alternatives is specified the same regardless of what the other alternatives are. Such an assumption may not be a problem unless, as is the case here, the alternatives are ordered and thus close substitutes [Kmenta, p. 558]. Because the alternatives are ordered, all of the alternatives are relevant to a decision. We know that a choice of "3" (somewhat important) is an attitude level between "2" (not important) and "4" (important). If an additional alternative were made available, between 3 and 4 corresponding to "relatively important," the odds for choosing an alternative would now be different. The automatic assumption by the logit model that a choice is totally unaffected by any other alternative may cause a serious weakness [Judge et al., 1985, p.

770].

Although the probit model varies slightly from the logit model in terms of its ability to provide adequate results, it does not rest upon the assumption of independence of irrelevant alternatives. The probit model allows tastes to vary across individuals in the population. The logit model assumes that parameters of the random utility function are constant across individuals in the population and that random utilities are independent. Because probit relaxes both of these, it is considered less restrictive [Judge et al., 1985, p. 778].

To avoid the independence of irrelevant alternatives problem associated with the logit model, Kmenta suggests the use of the multinomial probit model where the probabilities are generated from a multivariate normal distribution and are independent [Kmenta, p. 559]. Following this suggestion, probit analysis was chosen for this study.

The Ordered Probit

According to the SAS/STAT User's Guide, "the probit procedure calculates maximum likelihood estimates of regression parameters and natural (threshold) response rate for . . . discrete event data" [p. 1325]. The probit model was devised to meet the need for a tool to analyze a dependent variable of a qualitative nature within the regression boundaries [SAS/STAT User's Guide, p. 1325].

Attitudes, occasionally referred to in this study as "reason ratings," toward alternative methods are influenced by the characteristics of the feeder cattle producer and his/her farm or ranch. For the same reasons presented earlier, the explanatory variables used

here in the probit analysis were the same as those used for the regressions of the percent of cattle sold through each market type.

The multinomial ordered probit model is based on the relationship:

$$y_i^* = \alpha + \beta X + e_i,$$

where y_i^* is an unobservable variable, β is the estimated coefficient for the effect of variable X on y_i^*, X is the independent variable, e_i --- $N(0,1)$, and e_i and e_j $(i \neq j)$ are independent [Kmenta,p. 559]. Although the y_i^* are actually unobservable, they relate to the six alternative categories of choices that <u>are</u> observable and denoted as follows:

$y = 1$ *if* $y_i^* < 1$,

$y = 2$ *if* $1 \leq y_i^* < \mu_1$,

$y = 3$ *if* $\mu_1 \leq y_i^* < \mu_2$,

$y = 4$ *if* $\mu_2 \leq y_i^* < \mu_3$,

$y = 5$ *if* $\mu_3 \leq y_i^* < \mu_4$,

$y = 6$ *if* $\mu_5 < y_i^*$.

The $\mu's$ are unknown parameters to be estimated with β. The $\mu's$ are considered by the ordered probit model as cutoff points or thresholds which define the relationship between the observed and unobserved dependent variables [Pindyck and Rubinfeld, p. 274].

Each producer may have his or her own "intensity" of importance (Y^*) for a particular reason that depends on certain observable factors

and some unobservable factors, ϵ. Producers have the capacity, although not the option, to respond to the questionnaire with their own specific y^*. Given only six possible answers, they must choose the level that most closely represents their attitude toward the reason.

As probit assumes that ϵ is normally distributed across the observations, the mean and variance of ϵ is normalized to zero and one. With the normal distribution, the probabilities for each alternative are given below:

$$Prob\{y=1\} = \Phi(-\beta'x),$$

$$Prob\{y=2\} = \Phi(\mu_1-\beta'x) - \Phi(-\beta'x),$$

$$Prob\{y=3\} = \Phi(\mu_2-\beta'x) - \Phi(\mu_1-\beta'x),$$

$$\vdots$$

$$Prob\{y=6\} = 1 - \Phi(\mu_5 - \beta'x),$$

where $\Phi(\cdot)$ refers to the cumulative distribution function of a standard normal variable [Kmenta, p. 559]. It should be noted that these are consistent with the fact that the marginal effects of the regressors on the probabilities are not equal to the coefficients (β) [Greene, p. 704].

The marginal effects of changes in the regressors on the probabilities of the six categories are computed by the following derivatives with respect to each of the K explanatory variables [Greene p. 704]:

$$\frac{\partial\, Prob\,(y=1)}{\partial X_k} = \phi(\beta'x)\,\beta_k,$$

$$\frac{\partial\, Prob(y=2)}{\partial X_k} = -\,(\phi(\beta'x) - \phi(\mu_2+\beta'x))\,\beta_k,$$

$$\frac{\partial\, Prob(y=3)}{\partial X_k} = -\,(\phi(\mu_2+\beta'x) - \phi(\mu_3+\beta'x))\,\beta_k,$$

$$\frac{\partial Prob(y=4)}{\partial X_k} = -\,(\phi(\mu_3+\beta'x) - \phi(\mu_4+\beta'x))\,\beta_k,$$

$$\frac{\partial Prob(y=5)}{\partial X_k} = -\,(\phi(\mu_4+\beta'x) - \phi(\mu_5+\beta'x))\,\beta_k,$$

$$\frac{\partial Prob(y=6)}{\partial X_k} = -\,(\phi(\mu_5+\beta'x))\,\beta_k,$$

where ϕ refers to the associated density function of the $(\cdot)$, $\beta'x$ is the sum of all the individual products of the independent variables at their means times their coefficients estimated by probit, and β_k is the coefficient estimate for the independent variable in question.

The estimated coefficients calculated in the probit analysis do not indicate the change in the probability of the category being chosen, given a one-unit change in the corresponding independent variable. The amount of change in probability depends on the original probability and on the initial values of all the independent variables and their corresponding coefficients. Because the estimated coefficients do not show changes in probabilities of an event occurring given a one unit change in an independent variable, Judge et al. (1988) supports the calculation of the partial derivatives described above [pp. 791-794]. At the suggestion of Judge et al. (1988), the mean values of the explanatory variables are used in this study to compute the partial

derivatives [p. 794].

To evaluate the results of estimating the probit model, a measure of how well the estimated model fits the data is desirable. Computation of a log likelihood ratio (LLR) provides a convenient indication of the amount of explained variation for which the probit model accounts. The log likelihood ratio tests whether certain parameter restrictions are supported by the data. The null hypothesis is that some of the $\beta's$ are equal to 0 which indicates that no statistically significant relationships exist between the dependent and independent variables. The log likelihood ratio can be conveniently computed by calculating the difference in the log likelihood for one model with all explanatory variables of interest included and a second model with all the parameters to be tested restricted to zero. Because the likelihood function values from both models are in logarithmic form, their difference results in a ratio [Judge et al., 1985, pp. 773-775 and SAS/STAT User's Guide, pp. 1325]. The LLR is computed according to:

$$-2\ln\lambda = 2\,[L(\Omega) - L(\varpi)] \sim \chi^2_m$$

where: $L(\Omega)$ is the log likelihood of the unrestricted model, $L(\varpi)$ is the log likelihood of the restricted model, and m is the number of restrictors (independent variables) in the model. To test for significance, the calculated LLR value of χ^2_m above is compared to the critical values for desirable significance levels. If χ^2_m is greater than the critical value, the null hypothesis that the restrictions do not apply or that the $\beta's$ are equal to 0, is rejected [Pindyck and Rubinfeld, p. 240].

A measure of overall fit for the probit model is also desirable. As an alternative to the R^2 measure of overall fit used in classical regression models, the pseudo R^2 (also called log likelihood ratio index by some texts) is suggested for multiple choice models. Discussion of the pseudo R^2 logically follows the previous discussion concerning maximum likelihood estimations. Referring to the same symbols and variables for the restricted and unrestricted models above, the pseudo R^2 is defined as :

$$PR^2 = 1 - \frac{L(\Omega)}{L(\varpi)}.$$

In the event that the likelihood function predicted every choice in the sample correctly, the estimated PR^2 would be 1. Therefore, a PR^2 of one indicates that the model is a perfect predictor [Pindyck and Rubinfeld, pp. 268-9, and Judge, p. 774 (1985)].

CHAPTER IV

RESULTS

Survey Results

The producer and farm characteristics solicited in the questionnaire were evaluated to obtain frequency of occurrence and means. Although 185 questionnaires were considered sufficiently complete to warrant their use in the study, not all respondnts responded to every question. Therefore, the number of responses is indicated with the description of each of the category results.

Table 4 shows the mean percent of cattle that producers indicated they sold during 1991 through each market type. Mean results indicate that weekly auction sales accounted for the sale of 74.60 percent of the cattle sold by respondents in 1991. The sale of animals directly to buyers from the farm accounted for 10.20 percent of the animals. Graded feeder sales were used for the sale of 9.70 percent, while video board sales and satellite sales were responsible for the sale of 0.94 percent and 0.32 percent, respectively. The percentages do not total 100 percent because some cattle were transferred to other owners through methods not represented in the survey.

The number of brood cows owned by an individual producer during 1991 ranged from 0 to 400 with a mean of 38.95 (Table 5). The same 0 to 400 range existed for the number of brood cows that were beef type while 0 to 150 was the range for the number that were dairy. The mean number of beef and dairy brood cows for all producers was 36.68 and 1.61, respectively. The relatively low mean value for dairy was influenced by

Table 4. Mean Percentage of Cattle Sold in 1991 Through Each Type of Market.

Type of Market	Mean Percent Sold in 1991[a]
Weekly Auction Market	74.60
Graded Feeder Cattle Sale	9.70
Video Board Sale	.94
Satellite Video Sale	.32
Directly To Buyers On The Farm	10.20

[a] These percentages do not sum to 100 percent.

Table 5. Descriptive Statistics for Farm Characteristic Variables.

VARIABLE	UNIT	MEAN	RANGE	STD DEV
BROOD	HEAD	38.95	0 to 400	54.65
BRBEF	HEAD	36.68	0 to 400	52.24
BRDRY	HEAD	1.61	0 to 150	13.90
STCKR	HEAD	3.69	0 to 100	13.31
ACRES	ACRES	136.53	4.5 to 2000	222.63
SOLD	HEAD	29.60	0 to 350	40.92
NO5	HEAD	12.60	0 to 350	30.07
NO5-7	HEAD	15.63	0 to 180	25.77
NO7	HEAD	2.16	0 to 60	7.75

the fact that the sample was drawn from beef cattle producers.

The number of stocker calves that an individual producer bought during 1991 ranged from 0 to 100 (Table 5). The mean for all producers was 3.69 with a standard deviation of 13.13. The large number of respondents that noted zero stocker calves bought influenced the mean value.

The number of acres of pasture that an individual producer owned or rented during 1991 ranged from 4.5 acres to 2,000 acres (Table 5). The mean number of acres was 136.53 with a standard deviation of 222.63. This average size farm is reasonably consistent with 1991 reports from the Tennessee Agricultural Statistics Service. Tennessee Agriculture 1992 showed that the average size Tennessee farm in 1991 was 143 acres.

The results of the questionnaire indicated that each responding producer sold between 0 and 350 head of feeder cattle and calves in 1991. The mean was 29.60 with a standard deviation of 40.92 (Table 5).

Producers were asked to indicate the number of head of feeder cattle and calves that they sold in each of the three weight categories listed. The three categories given were less than 500 pounds, between 500 and 700 pounds, and more than 700 pounds. The number of head sold by an individual producer in the less than 500 pounds category ranged from 0 to 350 and the mean for all producers was 12.60. The number of head sold in the 500 to 700 pound category ranged from 0 to 180 and had a mean of 15.63. The animals sold in the weight category of more than 700 pounds ranged from 0 to 60 and had a mean of 2.16 (Table 5).

A further breakdown of three of the descriptive variables is given in Table 6. The frequencies for BROOD, ACRES, and SOLD is given for

Table 6. Frequencies of Different Size Categories.

VARIABLE	SIZE CATEGORIES	FREQUENCY	PERCENT
BROOD (HEAD)	Less than 10	33	18.64
	10 to 29	76	42.94
	30 to 49	30	16.95
	50 to 99	19	10.73
	100 to 199	14	7.91
	200 to 299	3	1.69
	More than 300	2	1.14
ACRES (ACRES)	Less than 50	50	28.41
	50 to 99	64	36.36
	100 to 199	30	17.05
	200 to 499	24	13.64
	500 to 999	5	2.84
	1000 to 2000	3	1.70
SOLD (HEAD)	Less than 10	50	28.25
	10 to 29	75	42.37
	30 to 49	20	11.30
	50 to 99	21	11.86
	100 to 199	10	5.65
	More than 200	1	0.60

different size categories. Of the 177 respondents that indicated the number of brood cows they owned in 1991, 33 had less than 10 head while 76 had more than 10 but less that 30. Thirty producers indicated more that 30 but less than 50 brood cows while 19 had more than 50 but less than 100. The remaining three category sizes of more than 100 but less than 200, more than 200 but less than 300, and more than 300 were respectively indicated by 14, 3, and 2 producers.

A similar frequency breakdown is given for the number of acres of pasture owned and rented in 1991. Of the 176 producers who indicated their number of acres, 50 had less than 50 acres while 64 had more than 50 but less that 100 acres. Thirty producers had between 100 and 199 acres while 24 had between 200 and 299 acres. Five producers indicated that they had between 500 and 999 acres and 3 producers had between 1000 and 2000 acres.

As the size categories for the number of feeder cattle and calves sold increases, the number of producers selling in those categories tends to decline. Of the 177 respondents that indicated the number of head they sold in 1991, 50 sold less than 10 while 75 sold between 10 and 29. Twenty producers sold between 30 and 49 head and 21 sold between 50 and 99 head. Ten producers sold more than 100 but less that 200 head while one producer sold more than 200.

Producers were asked to indicate the type of equipment that they used to haul cattle by marking the method or methods listed in the questionnaire. Four types of hauling methods were listed and a space was provided for the producer to write an "other" method if they used something not listed. Producers were asked to mark all methods used. A

dummy variable was used to indicate a yes or no response for each type of hauling method. Of the 178 respondents who indicated a type of equipment used to haul cattle, 51.12 percent indicated that they used a "gooseneck trailer," while 26.97 percent indicated use of a "bumper-hitch trailer," 26.97 percent indicated a "pick-up truck," 15.17 percent indicated a "1 to 2½ ton truck," and 6.74 percent indicated an "other" type (Table 7). Methods of hauling indicated in the "other" category included a tractor trailer, a neighbor, hired someone to haul, and buyers provided their own hauling. The mean percentages do not sum to 100 percent because producers often utilized more than one method to haul cattle.

Producers were asked to indicate what they considered to be their principal farm enterprise. This question was answered by 155 producers and 10 different enterprises were identified (Table 8). "Beef Cattle" was the most often indicated enterprise accounting for 73.55 percent of the question respondents. "Tobacco" was noted as the principal enterprise by 14.84 percent of the reporting producers. Four producers indicated that "Dairy" and four producers indicated that "Hay" was their principal farm enterprise. Combined, "Dairy" and "Hay" accounted for just over 5 percent of the principal farm operations.

The questionnaire asked producers to indicate whether they or their spouse had an off-farm job (Table 9). The dummy variable assignment of 0 = No and 1 = Yes was used for computational purposes. Of the 176 producers who responded to the employment question, 44.32 percent indicated that they had an off farm job, while 36.93 percent indicated that their spouse had an off-farm job. Just over 27 percent

Table 7. Frequencies for the Type of Equipment Used to Haul Cattle (n=178).

Variable Name	Type of Equipment	Frequency	Percent
HGOOS	Gooseneck Trailer	91	51.12
HBUMP	Bumper Trailer	48	26.97
HPICK	Pick-up Truck	48	26.97
HTON	1-2 1/2 Ton Truck	27	15.17
HOTHR	Other Type	12	6.74

Table 8. Principal Farm Enterprise Categories and Frequencies (n=155).

Enterprise	Frequency	Percent
Beef Cattle	114	73.55
Tobacco	23	14.84
Dairy	4	2.58
Hay	4	2.58
Corn	3	1.90
Fruits and Vegetables	2	1.30
Nursery, Greenhouse, Sod	2	1.30
Cotton	1	0.65
Other Row Crops	1	0.65
Soybeans	1	0.65

Table 9. Frequencies for Off-farm Job by Operator and Spouse (n=176).

Individual	Frequency	Percent
Operator	78	44.32
Spouse	65	36.93
Both	48	27.27

of the respondents reported that both they and their spouse had an off-farm job.

Five different categories were presented in the questionnaire to indicate the number of years of formal education. The producers were asked to indicate which of the levels represented their highest level of education. Almost 16 percent of the respondents indicated 8 years of education or less while just over 30 percent indicated 9 to 12 years. Some college was indicated as the highest level of education attained by almost 12 percent of the respondents. Thirteen percent of the respondents indicated that they were college graduates and nine percent indicated that they had received a graduate or professional degree (Table 10). In order to represent education as a single continuous variable, each discrete category was assigned a number as follows: 1 = 8 or fewer years, 2 = 9 to 12 years, 3 = some college, 4 = college graduate, and 5 = graduate or professional school.

The average age, education, and percent of family income from off-farm jobs are shown in Table 11. The average age of the respondents was 59.40 years with a range of 23 to 89 years and a standard deviation of 13.54. The mean level of education, based on dummy variable assignments of 1 to 5, was 2.5. This mean education level corresponds to a level between 2 (9 to 12 years) and 3 (some college.) In addition to the yes/no off-farm job question described earlier, the percent of total family income from off-farm employment was also solicited. Responses ranged from 0 to 100 percent of total family income derived from off-farm jobs. The mean percent of income coming as a result of off-farm jobs was 39.63 (Table 11).

Table 10. Frequencies for Categories of Years of Formal Education (n=177).

Key	Frequency	Percent
8 or fewer Years	28	15.82
9 to 12 Years	89	50.28
Some College	21	11.86
College Graduate	23	13.00
Graduate or Professional School	16	9.04

Table 11. Descriptive Statistics for Education, Age, and Income Variables.

VARIABLE	UNIT	MEAN	RANGE	STD DEV
EDUC[a]	-	2.50	1-5	1.17
AGE	YEARS	59.40	23-89	13.54
INC	PERCENT	39.63	0-100	40.54

[a] Based on the assignment of 1= 8 or fewer years, 2= 9 - 12 years, 3= some college, 4= college graduate, and 5= graduate or professional school to indicate the total number of years of formal education.

In summary, the previously described means provide an average description of the sample. The means depict a feeder cattle producer that is just over 59 years of age, receives almost 40 percent of family income from off-farm jobs, and has an education between the high school level and some college. This "mean" producer owns nearly 39 brood cows, 37 of which are beef and the remainder dairy. The producer buys almost 4 head of stocker calves a year and uses 136.53 acres of pasture. The average number of head sold annually is almost 30 with approximately 12 head sold at under 500 pounds, 15 head sold weighing between 500 and 700 pounds, and the remainder sold at greater than 700 pounds.

Why Producers Like and Dislike Certain Marketing Alternatives

Weekly Auctions

As described in detail in previous chapters, each producer was asked to rate a list of typical advantages and disadvantages of five different marketing methods. A 1 to 6 scale was used to indicate increasing levels of importance for irrelevant (1), not important (2), somewhat important (3), important (4), very important (5), and most important (6). Questionnaires that did not show a rating for a particular advantage or disadvantage were not included in that mean calculation. Ten typical advantages for weekly auctions were evaluated (Table 12). The mean rating for "Market is close to my farm or ranch" was 4.9. Other relatively high mean ratings were associated with "Market accepts single animals or small lots," "More assurance of payment for cattle," "Open, competitive bidding," and "Higher prices received for cattle." Only "Tradition or habit" seemed to have an

Table 12. Mean Rating for Reasons Why Regular Weekly Auction Markets are Liked By Feeder Cattle Producers.

Reasons Market is Liked (advantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Market is close to my farm or ranch	4.9	1.41	127
Market accepts single animals or small lots	4.8	1.27	133
More assurance of payment for cattle	4.8	1.56	99
Higher price received for cattle	4.7	1.43	101
Open, competitive bidding	4.7	1.24	121
Less effort or troublesome to me	4.5	1.43	119
More favorable weighing conditions	4.3	1.48	95
Good market management	4.2	1.43	95
Lower commission and yardage fees	3.6	1.64	94
Tradition or habit	3.0	1.65	113

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

extremely low mean rating. The mean value for "Tradition or habit" of 3.00 was 0.6 lower than the next closest mean rating.

Similar mean values were computed for the six typical disadvantages of weekly auctions (Table 13). With a mean rating of 4.50, "Lower price received for cattle" was the most important disadvantage cited. "Sale of single animals takes too much time" was considered the least important disadvantage of weekly auctions with a mean of 2.80.

Graded Feeder Sales

Mean ratings of the advantages for using graded feeder cattle sales indicated that "Higher price received for cattle" had the highest overall level of importance with a mean of 5.0 (Table 14). The next highest mean was 4.6 for "Larger number of buyers present." With a relatively low mean rating of 2.2, "Habit or tradition" showed little importance.

Based on mean computations, "Requires consignment of cattle in advance" was considered the most important disadvantage of graded feeder cattle sales with a mean of 3.9 (Table 15). With a mean of 3.8, "Market is too far from my farm or ranch" was a relatively important disadvantage of the market. "I do not like my cattle graded" was considered the least important disadvantage of graded feeder cattle sales with a mean of 2.2.

Table 13. Mean Rating for Reasons Why Regular Weekly Auction Markets are Not Liked By Feeder Cattle Producers.

Reasons Market is Not Liked (disadvantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Lower price received for cattle	4.5	1.74	66
Higher commission and yardage fees	4.3	1.83	64
Unfavorable weighing conditions	4.2	1.84	54
Poor market management	3.8	1.82	56
Poor market facilities	3.4	1.78	53
Sale of single animals takes too much time	2.8	1.90	62

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Table 14. Mean Rating for Reasons Why Graded Feeder Cattle Sales are Liked By Feeder Cattle Producers.

Reasons Market is Liked (disadvantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Higher price received for cattle	5.0	1.59	47
Larger number of buyers present	4.6	1.70	45
Open, competitive bidding	4.5	1.74	38
Good market management	4.3	1.62	35
More favorable weighing conditions	3.8	1.87	35
Lower commission and yardage fees	3.2	1.66	34
Habit or tradition	2.2	1.31	32

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Table 15. Mean Rating for Reasons Why Graded Feeder Cattle Sales are Not Liked By Feeder Cattle Producers.

Reasons Market is Not Liked (disadvantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Requires consignment of cattle in advance	3.9	1.86	51
Market is too far from my farm or ranch	3.8	1.97	47
Lower price received for cattle	3.5	1.92	44
Commingling of my cattle with others	3.4	1.97	46
Higher commission and yardage fees	3.3	1.93	43
Poor market management	3.0	1.91	39
Graded sales do not work well for my cattle	3.0	1.97	48
Sales not at the right time of year for me	2.9	1.65	54
Requires membership in an association	2.8	1.72	46
I do not like my cattle graded	2.2	1.77	42

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Video Board Sales

Means were also computed for the respondents' ratings for advantages and disadvantages of video board sales. The mean ratings of the advantages for video board sales did not vary greatly among the 10 reasons (Table 16). "More favorable weighing conditions" and "Higher price received for cattle" had the highest mean values of 4.5 and 4.4, respectively. "Buyer may be responsible for hauling" was the lowest rated advantage of video board sales with a mean of 3.5.

A narrow distribution of mean values for disadvantages of video board sales was observed (Table 17). The highest calculated mean of 4.5 was the only mean greater that 4.0 and corresponds to "Minimum lot size too large for my operation." Three different reasons had the lowest mean rating of 3.1. They were "Sales not at the right time of year for me," "Descriptions do not represent my cattle well," and "Poor market management." Of the nine disadvantages of video board sales listed, seven had a mean between 3.1 and 3.4. It should be noted that in relation to the 185 usable questionnaires, only 19 to 21 producers responded to the advantages and 24 to 36 responded about disadvantages of video board sales.

Satellite Video Sales

According to the mean ratings for advantages of satellite video sales, "Higher price received for cattle" was the most important with a mean of 3.7 (Table 18). With a mean of 3.6, "Large number of buyers" was a relatively important reason that satellite video sales are liked by feeder cattle producers. Other than these two highest rated reasons,

Table 16. Mean Rating for Reasons Why Video Board Sales are Liked By Feeder Cattle Producers.

Reasons Market is Liked (advantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
More favorable weighing conditions	4.5	1.85	20
Higher price received for cattle	4.4	1.82	20
Larger number of buyers	4.2	1.98	20
Lower commission fees	4.1	1.93	20
Cattle do not have to be hauled to market	4.1	1.89	21
Seller can "no-sale" cattle more easily	4.0	1.95	20
Seller can establish a reputation for cattle	4.0	2.06	21
Less effort or troublesome to me	3.9	1.93	22
Good market management	3.9	1.90	19
Buyer may be responsible for hauling	3.5	2.14	21

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Table 17. Mean Rating for Reasons Why Video Board Sales are Not Liked By Feeder Cattle Producers.

Reasons Market is Not Liked (disadvantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Minimum lot size too large for my operation	4.5	1.89	36
Dislike selling with a price "slide" on weight	3.9	1.83	30
Cattle must be consigned and filmed in advance	3.4	1.85	28
Lower price received for cattle	3.3	2.02	26
Sales are too far from my farm or ranch	3.2	1.92	29
Higher commission fees	3.2	1.80	27
Sales not at the right time of year for me	3.1	1.82	29
Descriptions do not represent my cattle well	3.1	1.94	25
Poor market management	3.1	1.83	24

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Table 18. Mean Rating for Reasons Why Satellite Video Sales are Liked By Feeder Cattle Producers.

Reasons Market is Liked (advantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Higher price received for cattle	3.7	2.23	15
Larger number of buyers	3.6	2.10	16
Cattle do not have to be hauled to market	3.4	2.00	16
Lower commission fees	3.4	2.14	14
More favorable weighing conditions	3.4	2.16	16
Can sell for future delivery	3.3	2.09	15
Less effort or troublesome to me	3.3	2.05	14
Seller can "no-sale" cattle more easily	3.3	2.05	14
Buyer may be responsible for hauling	3.3	2.24	16
Good market management	3.2	1.97	15
Seller can establish a reputation for cattle	3.1	1.89	16

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

the remaining nine reasons differ by only 0.3 with means ranging from 3.1 to 3.4. Only 14 to 16 producers rated advantages of satellite video sales.

A similar small variation in means was found in the disadvantages of satellite video sales (Table 19). The highest mean was 3.9 for "Minimum lot size is too large for my operation." The smallest mean value was 2.2 for "Descriptions do not represent my cattle well." Of importance once again is the number of producers that responded to the satellite video sale questions. In relation to the 185 total surveys adequate for analysis, only 21 to 30 producers indicated their attitude toward disadvantages of satellite video sales.

Direct Selling

Significantly more producers rated the advantages and disadvantages of direct selling than did video board and satellite video sales. With a mean rating of 4.8, "Higher price received for cattle" had the highest mean rating for advantages of direct selling feeder cattle (Table 20). "Tradition or habit" had the lowest level of importance as a reason for direct selling with a mean of 2.8. "No commission or yardage fees" was the most frequently marked advantage and had a mean rating of 4.6. "I can sell at any time I wish" also had a mean rating of 4.6.

"Possibility of getting a bad check" was the most important disadvantage of direct selling with a mean of 4.4 (Table 21). "My operation is too small to attract buyers" was marked by 62 respondents and had a mean rating of 3.8. "Tradition or habit" with a mean of 2.2,

Table 19. Mean Rating for Reasons Why Satellite Video Sales are Not Liked By Feeder Cattle Producers.

Reasons Market is Not Liked (disadvantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Minimum lot size is too large for my operat.	3.9	2.17	24
Not available in my geographic area	3.3	1.96	30
Lower price received for cattle	3.0	1.86	21
Cattle must be consigned and filmed in advance	2.8	1.66	22
Dislike selling with a price "slide" on weight	2.7	1.64	22
Poor market management	2.6	1.43	20
Higher commission fees	2.4	1.40	21
Descriptions do not represent my cattle well	2.2	1.34	21

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Table 20. Mean Rating for Reasons Why Selling Directly To Buyers from the Farm is Liked By Feeder Cattle Producers.

Reasons Market is Liked (advantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Higher price received for cattle	4.8	1.67	48
No commission or yardage fees	4.6	1.55	61
I can sell at any time I wish	4.6	1.55	59
Seller can establish a reputation for cattle	4.5	1.65	57
Cattle do not have to be hauled to market	4.5	1.62	58
Buyer can see my cattle better	4.4	1.69	58
Buyer may be responsible for hauling	4.0	1.80	51
Tradition or habit	2.8	1.60	45

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

Table 21. Mean Rating for Reasons Why Selling Directly To Buyers on the Farm is Not Liked By Feeder Cattle Producers.

Reasons Market is Not Liked (disadvantages)	Mean Rating[a]	Std. Dev.	Freq. Marked
Possibility of getting a bad check	4.4	1.83	57
Too many opportunities for dishonest buyers	4.2	2.01	57
Cannot get bids from a large number of buyers	4.2	1.81	58
No open, competitive bidding	4.0	1.90	58
Lower price received for cattle	3.8	1.97	53
My operation is too small to attract buyers	3.8	1.94	62
Dislike selling with a price "slide" on weight	3.6	1.90	46
Tradition or habit	2.2	1.46	43

[a] Based on assignment of 1 for "irrelevant," 2 for "not important," 3 for "somewhat important," 4 for "important," 5 for "very important," and 6 for "most important."

had the lowest importance level for producers not using direct selling. With a mean rating of 3.6, "Dislike selling with a price "slide" on weight" had the second lowest mean rating.

Relationships Between Producer Characteristics and Percent Sold

As described in Chapter 3, regression equations were formulated to determine relationships that exist between the characteristics of producers and the percent of cattle sold through each type of market. Ten characteristic variables were used as independent variables in the regression equations to estimate the parameters of the models. A separate regression analysis was made for each marketing method although the independent variables were the same in all five of the models.

This section will discuss the results of each model separately. A table of model results will be presented for each model as well. The tables are of similar format and provide the same type of information. Estimated coefficients and associated standard errors and t-values are presented for the intercept and each of the ten independent variables evaluated. Model statistics that are also provided in each of the tables include, F-values, prob>F values, R^2, $\overline{R^2}$, root mean square error (RMSE), and the sample size (n.) These values will be analyzed for indications of the goodness of fit provided by each model.

Table 22 shows the regression results for the variables affecting the percent of cattle sold through regular weekly auction sales. The evaluation for goodness of fit suggests that there are other important factors that contribute to the variation in the percent of cattle sold

Table 22. OLS Regression Results for Variables Affecting the Percent of Cattle Sold Through Weekly Auction Markets in 1991.

Variable[a]	Coefficient	Std. Error	t-value
Intercept	55.4183	22.1568	2.50**
SOLD	-0.1919	0.0942	-2.04**
NO5	11.2145	8.8734	1.26
NO7	17.2976	15.7241	1.10
YUJOB	4.6186	7.7107	0.60
SPJOB	-2.0258	7.3474	-0.28
EDUC	4.6121	3.0034	1.54
AGE	0.3302	0.2905	1.14
BEEF	-15.0409	8.0275	-1.87*
DAIRY	-3.7162	22.7550	-0.16
STKBT	-3.0768	8.6593	-0.36

F-value	1.5520
prob>F	0.1295
$\underline{R}^2$	0.1154
R^2	0.0411
RMSE	35.7100
n	130.0000

[a] Variables defined in Table 3.
** Indicates statistical significance at the 0.05 level.
* Indicates statistical significance at the 0.10 level.

through weekly auctions. The R^2 value indicates that about 12 percent of the total variation is accounted for by the independent variables in the model.

However, the estimated coefficient for the number of feeder cattle and calves sold (SOLD) was significant at the 0.05 level. The estimated coefficient was negative indicating that smaller numbers of feeder cattle and calves sold were associated with a larger percent of sales through weekly auctions.

The coefficient on the BEEF variable, which indicates that beef is the principal farm enterprise, was significant at the 0.10 level. The BEEF coefficient is negative which indicates that producers who consider beef cattle to be their principal farm enterprise, are likely to sell a smaller percent of their cattle through weekly auctions than are producers who consider something other than beef to be the principal farm enterprise.

Table 23 provides the regression results of the model for the percent of cattle sold through graded feeder sales. The low R^2 value of 0.1032 signifies that factors other than those used in the model influence the percent of cattle sold through graded sales. The R^2 value for this model in relation to the R^2 for the previously discussed model for weekly auctions indicates that the independent variables provide a slightly better fit for the weekly auction market than for the graded sales.

Although the measures of goodness of fit for this model do not indicate that a significant amount of variation is explained by the variables, one independent variable was significant at the 0.05 level.

Table 23. OLS Regression Results for Variables Affecting the Percent of Cattle Sold Through Graded Feeder Cattle Sales in 1991.

Variable[a]	Coefficient	Std. Error	t-value
Intercept	27.8147	15.3319	1.81*
SOLD	0.0626	0.0652	0.96
NO5	-11.0848	6.1401	-1.81*
NO7	-12.0044	10.8806	-1.10
YUJOB	-5.8482	5.3356	-1.10
SPJOB	5.3714	5.0842	1.06
EDUC	-0.7333	2.0783	-0.35
AGE	-0.2969	0.2010	-1.50
BEEF	7.0922	5.5548	1.28
DAIRY	-11.0773	15.7458	-0.70
STKBT	0.0151	5.9920	0.003

F-value	1.3700
prob>F	0.2027
$\underline{R}^2$	0.1032
R^2	0.0279
RMSE	24.7070
n	130.0000

[a] Variables defined in Table 3.
* Indicates statistical significance at the 0.10 level.

The coefficient on the number of cattle sold at less than 500 pounds (NO5) was significant and negative. The negative coefficient indicated that a lower ratio of animals sold at weights less that 500 pounds to the total number of head sold increases marketing activity through graded sales. This suggests that producers feel that graded sales best suit the sale of animals not weighing less than 500 pounds.

Table 24 shows the estimated coefficients, associated standard errors, t-values, and goodness of fit values for the percent of cattle sold through video board sales. While a considerable amount of variation in percent sold was due to factors not included in the model, the goodness of fit values in the model indicated that the ten independent variables contribute to a better fitting model than the previous models for weekly auctions and graded feeder sales. According to the R^2 value, the variation in the independent variables explains approximately 26 percent of the variation in the dependent variable. The coefficients for the number of head sold in 1991 (SOLD) and DAIRY, which indicates that dairy is the principal farm enterprise, have positive statistically significant (0.10 level) coefficients. The positive SOLD coefficient indicates that as the number of head sold increases, the percent of animals sold through video board sales also increases. The positive coefficient on DAIRY indicates that producers who consider dairy to be their principal farm enterprise are likely to sell a greater percentage of their cattle through video board sales than are producers who do not consider dairy cattle to be the principal farm enterprise.

Table 25 shows regression results with the percent of cattle sold

Table 24. OLS Regression Results for Variables Affecting the Percent of Cattle Sold Through Video Board Sales in 1991.

Variable[a]	Coefficient	Std. Error	t-value
Intercept	-11.9459	5.2186	-2.29**
SOLD	0.0632	0.0219	2.85**
NO5	0.9796	2.0899	0.47
NO7	-0.7469	3.7034	-0.20
YUJOB	2.5942	1.8161	1.43
SPJOB	-1.2695	1.7305	-0.73
EDUC	1.0896	0.7074	1.54
AGE	0.1209	0.0684	1.77*
BEEF	-0.7957	1.8907	-0.42
DAIRY	23.2439	5.3594	4.34**
STKBT	2.7205	2.0309	1.33

F-value	4.18400
prob>F	.00010
$\underline{R}^2$	.26010
R^2	.19790
RMSE	8.40995
n	130.00000

[a] Variables defined in Table 3.
** Indicates statistical significance at the 0.05 level.
* Indicates statistical significance at the 0.10 level.

Table 25. OLS Regression Results for Variables Affecting the Percent of Cattle Sold Through Satellite Video Sales in 1991.

Variable[a]	Coefficient	Std. Error	t-value
Intercept	-0.5253	2.8168	-0.19
SOLD	-0.0037	0.0120	-0.32
NO5	0.7528	1.1312	0.67
NO7	-0.2195	1.9966	-0.11
YUJOB	-0.4642	0.9793	-0.47
SPJOB	-0.3091	0.9356	-0.33
EDUC	-0.0373	0.3834	-0.10
AGE	0.0164	0.0368	0.45
BEEF	0.4471	1.0206	0.42
DAIRY	-0.1726	2.8901	-0.06
STKBT	-0.5047	1.0999	-0.46

F-value	0.27500
prob>F	0.98550
$\underline{R}^2$	0.02280
R^2	-0.06000
RMSE	4.53463
n	129.0000

[a] Variables defined in Table 3.

through satellite video sales as the dependent variable. This modelprovides a poor fit to the data. The low R^2 value coupled with the high prob>F and no significant variables, shows that the data yield no significant relationships between the explanatory variables and the percent sold through satellite video sales. This may be attributed to the small number of producers who indicated sales via satellite video.

Table 26 shows the regression results for the model with the percent of cattle sold through direct marketing as the dependent variable. The goodness of fit statistics indicate that there are obviously other factors that account for variations in the percent of cattle sold directly from the farm (R^2 = 0.1070). However, the coefficients on AGE and BEEF were significant at the 0.10 and 0.05 levels, respectively. The AGE coefficient was negative which indicates that as age decreases, the percent of cattle sold directly from the farm increases. The BEEF coefficient was also negative which indicates that producers who consider beef to be their principal farm enterprise are likely to sell a smaller percent of their cattle directly from the farm than are producers who do not consider beef to be their principal enterprise.

Predicting Importance Rating Selection

Direction of Change Expected in Importance Ratings

Because only a small number of responding producers sold cattle through video board sales or satellite video sales in 1991 and only a small number rated the advantages and disadvantages of these marketing

Table 26. OLS Regression Results for Variables Affecting the Percent of Cattle Sold Directly To Buyers on the Farm in 1991.

Variable[a]	Coefficient	Std. Error	t-value
Intercept	35.9972	14.8247	2.43**
SOLD	0.0897	0.0630	1.42
NO5	0.5234	5.9370	0.09
NO7	-2.0777	10.5206	-0.20
YUJOB	-7.4574	5.1590	-1.45
SPJOB	-4.2881	4.9160	-0.87
EDUC	-2.7309	2.0095	-1.36
AGE	-0.4028	0.1944	-2.07**
BEEF	10.2939	5.3710	1.92*
DAIRY	-13.3081	15.2249	-0.87
STKBT	-4.7135	5.7938	-0.81

F-value	1.4250
prob>F	.1774
$\underline{R}^2$	.1070
R^2	.0319
RMSE	23.8900
n	130.0000

[a] Variables defined in Table 3.
** Indicates statistical significance at the 0.05 level.
* Indicates statistical significance at the 0.10 level.

methods, the two markets were not considered in the ordered probit analysis. However, coefficients were estimated by probit analysis for the advantages and disadvantages of weekly auctions, graded sales, and direct sales rated by responding producers. The coefficient estimates and standard errors for the rating of the advantages and disadvantages of these markets are shown in Tables 27 through 32. Log likelihood ratio values (LLR) and Pseudo R^2 values (PR^2) are also included in the tables. The (PR^2) is used to indicate the goodness of fit obtained by each model. The LLR serves as a test of whether certain parameter restrictions are supported by the data [Pindyck and Rubinfeld, p. 240]. The calculated LLR value can be compared to the chi square distribution at the statistical significance levels of 5 and 10 percent. With ten independent variables, the computed critical values for 5 and 10 percent significance levels are 18.31 and 15.99, respectively [Pindyck and Rubinfeld, pp. 240 and 562].

The sign of the coefficients for variables from the probit analysis indicates the direction that the thresholds for each reason rating category will shift with a given change in the independent variable. A negative coefficient indicates that the 1 through 6 ratings that serve as the base of a normal distribution will move to the left as the normal distribution remains stable. This movement of the thresholds to the left results in a decrease in the probability of "irrelevant" being chosen as the rating of a particular reason. This movement of the thresholds also results in an increase in the probability of "most important" being chosen as the rating of the reason. However, the coefficient estimates of the probit model do not indicate where the

intermediate thresholds are located within the normal distribution. The changes in probabilities of the intermediate classes are identified by evaluating partial derivatives. In essence, a positive coefficient indicates that as the independent variable increases, the probability of rating the corresponding reason (the dependent variable) "most important" decreases, while the probability of rating "irrelevant" increases. For a negative coefficient, as the value of the independent variable increases, the probability of rating the associated reason "most important" increases, while the probability of rating it "irrelevant" decrease.[1]

The goodness of fit measures obtained from the probit analysis were disappointing even for cross-section data. No pseudo R^2 value for the probit models in this study was greater than 0.34. Most of the pseudo R^2 values were less than 0.10 which indicates that the fraction of the total variation in the dependent variable that is accounted for by the independent variables in the model is less than 10 percent for most of the models.

Weekly Auctions - Advantages. Table 27 shows the probit regression coefficient estimates for advantages of weekly auctions. With no statistically significant independent variables, an insignificant LLR, and a small PR^2, it is obvious that the ten

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[1] This configuration of signs of estimated coefficients results from the SAS estimation procedure. LIMDEP, for example, would result in coefficients with the opposite signs.

Table 27. Ordered Probit Model Coefficient Estimates for Ratings of the Advantages of Weekly Auction Markets. (Standard Errors in Parentheses)

	INDEPENDENT VARIABLES											LLR [a]
	INTERC	SOLD	NO5	NO7	YUJOB	SPJOB	EDUC	AGE	BEEF	DAIRY	STCKBT	PR^2 [e]
Advantages												
Tradition or habit	-1.1227 [b]	0.0047	-0.0795	0.7133	0.2532	0.0471	0.0120	0.0029	-0.0344	-0.4905	-0.0912	7.56
	(0.687)	(0.003)	(0.316)	(0.527)	(0.266)	(0.246)	(0.098)	(0.009)	(0.269)	(0.616)	(0.293)	0.0228
Lower commis. & yardage fees	-1.4751	0.0029	-0.6500	-0.7783	0.1904	-0.1731	0.0511	-0.0037	0.7604	1.3283	0.5022	18.76 [c]
	(0.747)	(0.003)	(0.350)	(0.547)	(0.297)	(0.283)	(0.107)	(0.010)	(0.298)	(0.626)	(0.318)	0.0665
Higher price received	-2.4620	0.0027	-0.4968	-0.5707	0.5750	0.0812	0.0495	0.0012	0.3463	1.1160	0.0753	13.46
	(0.764)	(0.003)	(0.337)	(0.563)	(0.290)	(0.281)	(0.103)	(0.009)	(0.296)	(0.705)	(0.324)	0.0503
Market is close to farm	-2.3485	0.0011	-0.3917	-0.5316	0.4752	0.0850	0.0415	0.0164	-0.4658	0.0496	-0.0783	9.20
	(0.769)	(0.003)	(0.347)	(0.575)	(0.291)	(0.276)	(0.106)	(0.010)	(0.296)	(0.619)	(0.347)	0.0316
Good market management	-2.3072	0.0004	0.1712	-0.1161	0.1261	0.2824	0.1275	0.0041	-0.0896	0.4932	0.0757	5.06
	(0.771)	(0.003)	(0.345)	(0.534)	(0.305)	(0.287)	(0.104)	(0.010)	(0.286)	(0.698)	(0.344)	0.0189
Open, compet. bidding	-2.2056	-0.0012	0.0519	-0.5993	0.1948	-0.0192	0.0961	0.0050	-0.1814	-0.5199	0.1251	4.70
	(0.781)	(0.003)	(0.339)	(0.530)	(0.297)	(0.275)	(0.105)	(0.010)	(0.280)	(0.634)	(0.302)	0.0157
Less effort or troublesome	-1.4077	0.0077	-0.2955	-0.5202	0.0541	-0.0985	-0.1691	0.0019	-0.1643	-0.5301	-0.2486	11.08
	(0.739)	(0.003)	(0.311)	(0.555)	(0.275)	(0.266)	(0.102)	(0.010)	(0.279)	(0.626)	(0.294)	0.0344
Market accepts single animals	-1.9323	0.0028	-0.3781	-0.1439	0.1286	0.1386	0.0321	0.0038	-0.2819	-0.3892	-0.3014	1.80
	(0.713)	(0.003)	(0.309)	(0.488)	(0.268)	(0.248)	(0.097)	(0.009)	(0.267)	(0.606)	(0.305)	0.0195
More favorable weighing cond.	-1.7641	0.0035	-0.6035	-0.2169	0.0091	0.2301	-0.0524	-0.0007	0.7120	0.9576	-0.3206	12.98
	(0.741)	(0.003)	(0.349)	(0.545)	(0.308)	(0.293)	(0.105)	(0.010)	(0.294)	(0.696)	(0.371)	0.0489
More assurance of payment	-2.3833	0.0022	-0.7534	-0.5894	0.0365	0.4331	0.0546	0.0079	0.3867	0.8346	-0.5001	13.26
	(0.791)	(0.003)	(0.367)	(0.535)	(0.311)	(0.290)	(0.110)	(0.010)	(0.313)	(0.593)	(0.374)	0.0525

[a] Log likelihood Ratio.
[b] ____ Indicates statistical significance at the 0.10 level.
[c] Indicates an overall statistical significance at the 0.05 level.
[e] Pseudo R^2.

independent variables do not provide a statistically significant explanation of the variability in "tradition or habit" as an advantage of weekly auctions.

Conversely, three variables are statistically significant (underscored) and the LLR indicates significance at the 0.05 level for "lower commission and yardage fees" as an advantage of the auction market. The negative coefficient for NO5 indicates that as the ratio of the number of animals sold at less than 500 pounds to total number of head sold increases, the probability of rating "lower commission and yardage fees" as a "most important" advantage of weekly auctions increases while the probability of rating it "irrelevant" decreases. Conversely, the positive coefficient on both BEEF and DAIRY coefficients indicate that producers who consider beef or dairy to be their principal farm enterprise tend to have a lower importance rating for "lower commission and yardage fees" as an advantage of weekly auctions than do non-beef or non-dairy producers.

Although the overall fit is not significant, "market is close to my farm" has two significant independent variables. The model indicates that as age increases, the probability of rating "market is close to my farm" as a "most important" advantage of weekly auctions decreases while the probability of rating it "irrelevant" increases. This model also indicates that the producers who have off-farm jobs are more likely to rate "market is close to my home" with a lower importance than producers who do not have off-farm employment. The meaning of the other significant variables in Table 27 may be interpreted in a similar fashion.

In reference to the independent variables in Table 27, NO5 is negative and significant for three advantages. This means that as the number of head of animals sold at less than 500 pounds increases, the probability of rating the associated advantages as a "most important" advantage of weekly auctions increases. YUJOB and BEEF are both significant and positive for two advantages indicating that the probabilities of selecting the associated reason as an "irrelevant" advantage of weekly auctions increases for a producer who has an off-farm job and/or who considers beef to be the principal farm enterprise. NO7, SPJOB, and STCKBT are not significant independent variables for any of the advantages of weekly auctions.

Weekly Auctions - Disadvantages. Table 28 shows the coefficient estimates and standard errors from the ordered probit model for the ratings of the disadvantages of weekly auction markets. Two models have LLR values that are significant at the 0.10 level and one model with an overall fit significant at the 0.05 level. With an LLR of 15.99, "poor market facilities" was significantly affected by SPJOB and AGE. Both independent variables have positive signs. The positive coefficient for AGE indicates that as the age of a producer increases, the probability of rating "poor market facilities" as a "most important" disadvantage of weekly sales decreases. The positive coefficient on SPJOB indicates that producers' households with off-farm employment are likely to indicate a lower rating of "poor market management" as a disadvantage than is a producer whos household does not have off-farm employment.

With an LLR value that is statistically significance at the 0.05

Table 28. Ordered Probit Coefficient Estimates for Ratings of the Disadvantages of Weekly Auction Markets. (Statndard Errors in Parentheses)

	INDEPENDENT VARIABLES											LLR [a]
	INTERC	SOLD	NO5	NO7	YUJOB	SPJOB	EDUC	AGE	BEEF	DAIRY	STCKBT	PR^2 [e]
Disadvantages												
Poor market facilities	-3.9003[b]	0.0045	-0.1276	-0.1992	-0.1108	1.1339	0.2396	0.0391	-0.4970	-1.2788	-0.3728	15.99 [d]
	(1.240)	(0.005)	(0.523)	(1.002)	(0.504)	(0.526)	(0.160)	(0.015)	(0.401)	(0.960)	(0.616)	0.0909
Poor market management	-3.5226	-0.0010	-0.0850	-0.7740	0.4095	0.5828	0.1714	0.0357	-0.3703	-1.2619	0.1364	13.14
	(1.099)	(0.004)	(0.450)	(0.943)	(0.414)	(0.405)	(0.139)	(0.014)	(0.350)	(0.926)	(0.527)	0.0721
Higher commission and yardage	-4.7751	0.0041	0.3331	0.1119	0.6084	0.7508	0.2516	0.0409	-0.4757	-1.0841	-0.0627	18.36 [c]
	(1.226)	(0.005)	(0.472)	(0.985)	(0.430)	(0.427)	(0.148)	(0.014)	(0.372)	(0.958)	(0.476)	0.0970
Unfavorable weighing conditions	-3.9375	0.0012	-0.2263	0.6402	0.2154	0.7686	0.2466	0.0368	-0.6088	-0.3022	-0.1679	13.76
	(1.162)	(0.004)	(0.461)	(0.842)	(0.424)	(0.420)	(0.149)	(0.014)	(0.361)	(0.831)	(0.534)	0.0801
Lower price received for cattle	-3.5932	-0.0010	0.3524	2.1950	0.0111	0.7262	0.2593	0.0275	-0.7354	-0.6918	0.1443	16.28 [d]
	(1.026)	(0.004)	(0.454)	(1.033)	(0.398)	(0.396)	(0.139)	(0.013)	(0.366)	(0.891)	(0.488)	0.0846
Sale of single animals takes too much time	-0.6495	0.0008	0.3810	-0.2647	0.4696	0.2661	0.0685	-0.0107	-0.2132	0.7511	0.9007	14.64
	(0.964)	(0.004)	(0.436)	(0.842)	(0.391)	(0.368)	(0.138)	(0.012)	(0.357)	(0.953)	(0.452)	0.0803

[a] Log likelihood Ratio.
[b] ___ Indicates statistical significance at the 0.10 level.
[c] Indicates an overall statistical significance at the 0.05 level.
[d] Indicates an overall statistical significance at the 0.10 level.
[e] Pseudo R^2.

level, "higher commission and yardage fees" has three significant independent variables: SPJOB, EDUC, and AGE. All three are positive and SPJOB and AGE indicate similar notions as previously discussed for "poor market facilities." The positive coefficient on EDUC indicates that as a producer's number of years of education increases, the probability of "higher commission and yardage fees," as a "most important" disadvantage of weekly auctions, also decreases.

Table 28 shows that "lower price received for cattle" has an LLR value significant at the 0.10 level and five significant independent variables. Four of the significant variables are positive and subject to similar interpretation as previously noted. However, BEEF has a negative coefficient which indicates that producers who consider beef to be their principal farm enterprise tend to have a higher rating of "lower price received for cattle" than non-beef enterprise producers.

Age is a positive and significant independent variable for five reasons. This implies that as the age of the producer increases, the probability of rating the associated five reasons as "irrelevant" disadvantages of weekly auctions increases. SPJOB was positive and significant for four reasons and EDUC was positive and significant for three reasons. BEEF is the only significant independent variable that has a negative coefficient. The negative BEEF coefficient indicates that producers who consider beef to be their principal enterprise tend to attach more importance to the two associated disadvantages. The two disadvantages for which BEEF was negative are "unfavorable weighing conditions" and "lower price received for cattle." This implies that beef producers are more likely to consider these two reasons as highly

important disadvantages of weekly auctions.

Graded Sales - Advantages. Table 29 shows the coefficient estimates, standard errors, LLR, and PR^2 values for the ordered probit model for the ratings of the advantages of graded feeder cattle sales. Three models indicate a rejection of the null hypothesis that no statistically significant relationships exist between the independent and dependent variables at the 0.05 level of statistical significance. With the highest LLR value in the table, "good market management" has five significant independent variables, three of which are positive. The positive coefficients indicate that an increase in the corresponding independent variable will cause a decrease in the probability of rating "good market management" as a "most important" advantage of graded sales. The negative coefficient on NO5 indicates that as the ratio of cattle sold at less than 500 pounds to total number of cattle and calves sold increases, the probability of rating "good market management" as "most important" will increase. Similarly, the negative coefficient on the BEEF variable indicates that producers of beef enterprises will tend to rate the reason with higher importance than producers of non-beef enterprises.

"Open competitive bidding" had a statistically significant LLR at the 0.05 level and has four significant independent variables all of which are positive with the exception of BEEF. These same four variables were significant for "good market management" and are subject to the same interpretation as provided above. "Higher price received for cattle" had an LLR value significant at the 0.10 level and had three

Table 29. Orderd Probit Model Coefficient Estimates for Ratings of the Advantages of Graded Sales. (Standard Errors in Parentheses)

	INDEPENDENT VARIABLES											LLR [a]
	INTERC	SOLD	NO5	NO7	YUJOB	SPJOB	EDUC	AGE	BEEF	DAIRY	STCKBT	PPR^2 [e]
Advantages												
Higher price received for cattle	-4.0619[b]	-0.0012	-0.3743	0.4056	0.0270	0.7798	0.6087	0.0328	-2.0222	7.0307	0.2212	22.56 [c]
	(1.540)	(0.007)	(0.698)	(1.241)	(0.590)	(0.501)	(0.230)	(0.020)	(0.640)	(17386.11)	(0.553)	0.2130
Larger number of buyers present	-3.4171	-0.0080	-0.3052	0.9237	0.5538	1.1640	0.1583	0.0193	-0.5486	6.8726	0.7294	19.32 [c]
	(1.394)	(0.007)	(0.727)	(1.191)	(0.548)	(0.506)	(0.203)	(0.018)	(0.574)	(17386.11)	(0.564)	0.1679
Habit or tradition	-2.6956	-0.0031	0.9069	-1.1133	0.2398	-0.1803	-0.0864	0.0335	0.9050	-1.1384	-0.3170	11.14
	(1.528)	(0.007)	(0.772)	(1.688)	(0.647)	(0.638)	(0.236)	(0.020)	(0.635)	(1.262)	(0.683)	0.1349
Lower commission and yardage fees	-1.8574	0.0069	-0.5591	-2.6429	-0.6648	0.4831	0.1120	0.0215	-0.4291	0.4052	-0.5208	9.76
	(1.443)	(0.006)	(0.674)	(1.651)	(0.551)	(0.547)	(0.212)	(0.019)	(0.564)	(1.208)	(0.535)	0.0903
More favorable weighing conditions	-3.5561	0.0105	-0.2306	-1.0182	0.6182	-0.3900	0.2454	0.0423	-0.9584	-0.0887	0.2956	9.62
	(1.624)	(0.007)	(0.761)	(1.325)	(0.623)	(0.577)	(0.233)	(0.022)	(0.646)	(1.310)	(0.600)	0.0798
Good market management	-8.6127	0.0033	-1.7207	-5.1881	0.9050	1.8663	0.6083	0.0972	-2.1966	6.2419	0.8496	35.82 [c]
	(2.385)	(0.008)	(0.819)	(4.014)	(0.655)	(0.741)	(0.249)	(0.029)	(0.682)	(17386.00)	(0.653)	0.3400
Open competitive bidding	-3.8913	0.0040	-0.3801	-1.0355	-0.3191	0.9500	0.4966	0.0373	-1.7103	6.7978	0.1755	17.48 [d]
	(1.531)	(0.006)	(0.690)	(1.237)	(0.551)	(0.500)	(0.220)	(0.020)	(0.636)	(17386.11)	(0.529)	0.1623

[a] Log Likelihood Ratio.
[b] ____ Indicates statistical significance at the 0.10 level.
[c] ____ Indicates an overall statistical significance at the 0.05 level.
[d] Indicates an overall statistical significance at the 0.10 level.
[e] Pseudo R^2.

statistically significant independent variables. The three variables are EDUC, AGE, and BEEF. These three have the same signs as they did for the previous reasons and are subject to the same interpretation as previously given.

It is worthy of mention that AGE is the independent variable that provides the most statistical significance in the models for the advantages of graded sales. AGE is positive and significant in five models indicating that as the age of a producer increases, the probability of rating the associated advantage "most important" decreases. EDUC is a positive and significant independent variable for four reasons and SPJOB and BEEF are significant for three reasons. SPJOB has a positive coefficient in each instance that it is significant while BEEF is negative when it is significant. SOLD, NO7, YUJOB, DAIRY, and STKBT are not significant independent variables for any of the advantages of graded sales.

Graded Sales - Disadvantages. Table 30 shows the coefficient estimates, standard errors, LLR, and PR^2 for the ordered probit model for the rating of the disadvantages of graded feeder cattle sales. Three models have an LLR that is significant at the 0.05 level and one model has an LLR significant at the 0.10 level. AGE is a significant independent variable in six models and has a positive coefficient in each.

"Do not like commingling my cattle with others" had a LLR value significant at the 0.05 level and had four statistically significant independent variables. The significant variables are NO5, SPJOB, AGE,

Table 30. Ordered Probit Model Coefficient Estimates for Ratings of the Disadvantages of Grades Sales. (Standard Errors in Parentheses)

	INDEPENDENT VARIABLES											LLR [a]
	INTERC	SOLD	NO5	NO7	YUJOB	SPJOB	EDUC	AGE	BEEF	DAIRY	STCKBT	PR^2 [e]
Disadvantages												
Do not like commingling my cattle with others	-5.5384[b] (1.617)	0.0020 (0.005)	1.1713 (0.614)	0.6636 (0.864)	0.0866 (0.496)	1.8831 (0.637)	0.1564 (0.169)	0.0339 (0.019)	0.6087 (0.503)	1.8771 (1.000)	0.6373 (0.509)	20.74 [c] 0.1558
Poor market management	-4.9711 (1.646)	-0.0044 (0.006)	0.6534 (0.657)	0.4830 (0.851)	-0.8058 (0.649)	2.3387 (0.817)	0.2226 (0.189)	0.0451 (0.020)	0.9905 (0.539)	0.5260 (0.954)	-0.7332 (0.590)	17.80 [d] 0.1590
Higher commiss. and yardage fees	-4.4816 (1.517)	0.0056 (0.005)	0.5162 (0.672)	0.1979 (0.849)	1.1179 (0.626)	0.0275 (0.631)	0.1621 (0.207)	0.0368 (0.019)	0.8347 (0.508)	0.2354 (0.882)	0.0286 (0.552)	12.94 0.1126
Requires consignment of cattle in advance	-3.0445 (1.417)	0.0067 (0.005)	0.7340 (0.526)	-0.4235 (0.873)	0.1105 (0.494)	0.4795 (0.573)	0.0691 (0.156)	0.0189 (0.017)	-0.4412 (0.401)	0.0230 (0.796)	0.0966 (0.463)	9.62 0.0629
Market is too far from my farm or ranch	-2.7200 (1.368)	0.0088 (0.005)	1.0678 (0.586)	-0.0978 (0.883)	0.1302 (0.489)	0.2241 (0.548)	0.1636 (0.166)	0.0137 (0.017)	-0.4651 (0.452)	0.1068 (0.771)	-0.2763 (0.434)	10.72 0.0790
Sale not at the right time of year	-3.7581 (1.220)	0.0149 (0.005)	0.7320 (0.525)	0.7561 (0.698)	0.1382 (0.428)	1.1299 (0.445)	-0.0024 (0.157)	0.0183 (0.014)	-0.2384 (0.406)	-0.0369 (0.674)	0.1350 (0.415)	18.68 [c] 0.1151
Lower price received	-5.1724 (1.664)	0.0069 (0.006)	0.1403 (0.630)	0.0113 (0.943)	-0.0343 (0.579)	1.7424 (0.743)	0.3379 (0.188)	0.0369 (0.020)	0.1277 (0.474)	-0.6332 (0.856)	0.2551 (0.533)	15.78 0.1230
I do not like my cattle graded	-3.7497 (1.572)	0.0033 (0.006)	0.1720 (0.621)	-0.8866 (0.926)	0.1489 (0.608)	1.1890 (0.735)	0.2754 (0.197)	0.0288 (0.019)	0.4893 (0.508)	0.6002 (0.817)	0.2849 (0.552)	13.22 0.1223
Graded sales do not work well for my type cattle	-4.3894 (1.455)	0.0157 (0.006)	0.1932 (0.515)	1.3514 (0.892)	1.3422 (0.512)	0.5299 (0.584)	-0.0061 (0.179)	0.0304 (0.017)	0.6167 (0.477)	0.6121 (0.775)	-0.0046 (0.415)	24.62 [c] 0.1723
Requires membership in an association	-4.0638 (1.381)	0.0070 (0.005)	0.8844 (0.543)	-0.7659 (0.930)	-0.0567 (0.454)	0.7520 (0.532)	0.3112 (0.166)	0.0314 (0.016)	-0.0648 (0.470)	0.0403 (0.798)	0.2036 (0.403)	13.58 0.0962

[a] Log likelihood Ratio.
[b] Indicates statistical significance at the 0.10 level.
[c] Indicates an overall statistical significance at the 0.05 level.
[d] Indicates an overall statistical significance at the 0.10 level.
[e] Pseudo R^2.

and DAIRY and they are each positive. The positive coefficients for AGE and NO5 indicate that as the age of the producer increases and the number of head of animals sold at weights less than 500 pounds increases, the probability of rating "do not like commingling my cattle with others" as an "irrelevant" disadvantage of graded sales increases. Similarly, the positive coefficients for SPJOB and DAIRY indicate that a producer whose spouse has an off-farm job and a producer who considers the principal farm enterprise to be dairy cattle has an increased probability of rating "do not like commingling my cattle with others" as irrelevant.

"Graded sales do not work well for my type of cattle" is the dependent variable for the model with the highest LLR and has SOLD as a significant independent variable. The positive coefficient for SOLD indicates that as the number of feeder cattle sold increases, the probability of rating "graded sales do not work well for my type of cattle" as a "most important" disadvantage of graded sales decreases. SPJOB is also a statistically significant independent variable for this disadvantage and its positive coefficient indicates that a producer whose spouse has an off-farm job has an increased probability of rating "graded sales do not work well for my type of cattle" as an "irrelevant" disadvantage of graded sales.

It should be noted that all of the significant independent variables in each of the models presented in Table 30 have positive values. This indicates that there are no significant variables that when increased will cause an increase in the probability of rating a disadvantage of graded sales as "most important." It also indicates

that increases in all of the significant variables increase the probability of rating the disadvantages as "irrelevant."

Direct Selling - Advantages. Table 31 shows the coefficient estimates, standard errors, LLR, and PR^2 values from the ordered probit model for the rating of the advantages of direct sales of feeder cattle on the farm. The table shows that the probit analysis did not indicate any models with a statistically significant LLR at the 0.05 or 0.10 level. However, several independent variables were significant in certain models. BEEF was a significant independent variable in four models and had a negative coefficient in each. The negative coefficients on BEEF indicated that a producer who considers beef to be his/her principal farm enterprise will have a higher probability of rating, for example, "no commission or yardage fees" as a "most important" advantage of direct selling compared to a non-beef principle enterprise producer.

AGE is a positive and significant independent variable for two reasons. The positive coefficient for AGE indicates that as the age of the producer increases, the probability of rating the associated advantage as "most important" decreases. The statistically significant negative coefficient for DAIRY indicates that producers who list dairy as their principle farm enterprise rate the reason more important than producers of principal enterprises that are non-dairy.

Although it does not have a significant LLR, "no commission or yardage fees" does have two negative statistically significant coefficients: BEEF and DAIRY. The fact that these two variables are

Table 31. Ordered Probit Model Coefficient Estimates for Ratings of the Advantages of Direct Sales to Buyers. (Standard Errors in PArentheses)

	INDEPENDENT VARIABLES											LLR [a]
	INTERC	SOLD	NO5	NO7	YUJOB	SPJOB	EDUC	AGE	BEEF	DAIRY	STCKBT	PR^2 [e]
Advantages												
Can sell at any time I wish	-2.9583[b] (1.070)	0.0047 (0.004)	0.1905 (0.466)	-0.1314 (1.083)	0.3006 (0.513)	0.4683 (0.479)	0.0346 (0.158)	0.0295 (0.014)	-0.8490 (0.450)	-8.2576 (10153.78)	-0.6349 (0.505)	14.76 0.1005
Seller can establish a reputation for cattle	-1.7374 (1.029)	-0.0015 (0.005)	-0.1525 (0.505)	0.1578 (0.951)	0.0904 (0.520)	0.4336 (0.487)	-0.0510 (0.163)	0.0237 (0.015)	-1.0481 (0.478)	-8.2797 (9856.59)	-0.2029 (0.446)	12.24 0.0773
Higher price received	-1.8946 (1.180)	-0.0039 (0.005)	0.3616 (0.556)	-1.7374 (1.247)	-0.0675 (0.617)	0.7656 (0.594)	-0.0693 (0.193)	0.0179 (0.016)	-0.6001 (0.513)	-1.6897 (1.166)	-0.4485 (0.574)	12.96 0.1651
Tradition or habit	-1.2581 (1.139)	-0.0007 (0.005)	0.9958 (0.626)	0.3710 (1.349)	0.1559 (0.618)	-0.2107 (0.655)	0.0633 (0.184)	0.0053 (0.016)	0.0763 (0.473)	-0.4576 (0.964)	-0.5866 (0.554)	4.02 0.0313
No commission or yardage fees	-1.8191 (0.990)	0.0003 (0.004)	0.1968 (0.462)	0.4603 (0.937)	0.3465 (0.485)	-0.1898 (0.454)	0.0797 (0.148)	0.0159 (0.013)	-0.9277 (0.440)	-1.7484 (0.997)	-0.3726 (0.425)	6.90 0.0407
Cattle do not have to be hauled to market	-1.5991 (0.992)	0.0023 (0.004)	0.2813 (0.475)	-0.4958 (1.105)	0.7680 (0.513)	-0.4493 (0.490)	-0.0484 (0.160)	0.0081 (0.013)	-0.3665 (0.468)	-0.6683 (0.959)	-0.5457 (0.479)	4.98 0.0312
Buyer may be responsible for hauling	-0.9469 (1.005)	0.0011 (0.005)	-0.0930 (0.485)	0.3886 (0.941)	-0.0047 (0.525)	-0.0523 (0.498)	-0.0347 (0.161)	0.0083 (0.013)	-0.3516 (0.440)	-0.7081 (0.960)	-0.3090 (0.439)	1.96 0.0127
Buyer can see my cattle better	-0.8462 (0.967)	0.0002 (0.004)	0.2432 (0.479)	0.3655 (1.010)	0.0403 (0.496)	-0.0611 (0.477)	0.0270 (0.157)	0.0049 (0.013)	-0.8926 (0.477)	-1.2503 (0.982)	-0.5884 (0.479)	5.42 0.0329

[a] Log Likelihood Ratio.
[b] ____ Indicates statistical significance at the 0.10 level.
[e] Pseudo R^2.

negative indicates that producers of beef principal enterprises and producers of dairy principal enterprises show an increased probability of rating "no commission or yardage fees" as a "most important" advantage of direct selling.

Direct Selling - Disadvantages. Table 32 shows the coefficient estimates, standard errors, LLR, and PR^2 values from the ordered probit model for the rating of the disadvantages of direct sales of feeder cattle to buyers on the farm. Only one model has an LLR that is above the critical chi square value. With an LLR value of 18.18, the model for "lower price received for cattle" is statistically significant at the 0.05 level. NO5 is a statistically significant independent variable and has a positive coefficient for the same reason. An increase in NO5 will lead to a decrease in the probability of rating "lower price received for cattle" as a "most important" disadvantage of direct selling. The positive coefficient on SPJOB indicates that producers with spouses with off-farm employment tend to provide the reason with a lower importance rating than producers who do not have an off-farm job. AGE, with a negative coefficient, indicates that as the age of the producer increases, the probability of rating "lower price received for cattle" as a "most important" disadvantage of direct selling, increases. "Too many opportunities for dishonest buyers" has three significant independent variables. The positive sign on NO5 indicates that as the number of head of cattle sold at less than 500 pounds increases, the reason is more likely to be rated as "irrelevant." However, the negative coefficients for BEEF and STCKBT indicate that producers of

Table 32. Ordered Probit Model Coefficient Estimates for Ratings of the Disadvantages of Direct Sales to Buyers. (Standard Errors in Parentheses)

	INDEPENDENT VARIABLES											LLR [a]
	INTERC	SOLD	NO5	NO7	YUJOB	SPJOB	EDUC	AGE	BEEF	DAIRY	STCKBT	PR^2 [e]
Disadvantages												
Cannot get bids from a large number of buyers	-0.3943 (1.081)	0.0033 (0.004)	1.0836[b] (0.558)	0.5612 (0.719)	0.0161 (0.471)	-0.0117 (0.432)	0.0354 (0.143)	-0.0244 (0.016)	-0.3427 (0.369)	-0.9610 (0.965	-0.1214 (0.491)	9.30 0.0571
No open, competitive bidding	0.6424 (1.107)	0.0009 (0.004)	1.0485 (0.534)	-.0327 (0.636)	-0.1729 (0.496)	-0.2850 (0.481)	-0.0626 (0.139)	-0.0274 (0.016)	-0.3704 (0.376)	0.1123 (0.874)	-0.0920 (0.496)	9.32 0.0529
Dislike selling with a price "slide" on weight	0.8814 (1.278)	-0.0037 (0.005)	1.0129 (0.633)	-0.0155 (0.819)	-0.4005 (0.598)	-0.1765 (0.581)	-0.0045 (0.158)	-0.0401 (0.019)	0.3007 (0.428)	7.9526 (12276.62)	0.3161 (0.587)	13.34 0.1003
My operation is too small to attract buyers	-1.3685 (1.047)	0.0080 (0.004)	0.3401 (0.521)	0.1813 (0.736)	0.4714 (0.509)	-0.4379 (0.509)	0.0235 (0.134)	0.0025 (0.014)	-0.1097 (0.358)	0.4915 (0.793)	-0.2318 (0.490)	5.94 0.0342
Tradition or habit	-1.1630 (1.423)	-0.0008 (0.005)	0.6463 (0.611)	0.8194 (0.850)	-0.2596 (0.664)	0.7230 (0.681)	0.1547 (0.183)	-0.0136 (0.020)	0.9974 (0.445)	7.4230 (12280.12)	-0.3527 (0.529)	12.40 0.1109
Lower price received	-0.7649 (1.165)	-0.0016 (0.005)	1.3934 (0.590)	0.3104 (0.681)	-0.1855 (0.531)	0.8518 (0.518)	0.1669 (0.158)	-0.0299 (0.017)	0.1299 (0.396)	0.1701 (0.973)	0.2960 (0.448)	18.18 [d] 0.1177
Too many opportunities for dishonest buyers	-0.9034 (1.203)	0.0014 (0.005)	0.9685 (0.572)	-0.0663 (0.652)	0.1571 (0.512)	0.2427 (0.480)	0.0632 (0.149)	-0.0017 (0.017)	-0.7789 (0.393)	-0.7027 (1.011)	-1.3476 (0.736)	12.56 0.0867
Possibility of getting a bad check	-1.0946 (1.154)	-0.0011 (0.005)	0.5432 (0.592)	-0.9575 (0.742)	0.2564 (0.553)	0.1458 (0.544)	0.1179 (0.144)	-0.0045 (0.017)	-0.5497 (0.418)	1.0639 (1.015)	-0.6438 (0.581)	12.96 0.0891

[a] Log likelihood Ratio.
[b] Indicates statistical significance at the 0.10 level.
[d] Indicates an overall statistical significance at the 0.10 level.
[e] Pseudo R^2.

principal beef enterprises and increases in the ratio of the number of stocker calves bought to the total number of head sold, will cause an increase in the probability of rating "too many opportunities for dishonest buyers" as a "most important" disadvantage of direct selling.

Overall, NO5 was a statistically significant independent variable for four reasons and positive in each case. AGE was a significantly negative independent variable for three reasons. The negative coefficient for AGE indicates that as the age of the producer increases, the probability of rating the associated disadvantage of direct selling as "irrelevant" increases. BEEF was a significant variable for two reasons. The positive coefficient for BEEF indicated that beef producers cause an increase in the probability of rating "tradition or habit" as an "irrelevant" disadvantage, while the negative coefficient for BEEF indicated that beef producers cause an increase in the probability of rating "too many opportunities for dishonest buyers" as a "most important" disadvantage. NO7, YUJOB, EDUC, and DAIRY were not statistically significant variables for any of the disadvantages of direct selling.

Marginal Effects of Changes in Regressors on Probabilities

As discussed earlier, the marginal effects of changes in the independent variables on the probabilities of each importance rating are not equal to the coefficients calculated by probit. The marginal effects of the changes in the regressors are, however, evident from the partial derivatives with respect to each independent variable. The partial derivatives reported here are based on calculations made at the

mean value of the independent variables used in the probit model. It should be noted that the marginal effects (partial derivatives) would be different for calculations made at values other than the mean. The sign of the partial derivative for a given independent variable indicates the direction of expected change, while the actual numeric value represents the amount of change that will occur in the probability of a producer, representative of the mean characteristics, selecting a given 1 through 6 rating for a particular advantage or disadvantage of a type of market in response to a change in a single independent variable.

Table 33 shows the partial derivatives which indicate the change in the probability of selecting a 1 through 6 importance rating based on a one-unit change in the independent variables for advantages of weekly auctions. Derivatives were calculated only for the independent variables that were significant at the 0.10 level or better. The value of -0.1354 indicates a decrease of 0.1354 in the probability of a "mean" producer choosing "irrelevant" to describe the importance of "lower commission and yardage fees" as an advantage of weekly auctions with a one unit change in NO5. With the thresholds shifting to the left in the normal distribution,

-0.0759 indicates that a decrease of 0.0759 is expected in the probability of a "mean" producer choosing "not important" to describe the importance of "lower commission and yardage fees" as an advantage of weekly auctions with a one unit change in NO5. The same notions are applicable for the negative values for the reason ratings of "somewhat important" and "important." However, it is with the positive value for "very important" that an increase in the probability of a producer

Table 33. The Change in the Probability of Selecting a Reason Rating to Indicate a Producer's Attitude Toward Advantages of Weekly Auctions for a Given One Unit Change in Statistically Significant Independent Variables, Calculated at the Mean Values of the Independent Variables.

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages							
Lower commis. & yardage fees	NO5	-0.1354	-0.0759	-0.0326	-0.0198	0.0700	0.1541
"	BEEF	0.1583	0.0888	0.0381	-0.0231	-0.0819	-0.1802
"	DAIRY	0.2770	0.1553	0.0666	-0.0404	-0.1432	-0.3153
Higher price received	YUJOB	0.0399	0.0486	0.0030	0.0950	0.0114	-0.2248
Market is close to farm	YUJOB	0.0544	0.0177	0.0371	0.0510	0.0293	-0.1895
"	AGE	0.0018	0.0006	0.0012	0.0017	0.0010	-0.0064
Less effort or troublesome	SOLD	0.0007	0.0007	0.0008	0.0009	-0.0005	-0.0027
"	EDUC	-0.0146	-0.0155	-0.0177	-0.0190	0.0105	0.0563
More favorable weighing cond.	NO5	-0.0403	-0.0031	-0.0653	-0.1105	-0.0092	0.2285
"	BEEF	0.0476	0.0037	0.0771	0.1305	0.0109	-0.2698
More assurance of payment	NO5	-0.0255	-0.0372	-0.0564	-0.0540	-0.0893	0.2624

[a] Independent variables statistically significant at the 0.10 level in the probit models.

choosing a rating occurs. The expected increase in the probability of a "mean" producer choosing "very important" and "most important" to describe the rating for "lower commission and yardage fees" as an advantage of weekly auctions is 0.0700 and 0.1541 respectively. The sum of the partial derivatives in any given row is zero indicating that the sum of the probabilities over the six importance ratings must remain unity.

Table 34 shows the change in the probability of a producer of "mean" characteristics selecting a given rating to indicate the importance of typical disadvantages of weekly auctions in response to a one-unit change in the listed independent variables. Derivatives were calculated only for statistically significant coefficients. A 0.0156 decrease in the probability of selecting "most important" as the level of importance to describe "higher commission and yardage fees" is expected for a one unit increase in age. The probability of selecting "very important" is expected to decrease by 0.0002 in the same instance. With the threshold shifting to the right, the remaining four importance ratings are positive and correspond to increases in the probability of choosing those lower importance ratings.

Considering "lower price received for cattle" as a disadvantage of weekly auctions, an increase in the level of education (EDUC) corresponds to a movement to the right of the category thresholds under a stationary normal distribution. The marginal effects of the probability of selecting importance ratings increase by 0.0438, 0.0207, 0.0158, and 0.0175 for "irrelevant," "not important," somewhat important," and "important," respectively. The peak of the normal

Table 34. The Change in the Probability of Selecting a Reason Rating to Indicate a Producer's Attitude Toward Disadvantages of Weekly Auctions for a Given One Unit Change in Statistically Significant Independent Variables, Calculated at the Mean Values of the Independent Variables.

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Poor market facilities	SPJOB	0.1674	0.1585	0.0847	0.0289	-0.0662	-0.3733
"	AGE	0.0058	0.0055	0.0029	0.0010	-0.0023	-0.0129
Poor market management	AGE	0.0101	-0.0037	-0.0025	-0.0028	-0.0005	-0.0005
Higher commission and yardage	SPJOB	0.1205	0.0758	0.0213	0.0735	-0.0038	-0.2873
"	EDUC	0.0404	0.0254	0.0072	0.0247	-0.0013	-0.0964
"	AGE	0.0066	0.0041	0.0012	0.0040	-0.0002	-0.0156
Unfavorable weighing conditions	SPJOB	0.1404	0.0894	0.0233	0.0511	-0.0420	-0.2622
"	EDUC	0.0451	0.0287	0.0075	0.0164	-0.0135	-0.0842
"	AGE	0.0067	0.0043	0.0011	0.0024	-0.0020	-0.0125
"	BEEF	-0.1112	-0.0708	-0.0184	-0.0404	0.0332	0.2076

Table 34. (continued)

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Lower price received for cattle	NO7	0.3712	0.1758	0.1337	0.1486	-0.0029	-0.8864
"	SPJOB	0.1227	0.0582	0.0442	0.0492	-0.0009	-0.2733
"	EDUC	0.0438	0.0207	0.0158	0.0175	-0.0003	-0.0975
"	AGE	0.0047	0.0022	0.0017	0.0019	-0.00004	-0.0104
"	BEEF	-0.1243	-0.0589	-0.0448	-0.0498	0.0010	0.2767
Sale of single animals takes too much time	STKBT	0.2890	-0.1775	-0.0338	-0.0152	-0.0305	-0.0320

[a] Independent variables statistically significant at the 0.10 level in the probit models.

distribution occurs between "important" and "very important" because this is where the change in sign occurs. The probability of choosing "very important" and "most important" decreases by 0.00004 and 0.0104, respectively.

In Table 35, it is noticed that an increase in the education level of a producer (EDUC) will cause an increase in the probability of "irrelevant" through" important" being selected as the importance rating of "good market management" as an advantage of graded feeder cattle sales. The second page of the same table shows a similar pattern for the ratings of "open competitive bidding" with an increase in EDUC for the same market.

Several noteworthy movements are shown in Table 36 for the disadvantages of graded feeder cattle sales. An increase in NO5, AGE, and DAIRY follow similar changes in the probability of selecting importance ratings for "do not like commingling my cattle with others." The peak of the normal distribution for the ratings of these reasons occurs between "somewhat important" and "important" with the lower importance ratings having an increased probability and the higher importance ratings having a decreased probability.

AGE and BEEF variables cause similar changes in the probabilities of rating "poor market management" as a disadvantage of graded sales. The peak of the distribution occurs between "important" and "very important" with "very important" and "most important" having a decreased probability of being identified as the importance rating.

The same pattern is observed for increases in EDUC and AGE when "requires membership in an association" is the disadvantage considered

Table 35. The Change in the Probability of Selecting a Reason Rating to Indicate a Producer's Attitude Toward Advantages of Graded Sales for a Given One Unit Change in Significant Independent Variables, Calculated at the Mean Values of the Independent Variables.

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages							
Higher price received for cattle	EDUC	0.0937	-0.0456	***[b]	-0.0407	-0.0063	-0.0011
"	AGE	0.0050	-0.0025	***[b]	-0.0022	-0.0003	-0.00006
"	BEEF	-0.3112	0.1515	***[b]	0.1351	0.0210	0.0036
Larger number of buyers present	SPJOB	0.1211	0.1023	***[b]	0.1981	0.0137	-0.4352
Habit or tradition	AGE	0.0133	-0.0061	***[b]	-0.0028	-0.0042	-0.0003
More favorable weighing conditions	EDUC	0.0692	-0.0305	-0.0129	-0.0139	-0.0102	-0.0019
"	AGE	0.0120	-0.0053	-0.0022	-0.0024	-0.0017	-0.0003
Good market management	NO5	-0.0260	-0.0633	-0.1403	-0.4375	0.2590	0.4080
"	SPJOB	0.0282	0.0687	0.1521	0.4743	-0.2808	-0.4424
"	EDUC	0.0092	0.0224	0.0496	0.1546	-0.0915	-0.1442

Table 35. (continued)

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages							
Good market management	AGE	0.0015	0.0036	0.0079	0.0247	-0.0146	-0.0230
"	BEEF	-0.0332	-0.0808	-0.1791	-0.5585	0.3306	0.5209
Open competitive bidding	SPJOB	0.1422	0.0017	0.1179	0.1089	-0.0638	-0.3068
"	EDUC	0.0744	0.0009	0.0617	0.0570	-0.0334	-0.1605
"	AGE	0.0056	0.0001	0.0046	0.0043	-0.0025	-0.0120
"	BEEF	-0.2560	-0.0030	-0.2122	-0.1960	0.1149	0.5524

[a] Independent variables statistically significant at the 0.10 level in the probit models.
[b] *** Indicates that the category was not selected by any of the respondents.

Table 36. The Change in the Probability of Selecting a Reason Rating to Indicate a Producer's Attitude Toward Disadvantages of Graded Sales for a Given One Unit Change in Statistically Significant Independent Variables, Calculated at the Mean Values of the Independent Variables.

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Do not like commingling my cattle with others	NO5	0.2247	0.2191	0.0219	-0.0279	-0.0932	-0.3446
"	SPJOB	0.3613	0.3523	0.0352	-0.0448	-0.1499	-0.5542
"	AGE	0.0065	0.0063	0.0006	-0.0008	-0.0027	-0.0100
"	DAIRY	0.3602	0.3512	0.0351	-0.0447	-0.1494	-0.5524
Poor market management	SPJOB	0.4271	0.3134	0.0830	0.0107	-0.1326	-0.7976
"	AGE	0.0082	0.0060	0.0016	0.0021	-0.0026	-0.0154
"	BEEF	0.1809	0.1327	0.0352	0.0452	-0.0562	-0.3378
Higher commission and yardage fees	YUJOB	0.4224	0.0180	-0.0013	-0.0854	-0.2649	-0.0915
"	AGE	0.0139	0.0006	-0.00004	-0.0028	-0.0087	-0.0030
"	BEEF	0.3155	0.0134	-0.0010	-0.0638	-0.1978	-0.0683

Table 36. (continued)

Dependent Variable	Significant Independent Variable[a]	Reason Ratings: Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Market is too far from my farm or ranch	SOLD	0.0021	0.0010	0.0002	0.0002	-0.0003	-0.0032
"	NO5	0.2558	0.1274	0.0215	0.0183	-0.0363	0.3867
Sales not at the right time of year	SOLD	0.0018	0.0016	0.0015	0.0010	-0.0016	-0.0043
"	SPJOB	0.1358	0.1241	0.1144	0.0764	-0.1233	-0.3271
Lower price received	SPJOB	0.3670	0.0279	0.0449	-0.0380	-0.0874	-0.3144
"	EDUC	0.0712	0.0542	0.0087	-0.0074	-0.0170	-0.1099
Graded sales do not work well for my type of cattle	SOLD	0.0049	0.0013	0.00003	-0.0008	-0.0020	-0.0035
"	YUJOB	0.4162	0.1141	0.0030	-0.0679	-0.1696	-0.2956
"	AGE	0.0094	0.0026	0.00007	-0.0015	-0.0038	-0.0067

Table 36. (continued)

Dependent Variable	Significant Independent Variable[a]	Reason Ratings: Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Requires membership in an association	NO5	0.2855	0.0668	-0.0294	-0.0751	-0.0943	-0.1535
"	EDUC	0.1005	0.0235	-0.0104	-0.0264	-0.0332	-0.0540
"	AGE	0.0101	0.0024	-0.0010	-0.0027	-0.0034	-0.0055

[a] Independent variables statistically significant at the 0.10 level in the probit models.

for graded sales. Only the two lower importance ratings show increases in the probability while the remaining four ratings show decreases. The peak of the distribution occurs between "not important" and "somewhat important" as the threshold shifts to the right. This indicates that increases in the age and/or education level of a producer is associated with a decreased probability of selecting "somewhat important," "important," "very important" and "most important" as the rating for "requires membership in an association" as a disadvantage of graded sales.

In Table 37, where "seller can establish a reputation for cattle" is the dependent variable, as the age of the producer increases, the probability of choosing "very important" and "most important" decreases by 0.0005 and 0.0008 respectively. Conversely, producers who consider beef to be their principal farm enterprise cause respective increases of 0.0215 and 0.3875 in the probability of selecting the same importance ratings for the advantages of direct selling.

Table 38 shows that a decrease will occur in the probability of selecting "irrelevant" and "not important" to describe "dislike selling with a price "slide" on weight" as a disadvantage of direct selling as the age of producer increases. This also indicates that as the age of the producer increases, "dislike selling with a price "slide" on weight" corresponds to an increase in the probability of selecting "somewhat important" through "not important." The same notion is expected with respect to "lower price received" as the age of the producer increases.

Table 37. The Change in the Probability of Selecting a Reason Rating to Indicate a Producer's Attitude Toward Advantages of Direct Selling for a Given One Unit Change in Statistically Significant Independent Variables, Calculated at the Mean Values of the Independent Variables.

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages							
Can sell at any time I wish	AGE	0.0037	0.0019	****[b]	0.0059	-0.0002	-0.0113
"	BEEF	-0.1067	-0.0542	****[b]	-0.1698	0.0053	0.3238
Seller can establish a reputation for cattle	AGE	0.0037	0.0022	0.0013	0.0020	-0.0005	-0.0088
"	BEEF	-0.1636	-0.0976	-0.0591	-0.0887	0.0215	0.3875
No commission or yardage fees	BEEF	-0.1716	-0.0642	-0.0499	-0.0814	0.0579	0.3092
"	DAIRY	-0.3232	-0.1210	-0.0940	-0.1533	0.1091	0.5824
Buyer can see my cattle better	BEEF	-0.1903	-0.0924	-0.0347	-0.0380	0.0766	0.2789

[a] Independent variables statistically significant at the 0.10 level in the probit models.
[b] *** Indicates that the category was not selected by any of the respondents.

Table 38. The Change in the Probability of Selecting a Reason Rating to Indicate a Producer's Attitude Toward Disadvantages of Direct Selling for a Given One Unit Change in Statistically Significant Independent Variables, Calculated at the Mean Values of the Independent Variables.

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Cannot get bids from a large number of buyers	NO5	0.1533	0.0880	0.0726	0.1148	0.0023	-0.4309
No open, competitive bidding	NO5	0.2234	0.0947	0.0632	0.0366	-0.0400	-0.3780
"	AGE	-0.0058	-0.0025	-0.0017	-0.0010	0.0001	0.0099
Dislike selling with a price "slide" on weight	AGE	-0.0101	-0.0050	0.0006	0.0010	0.0011	0.0135
My operation is too small to attract buyers	SOLD	0.0023	0.0006	0.0001	0.0002	-0.0003	-0.0029
Tradition or habit	BEEF	0.3864	-0.0207	-0.0587	-0.1226	-0.1505	-0.0338
Lower price received	NO5	0.2771	0.0532	0.0954	0.1022	-0.0375	-0.4905
"	SPJOB	0.1693	0.0325	0.0583	0.0624	-0.0229	-0.2996
"	AGE	-0.0059	-0.0011	-0.0020	-0.0022	0.0008	0.0105

Table 38. (continued)

Dependent Variable	Significant Independent Variable[a]	Reason Ratings					
		Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages							
Too many opportunities for dishonest buyers	NO5	0.2366	0.0549	0.0291	0.0593	0.0055	-0.3855
"	BEEF	-0.1904	-0.0442	-0.0234	-0.0478	-0.0044	0.3102
"	STCKBT	-0.3295	-0.0764	-0.0406	-0.0826	-0.0077	0.5368

[a] Independent variables statistically significant at the 0.10 level in the probit models.

Observed Probabilities for Ratings

The results previously discussed are useful. However, their explanation involves numerous references to the change in the "probability" of selecting various ratings. The actual probabilities of the sample of producers on which this study is based are represented by the percent of producers that indicated a 1 through 6 rating for the particular reason. For example, the number of producers that indicated "irrelevant" as the rating for "tradition or habit" as an advantage of weekly auctions divided by the total number of respondents that provided a rating for "tradition or habit" is the observed probability of selecting "irrelevant" in this instance (Table 39, Appendix A).

The probability of each 1 through 6 rating being selected to describe the importance of each advantage and disadvantage of weekly auctions, graded sales, and direct selling are presented in tables for each market type in Appendix A. Tables 39 and 40 present the actual probabilities of ratings for the advantages and disadvantages of weekly auctions, respectively. Tables 41 and 42 include the same information for graded sales while Tables 47 and 48 serve the same purpose for direct selling.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Problem and Method

The domestic livestock marketing industry has undergone substantial adjustments over the years. Despite these changes, no clear consensus has developed concerning the overall superiority of any of the marketing alternatives currently in use. As a result, the use of a wide variety of marketing systems will continue to be a characteristic of the feeder cattle industry. However, developing a better understanding about how the advantages and disadvantages and producer characteristics affect producers' choices of marketing alternatives will provide useful insights into future directions of change in the livestock marketing industry.

A review of the literature suggests that the economic advantages of markets that have adopted technological advances are superior to the traditional marketing methods. In the absence of other factors, some researchers contend that marketing methods that offer economic advantages should command larger proportions of the marketing activity than has recently been reported. Therefore, it seems that producers' decisions concerning how to market feeder cattle are based on criteria other than the economic aspects considered by such previous studies. Producers may make marketing decisions based on their evaluation of a number of market criteria. Although a particular market may have "known" economic advantages, a producer may place more importance on criteria such as proximity and convenience of the market actually

chosen. The specific objectives of this study were to determine why Tennessee feeder cattle producers use or do not use certain types of marketing alternatives, to determine relationships between producer characteristics and the amount sold through each type of market, and to determine relationships between producer characteristics and reasons for the choice of markets.

These objectives were met by the statistical analysis of a mail survey of Tennessee feeder cattle producers that were mailed during the late summer and fall, 1992. A stratified random sample of 1000 producers was selected. The survey resulted in 185 usable responses after two mailings. Descriptive statistics, regression analysis, and ordered probit models were used to analyze the survey results.

Results and Conclusions

Sample Characteristics

Mean characteristics of the sample indicated that almost 75 percent of the feeder cattle sold by respondents in 1991 were marketed through weekly auction sales. The market type with the next largest activity was direct selling which represented approximately 10 percent of the 1991 sales. The average number of head of feeder cattle sold by each producer was nearly 30. Mean number of brood cows was 39 head and mean number of acres of pasture was 137. Of the responding producers, 114 considered beef cattle to be their principal farm enterprise. A gooseneck trailer was the most often indicated type of equipment used to haul cattle. Almost 45 percent of the respondents had off-farm

employment and just over 45 percent had an education level of 12 years or less. Mean age of producers was almost 60 years. Forty-four percent of the producers and 37 percent of their spouses held off-farm jobs.

Market Advantages and Disadvantages

Producers rated the importance of several advantages and disadvantages for each market. Rating choices available to the producer were: irrelevant, not important, somewhat important, important, very important, and most important. The analysis of the ratings of the advantages and disadvantages for each of the marketing alternatives revealed the importance of the advantages and disadvantages in selecting a market.

"Market is close to my farm or ranch" was the overall most important advantage of weekly auctions. Other reasons indicated as highly important advantages of weekly auctions include "more assurance of payment for cattle," "market accepts single animals or small lots," "open, competitive bidding, and "higher price received for cattle." The mean computations of the reason ratings also showed that "tradition or habit" was not a very important reason for using weekly auction sales. "Lower price received for cattle" was the most important and "higher commission and yardage fees" was the second most important disadvantage of weekly auctions. "Sale of single animals takes to much time" was considered to be the least important disadvantage of weekly auctions.

"Higher price received for cattle" was indicated as the most important advantage of graded sales. "Larger number of buyers present" and "open, competitive bidding" were also indicated as important

reasons, while "habit or tradition" was considered an "irrelevant" reason for liking graded sales. "Requires consignment of cattle in advance" was the highest rated disadvantage of graded sales. The mean ratings also indicated that producers consider "market is too far from my farm or ranch" to be an important disadvantage of graded sales. Producers do not seem to mind their cattle being graded because "I do not like my cattle graded," as a disadvantage of graded sales, received a low importance rating.

"More favorable weighing conditions" was the highest rated advantage of video board sales. Producers also considered "higher price received for cattle" to be an important reason for liking this type of market. With the smallest mean rating, "buyer may be responsible for hauling" was considered to be an irrelevant advantage of video board sales. "Minimum lot size too large for my operation" was the most important disadvantage for video board sales. Three reasons had the lowest mean rating as disadvantages of video board sales. They were, "sales not at the right time of year for me," "descriptions do not represent my cattle well," and "poor market management."

As was the case for graded sales, "higher price received for cattle" was the highest rated advantage of satellite video sales. "Larger number of buyers" was also rated as a most important advantage of liking that market type. Conversely, "seller can establish a reputation for cattle," and "good market management" were considered to be irrelevant reasons for liking the satellite video sale. "Minimum lot size is too large for my operation" was the highest rated disadvantage for satellite video sales, while "descriptions do not represent my

cattle well" was considered as an irrelevant disadvantage.

"Higher price received for cattle" had the highest mean rating as an advantage of direct selling. "I can sell at any time I wish" and "no commission or yardage fees" were also rated as important reasons for liking direct selling. "Tradition or habit" was considered to be an irrelevant advantage of direct selling. "Possibility of getting a bad check" was the highest rated disadvantage of direct sales. "Cannot get bids from a large number of buyers," and "too many opportunities for dishonest buyers" were also indicated as important disadvantages of direct selling while "tradition or habit" was rated as an irrelevant disadvantage.

Percent Sold Through Market Types

Regression analysis was used to examine the relationships between producer and farm characteristics and the percentage of cattle sold through each type of market. The results of the regression equations showed some variables to be significant in explaining the percent of cattle sold through different types of markets.

Number of feeder cattle sold (SOLD) and the existence of beef cattle as the principal farm enterprise (BEEF) were negative significant variables for the percent sold through weekly auctions. The statistically significant SOLD variable indicated that as the number of feeder cattle sold increases, the percent of cattle sold through weekly auctions decreases. Similarly, the significant BEEF variable indicated that producers who consider beef cattle to be their principal enterprise are likely to sell a smaller percentage of their cattle through weekly

auctions than are non-beef principal enterprise producers.

The ratio of the number of head sold at less than 500 pounds to the total number sold (NO5) was the only significant variable for the percent sold through graded sales. The negative NO5 coefficient indicated that as the number of head sold at less than 500 pounds increases, the percent of cattle sold through graded sales decreases.

Three variables were significant for the percent sold through video board sales. They were the total number sold (SOLD), age of producer (AGE), and indication of dairy as the principal farm enterprise (DAIRY). The coefficients for SOLD and AGE indicated that as the number of head sold increases and as the age of the producer increases, the percent sold through video board sales also increases. The significant DAIRY variable indicated that producers of principal dairy cattle enterprises sell a larger percent of cattle through video board sales than do producers of non-dairy principal enterprises.

No variables were significant in the regression analyses of the percent sold through satellite video sales probably because the number of observations on this market type was very small. AGE and BEEF were significant variables for the percent of cattle sold directly from the farm. The coefficient for AGE indicated that as the age of the producer increases the percent sold through direct selling decreases. The coefficient for the BEEF variable indicated that producers of principally beef cattle enterprises sell a larger percent of their cattle by direct selling than do non-beef principal enterprise producers.

Relationship Between Importance Ratings and Characteristics

Probit analysis was chosen to evaluate the relationships between producer and farm characteristics and the importance of reasons for the choice of a market type. Due to the small number of observations on video board sales and satellite video sales, these were not included in the probit analysis. The probit analysis for the three remaining marketing alternatives showed some variables to be significant in explaining the rating of the "typical" advantages and disadvantages. The signs of statistically significant coefficients indicated the direction of change in the rating of a given reason in response to a change in the individual variable. A positive coefficient indicated a decrease (movement toward "irrelevant") in the importance rating of the associated reason for a one-unit increase in the independent variable, while a negative coefficient indicated an increase (movement toward "most important").

Weekly Auctions. Results of the probit analysis were disappointing. "Lower commission and yardage fees" was the only model for an advantage of weekly auctions that had a statistically significant log likelihood ratio (LLR) value. NO5 was a significant variable for three reasons and had a negative coefficient in each instance. The negative value for NO5 indicated that as the ratio of number of head sold at less than 500 pounds to the total number of head sold increases, the probability of the corresponding reason being selected as a "most important" advantage of weekly auction sales increases. The positive and significant signs for YUJOB and BEEF indicated that producers of

principally beef enterprises and producers who have off-farm jobs cause an increase in the probability of rating the associated reasons as "irrelevant" advantages of weekly auctions.

Two models showed LLR's that were significant at the 0.10 level and one model was significant at the 0.05 level for the disadvantages of weekly auctions. AGE was a statistically significant independent variable for five reasons and SPJOB was statistically significant in four. AGE and SPJOB had positive coefficients in all instances where they were significant. The positive coefficient for the AGE variable indicated that as the age of the producer increases, the probability of rating the associated reason as an "irrelevant" disadvantage of weekly auctions increases. The positive SPJOB variable indicated that producers with off-farm jobs increase the probability of the associated reason being rated as an "irrelevant" disadvantage of weekly auctions. EDUC was a positive significant variable for three reasons while BEEF was negative and significant in two. The positive EDUC variable indicated that as the number of years of education increases, the probability of rating the associated reason as an "irrelevant" disadvantage increases. The negative BEEF variable indicated that producers of principal beef enterprises increase the probability that the associated independent variable will be rated as "most important" disadvantages of weekly auctions.

Graded Sales. In the case of advantages of graded sales, three models had an LLR significant at the 0.05 level while one did so at the 0.10 level. With a positive coefficient in every case, AGE was a

statistically significant independent variable for five reasons. Also positive, EDUC was significant for four reasons. The positive coefficients for the AGE and EDUC variables indicated that as the age or education level of the producer increases, the probability of rating the associated reasons as "irrelevant" advantages of graded sales, increases. The positive SPJOB variable indicated that producers with off-farm jobs increase the probability of rating the associated reasons as "irrelevant" advantages of graded sales while the negative sign for BEEF indicated that producers of principal beef enterprises increase the probability of rating the associated reason as a "most important" advantage of graded sales.

A variety of variables were determined to be significant in the probit analysis for the disadvantages of graded sales. Three models had significant LLR values at the 0.05 level while one model was significant at the 0.10 level. Positive in every instance, AGE was a statistically significant variable for six reasons. The positive sign for AGE indicated that as the age of the producer increases, the probability of rating the associated reason as a "most important" disadvantage of graded sales decreases. All of the independent variables were significant for at least one reason with the exception of NO5 and STCKBT. All of the statistically significant variables had positive coefficients when they were significant. This indicated that an increase in any of the significant independent variables will cause an increase in the probability of the associated reason being selected as an "irrelevant" disadvantage of graded sales.

Direct Selling. No model had an LLR value significant at the 0.05 or 0.10 level for the advantages of direct selling. However, BEEF was a negative statistically significant variable for four models, DAIRY was negative and significant in one, and AGE was positive and significant in two. The negative BEEF and DAIRY variables indicated that the producers of beef principal enterprises and dairy principal enterprises increase the probability of the associated reasons being rated as "most important" advantages of direct selling. The positive AGE variable indicates that as the age of the producer increases, the probability of rating the associated reason as an "irrelevant" advantage of direct selling increases.

One model had a significant LLR value at the 0.10 level for the disadvantages of direct selling. A broad variety of independent variables were significant for specific reasons. NO5 was positive and significant for four reasons while AGE was negative and significant for three reasons. The positive NO5 variable indicated that as the ratio of the number of head sold at less than 500 pounds to the total number of head sold increases, the probability of rating the associated reason as an "irrelevant" disadvantage of direct selling, increases. The negative AGE variable indicated that as the age of the producer increases, the probability of rating the associated reason as a "most important" disadvantage of direct selling increases. BEEF was a positive significant variable for one reason and was a negative significant variable for a different reason. The negative BEEF variable indicated that the probability of the associated reason being selected as a "most important" disadvantage of direct selling, increases.

In addition to predicting the direction of change expected in the importance of advantages and disadvantages, this study provided the actual amount of change in probability in each 1 through 6 rating in response to a change in each statistically significant independent variable. The exact amount of change corresponds to the changes in the probability of choosing a rating for a particular advantage or disadvantage.

Implications

The intricate results of this study will be most useful for specific industry participants in particular situations. This analysis of producer attitudes will assist producers in understanding what importance other producers place on typical advantages and disadvantages associated with certain markets types. The results will assist market operators in adjusting their operations in a manner consistent with what producers consider as important decision criteria. Buyers can also make use of the results by understanding why producers market their cattle in the way that they do.

The market outlets used by feeder cattle producers for selling their animals in 1991 represent their choice of a market among a number of available alternatives. The ratings by the producers of advantages and disadvantages for alternative markets provided supporting information as to why particular market outlets are chosen. There is no simple and brief statement of criteria that can be formulated as an indication of the choice of a most desirable market type.

The results of this study indicate producers are driven by four

primary market features: price, convenience, weighing conditions, and minimum lot sizes required. The results imply that producers prefer markets because a higher price is thought to be received, because of a market's close proximity to the farm, and because of the favorable weighing conditions offered by a market.

The results also imply that weekly auctions are better suited for and used by producers of fewer head of cattle that do not consider beef to be their principal enterprise. The results imply that graded sales are not very well suited for the sale of animals weighing less that 500 pounds. Video board sales are suited for a larger number of animals sold and for dairy producers. Direct selling is favored by younger beef enterprise operators.

The results of this study indicate that producers do not admit that they use a particular marketing method because of tradition or habit. Over 40 percent of the participants who responded to the advantages of weekly auctions, graded feeder cattle sales, and direct selling indicated that tradition or habit was a "not important" or "irrelevant" reason for liking the market. Therefore, producers feel that their preference of a market used is not based on tradition or habit regardless of the market used. Producers also indicated that they do not dislike weekly auctions because the sale of single animals takes longer. Over 60 percent of the responding producers indicated that "the sale of single animals takes too much time" was a "not important" or "irrelevant" disadvantage of weekly auctions.

The results of this study also indicated that producers were not bothered by their cattle being graded for graded sales. Almost 70

percent of the respondents indicated that "do not like my cattle graded" was an "irrelevant" or "not important" disadvantage of graded sales. This indicates that producers are comfortable with their cattle being graded. The producers of cattle for graded sales also indicated that being a member of an association in order to sell through graded sales was not an important disadvantage of the market. Over 55 percent of the respondents indicated "irrelevant" or "not important" as the rating for "requires membership in an association" as a disadvantage of graded sales. Over 50 percent of the graded sales respondents indicated that poor market management was a "not important" or "irrelevant" disadvantage of graded sales. That is, they did not seem to feel as though poor management was an important reason for disliking graded sales.

The results of this study indicated that producers seem to feel as though they are receiving a higher price for their cattle because of the market they are using. Over 60 percent of the respondents indicated that "higher price received for cattle was a "very important" or "most important" reason for liking weekly auctions, graded sales, and direct selling. Therefore, producers seem to like the market they are using because they think it offers a higher price than another market. It should also be mentioned that 65 percent of the respondents indicated that "lower price received for cattle " was a "very important" or "most important" reason for disliking weekly auctions. While this seems to somewhat contradict the previous indication of weekly auctions being liked because of higher prices, the probit analysis indicated that producers of beef principal enterprises dislike weekly auctions, because

they feel as though lower prices are received through them.

Almost 60 percent of the respondents indicated that "lower commission and yardage fees" is a "very important" or "most important" reason for liking weekly auctions. Fifty-one percent of the respondents also indicated that "more assurance of payment " was a "most important" advantage of weekly auctions. This indicates that producers feel as though the favorable commission and yardage fees charged by weekly auctions is a good reason to sell cattle through them. It also seems to reveal the producers value the assurance that weekly auctions offer concerning receiving payment for cattle. Respondents seem to dislike direct selling for similar reasons. Almost 44 percent of the respondents indicated that "too many opportunities for dishonest buyers" and "possibility of getting a bad check" were "most important" disadvantages of direct selling

The results also indicated that producers place a great deal of importance in "larger number of buyers present" as an advantage of graded sales. They also like the fact that "open competitive bidding" is associated with graded sales. Approximately 66 percent of the respondents rated "larger number of buyers present" and "open competitive bidding" as a "very important" or most important advantages of graded sales. However, producers seem to dislike graded sales because of consignment requirements and the distance of the market from the farm. Over 47 percent of the respondents rated "requires consignment of cattle in advance" as a "very important" or "most important" disadvantage of graded sales, while almost 45 percent rated "market is too far from my farm of ranch" with the same importance.

Producers seem to like selling their cattle directly from the farm, because they can sell at any time they desire and they have an opportunity to establish a reputation for their cattle. Over 60 percent of the respondents indicated that "seller can establish a reputation for cattle" was a "very important" or "most important" advantage of direct selling, while over 72 percent indicated the same importance ratings for "can sell at any time I wish."

The results of this study imply that producers consider the opportunity for the seller to establish a reputation for cattle and the exposure of cattle to a larger number of buyers as important reasons for liking video board sales. Over 40 percent of the responding producers indicated that "seller can establish a reputation for cattle" and "larger number of buyers" were "most important" advantages of video board sales. This indicates that producers feel as though the larger number of buyers that are present for video board sales and the opportunity for the producer to establish a reputation for cattle serve as important reasons to use the video board sale to market cattle. Fifty percent of the respondents indicated that "minimum lot size is too large for my size operation" is a "most important" disadvantage of video board sales. This implies that half of the responding producers do not feel as though they have enough stock to sell through video board sales.

Overall, the results imply that producers do not consider tradition or habit when selecting a market. They are not bothered by their cattle being graded nor do they mind the time required to sell animals individually through weekly auctions. The results also imply that producers primarily consider price, convenience, and certainty of

payment for their cattle as the most important criteria for selecting a market. The reasons that were indicated with high importance ratings by a large percent of the respondents can be classified into one of these three categories.

Although it was expected that more efficient markets associated with the adoption of the latest technology would lead to an end of the "traditional" marketing methods, the results of this study fail to support that expectation. Nearly 75 percent of the survey respondents used regular weekly auctions to market their feeder cattle and calves in 1991. The results of this study indicated somewhat conflicting yet understandable results. The conflict arises because producers seem to like weekly auctions because of the close proximity of the sale barn to the farm. However, some producers indicate that they dislike weekly auctions because they think they are receiving a lower price. Because almost 75 percent of the cattle were sold via weekly auctions, the close proximity, evidently compensates for the fact that a lower price is thought received. This could identify a contributing factor to the confusion as to why weekly auctions have not been overtaken by the methods that some refer to as more cost efficient. As long as a producer's choice of a market is driven by considerations of convenience, predictions that the more economically efficient markets will replace the inefficient traditional markets will be inaccurate.

The results of this study indicated that weekly auctions are the preferred market for producers with fewer head of cattle and for producers that do not consider beef to be the principal farm enterprise. Over 93 percent of Tennessee's beef producers have fewer than 50 head of

cattle [National Agricultural Statistics Service, 1991]. The results of this study indicated that as the number of head sold decreases, the chance of selling through weekly auctions increases. This means that producers of a smaller number of cattle are likely to prefer weekly auctions. Because most of Tennessee's feeder cattle producers produce at this relatively small scale, the majority of Tennessee's feeder cattle are expected to be marketed through weekly auctions as long as the scale of cow-calf operations remains small. The results indicate that video board sales are preferred by some for larger numbers of head sold. Yet some producers do not like the method because they feel as though they do not have a large enough volume to sell to meet the minimum lot size requirements.

It is expected that an array of marketing alternatives for the sale of feeder cattle will continue to evolve through technological changes and improvements along a path of entrepreneurial decisions to satisfy economic and noneconomic incentives. Future research should be initiated to study the relative merits and desirability of new marketing methods as they evolve.

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APPENDIXES

APPENDIX A

OBSERVED PROBABILITIES FOR A "MEAN" PRODUCER SELECTING A REASON RATING TO INDICATE THEIR ATTITUDE TOWARD ADVANTAGES AND DISADVANTAGES OF DIFFERENT MARKETING METHODS

Table 39. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Advantages of Weekly Auctions.

Advantages	Reason Ratings: Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
	Probabilities					
Tradition or habit	26.5	16.8	15.0	23.9	7.1	10.6
Lower commis. & yardage fees	16.0	11.7	10.6	31.9	13.8	16.0
Higher price received	5.0	5.9	5.0	24.8	21.8	37.6
Market is close to farm	5.5	2.4	6.3	15.0	23.6	47.2
Good market management	6.3	10.5	5.3	30.5	29.5	17.9
Open, compet. bidding	3.3	2.5	7.4	23.1	31.4	32.2
Less effort or troublesome	4.2	7.6	8.4	22.7	25.2	31.9
Market accepts single animals	3.0	3.8	5.3	21.1	27.8	39.1
More favorable weighing cond.	7.4	7.4	7.4	28.4	25.3	24.2
More assurance of payment	6.1	6.1	8.1	9.1	19.2	51.5

Table 40. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Disadvantages of Weekly Auctions.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages	Probabilities					
Poor market facilities	20.8	15.1	11.3	24.5	9.4	18.9
Poor market management	17.9	10.7	10.7	25.0	8.9	26.8
Higher commission and yardage	14.1	9.4	3.1	17.2	17.2	39.1
Unfavorable weighing conditions	14.8	11.1	3.7	14.8	22.2	33.3
Lower price received for cattle	12.1	6.1	6.1	10.6	25.8	39.4
Sale of single animals takes too much time	33.9	27.4	8.1	4.8	8.1	17.7

Table 41. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Advantages of Graded Sales.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages	Probabilities					
Higher price received for cattle	8.5	4.3	-[a]	12.8	14.9	59.6
Larger number of buyers present	11.1	6.7	-[a]	15.6	24.4	42.2
Habit or tradition	37.5	31.3	-[a]	9.4	18.8	3.1
Lower commission and yardage fees	17.6	29.4	5.9	20.6	17.6	8.8
More favorable weighing conditions	17.1	14.3	8.6	14.3	20.0	25.7
Good market management	11.4	5.7	5.7	22.9	28.6	25.7
Open competitive bidding	13.2	5.3	2.6	13.2	28.9	36.8

[a] _ Indicates that "somewhat important" was not indicated as the importance rating for the corresponding reason.

Table 42. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Disadvantages of Graded Sales.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages	Probabilities					
Do not like commingling my cattle with others	23.9	21.7	6.5	10.9	13.0	23.9
Poor market management	35.9	15.4	5.1	17.9	10.3	15.4
Higher commission and yardage fees	32.6	4.7	9.3	18.6	18.6	16.3
Requires consignment of cattle in advance	11.8	19.6	13.7	7.8	15.7	31.4
Market is too far from my farm or ranch	19.1	17.0	4.3	14.9	12.8	31.9
Sale not at the right time of year	13.0	11.1	13.0	22.2	22.2	18.5
Lower price received	20.5	18.2	9.1	18.2	6.8	27.3
I do not like my cattle graded	45.2	23.8	4.8	9.5	4.8	11.9
Graded sales do not work well for my type of cattle	35.4	16.7	6.3	12.5	10.4	18.7
Requires membership in an association	30.4	26.1	10.9	13.0	8.7	10.9

Table 43. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Advantages of Video Board Sales.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages	Probabilities					
Seller can establish a reputation for cattle	19.0	14.3	--[a]	19.0	4.8	42.9
Cattle do not have to be hauled to market	14.3	14.3	4.8	14.3	19.0	33.3
Buyer may be responsible for hauling	28.6	19.0	--[a]	9.58	14.3	28.6
Larger number of buyers	20.0	5.0	5.0	20.0	10.0	40.0
Lower commission fees	15.0	5.0	5.0	10.0	30.0	35.0
More favorable weighing conditions	15.0	15.0	5.0	15.0	15.0	35.0
Less effort or troublesome	20.0	10.0	5.0	25.0	10.0	30.0
Good market management	21.1	5.3	--[a]	36.8	5.3	31.6
Seller can "no-sale" cattle more easily	20.0	5.0	10.0	20.0	10.0	35.0

[a] _ Indicates that the reason rating was not indicated as the importance rating for the corresponding reason.

Table 44. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Disadvantages of Video Board Sales.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages	Probabilities					
Minimum lot size is too large for my size operation	13.9	8.3	2.8	13.9	11.1	50.0
Sales are not at right time of year for me	27.6	17.2	13.8	13.8	13.8	13.8
Sales are to far from my farm or ranch	27.6	17.2	10.3	10.3	17.2	17.2
Higher commission fees	22.2	22.2	11.1	14.8	14.8	14.8
Cattle must be consigned and filmed in advance	17.9	25.0	7.1	17.9	10.7	21.4
Descriptions do not represent my cattle well enough	24.0	32.0	4.0	8.0	12.0	20.0
Dislike selling with a price "slide" on weight	13.0	20.0	--[a]	30.0	6.7	30.0
Poor market mangagement	25.0	25.0	4.2	16.7	16.7	12.5
Lower price received for cattle	26.9	23.1	--[a]	15.4	11.5	23.1

[a] _ Indicates that the reason rating was not indicated as the importance rating for the corresponding reason.

Table 45. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Advantages of Satellite Video Sales.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages	Probabilities					
Larger number of buyers	31.3	6.3	--[a]	31.3	--[a]	31.3
Higher price received for cattle	33.3	6.7	--[a]	13.3	13.3	33.3
Can sell for future delivery	37.5	6.3	--[a]	18.8	12.5	25.0
Good market management	33.3	13.3	--[a]	13.3	20.0	20.0
Buyer may be responsible for hauling	33.3	13.3	--[a]	20.0	20.0	13.3
Seller can establish a reputation for his/her cattle	37.5	12.5	6.3	6.3	6.3	31.3
Cattle do not have to be hauled to market on sale day	31.3	6.3	6.3	18.8	18.8	18.8
Less effort or troublesome to me	35.7	7.1	--[a]	28.6	7.1	21.4
Lower commission fees	35.7	7.1	--[a]	14.3	21.4	21.4
Seller can "no-sale" cattle more easily	35.7	7.1	--[a]	28.6	7.1	21.4

[a] _ Indicates that the reason rating was not indicated as the importance rating for the corresponding reason.

Table 46. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Disadvantages of Satellite Video Sales.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages	Probabilities					
Not available in my geographic area	30.0	13.3	10.0	13.3	13.3	20.0
Minimum lot size is too large for my size operation	25.0	12.5	--[a]	12.5	8.3	41.7
Poor market management	35.0	20.0	5.0	35.0	5.0	--[a]
Descriptions do not represent my cattle well enough	38.1	28.6	14.3	9.5	9.5	--[a]
Higher commission fees	33.3	28.6	14.3	19.0	--[a]	4.8
Dislike selling with a price "slide" on weight	31.8	22.7	4.5	31.8	--[a]	9.1
Cattle must be consigned and filmed in advance	31.8	22.7	4.5	22.7	13.6	4.5
Lower price received for cattle	28.6	23.8	--[a]	23.8	9.5	14.3

[a] _ Indicates that the reason rating was not indicated as the importance rating for the corresponding reason.

Table 47. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Advantages of Direct Selling.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Advantages	Probabilities					
Can sell at any time I wish	8.5	5.1	-[a]	27.1	18.6	40.7
Seller can establish a reputation for cattle	8.8	7.0	7.0	15.8	21.1	40.4
Higher price received	10.4	4.2	4.2	8.3	25.0	47.9
Tradition or habit	28.9	17.8	22.2	15.6	6.7	8.9
No commission or yardage fees	8.2	4.9	4.9	19.7	24.6	37.7
Cattle do not have to be hauled to market	8.6	8.6	3.4	15.5	27.6	36.2
Buyer may be responsible for hauling	15.7	9.8	3.9	25.5	15.7	29.4
Buyer can see my cattle better	10.3	8.6	5.2	15.5	25.9	34.5

[a] _ Indicates that "somewhat important" was not indicated as the importance rating for the corresponding reason.

Table 48. Observed Probabilities of a "Mean" Producer Selecting a Reason Rating to Indicate Their Attitude Toward Disadvantages of Direct Selling.

	Reason Ratings					
	Irrelevant	Not Important	Somewhat Important	Important	Very Important	Most Important
Disadvantages	Probabilities					
Cannot get bids from a large number of buyers	13.8	8.6	6.9	22.4	10.3	37.9
No open, competitive bidding	17.2	10.3	8.6	12.1	19.0	32.8
Dislike selling with a price "slide" on weight	21.7	15.2	6.5	23.9	6.5	26.1
My operation is too small to attract buyers	22.6	9.7	4.8	21.0	12.9	29.0
Tradition or habit	46.5	25.6	7.0	9.3	9.3	2.3
Lower price received	24.5	5.7	7.5	13.2	20.8	28.3
Too many opportunities for dishonest buyers	21.1	5.3	3.5	14.0	12.3	43.9
Possibility of getting a bad check	15.8	3.5	3.5	19.3	14.0	43.9

APPENDIX B

THE QUESTIONNAIRE

CONFIDENTIAL

FEEDER CATTLE PRODUCER SURVEY
Department of Agricultural Economics
University of Tennessee

I. *Please fill in the percentage of your feeder cattle and calves sold through each type of market in 1991. Then rate the reasons why you like or dislike that type. If you are not familiar with a particular type of market, skip that section.*

1. _____% sold through regular **weekly auction markets** in 1991.

Rate the importance of the reasons why you **like** to use regular weekly auctions. **Circle** the letters that best describe how important each reason is to you.

KEY:
MI-most important
VI-very important
I-important
SI-somewhat important
NI-not important
X-irrelevant

MI VI I SI NI X tradition or habit
MI VI I SI NI X lower commission and yardage fees
MI VI I SI NI X higher price received for cattle
MI VI I SI NI X market is close to my farm or ranch
MI VI I SI NI X good market management
MI VI I SI NI X open, competitive bidding
MI VI I SI NI X less effort or troublesome to me
MI VI I SI NI X market accepts single animals or small lots
MI VI I SI NI X more favorable weighing conditions
MI VI I SI NI X more assurance of payment for cattle
MI VI I SI NI X other (list) _____
_____

Rate the importance of the reasons why you **do not like** to use regular weekly auctions.

MI VI I SI NI X poor market facilities
MI VI I SI NI X poor market management
MI VI I SI NI X higher commission and yardage fees
MI VI I SI NI X unfavorable weighing conditions
MI VI I SI NI X lower price received for cattle
MI VI I SI NI X sale of single animals takes too much time
MI VI I SI NI X other (list) _____
_____

2. _____% sold through special **graded feeder cattle sales** in 1991.

Rate the importance of the reasons why you **like** to use graded feeder cattle sales. **Circle** the letters that best describe how important each reason is to you.

MI VI I SI NI X higher price received for cattle
MI VI I SI NI X larger number of buyers present
MI VI I SI NI X habit or tradition
MI VI I SI NI X lower commission and yardage fees
MI VI I SI NI X more favorable weighing conditions
MI VI I SI NI X good market management
MI VI I SI NI X open, competitive bidding
MI VI I SI NI X other (list) _____
_____

Rate the importance of the reasons why you **do not like** to use graded feeder cattle sales.

MI	VI	I	SI	NI	X	commingling (mixing) of my cattle with others
MI	VI	I	SI	NI	X	poor market management
MI	VI	I	SI	NI	X	higher commission and yardage fees
MI	VI	I	SI	NI	X	requires consignment of cattle in advance
MI	VI	I	SI	NI	X	market is too far from my farm or ranch
MI	VI	I	SI	NI	X	sales not at the right time of year for me
MI	VI	I	SI	NI	X	lower price received for cattle
MI	VI	I	SI	NI	X	I do not like my cattle graded
MI	VI	I	SI	NI	X	graded sales do not work well for my type of cattle
MI	VI	I	SI	NI	X	requires membership in an association
MI	VI	I	SI	NI	X	other (list)_____

3. _____% sold through **video board sales** in 1991.

Rate the importance of the reasons why you **like** to use video board sales. **Circle** the letters that best describe how important each reason is to you.

KEY:

MI-most important

VI-very important

I-important

SI-somewhat important

NI-not important

X-irrelevant

MI	VI	I	SI	NI	X	seller can establish a reputation for his/her cattle
MI	VI	I	SI	NI	X	cattle do not have to be hauled to market on sale day
MI	VI	I	SI	NI	X	buyer may be responsible for hauling
MI	VI	I	SI	NI	X	larger number of buyers
MI	VI	I	SI	NI	X	higher price received for cattle
MI	VI	I	SI	NI	X	lower commission fees
MI	VI	I	SI	NI	X	more favorable weighing conditions (less shrink)
MI	VI	I	SI	NI	X	less effort or troublesome to me
MI	VI	I	SI	NI	X	good market management
MI	VI	I	SI	NI	X	seller can "no-sale" cattle more easily
MI	VI	I	SI	NI	X	other (list) _____

Rate the importance of the reasons why you **do not like** to use video board sales.

MI	VI	I	SI	NI	X	minimum lot size is too large for my size operation
MI	VI	I	SI	NI	X	sales not at the right time of year for me
MI	VI	I	SI	NI	X	sales are too far from my farm or ranch
MI	VI	I	SI	NI	X	higher commission fees
MI	VI	I	SI	NI	X	cattle must be consigned and filmed in advance
MI	VI	I	SI	NI	X	descriptions do not represent my cattle well enough
MI	VI	I	SI	NI	X	dislike selling with a price "slide" on weight
MI	VI	I	SI	NI	X	poor market management
MI	VI	I	SI	NI	X	lower price received for cattle
MI	VI	I	SI	NI	X	other (list) _____

4. _____% sold through **satellite video sales** in 1991.

Rate the importance of the reasons why you **like** to use satellite video sales. **Circle** the letters that best describe how important each reason is to you.

MI	VI	I	SI	NI	X	larger number of buyers
MI	VI	I	SI	NI	X	higher price received for cattle
MI	VI	I	SI	NI	X	more favorable weighing conditions (less shrink)
MI	VI	I	SI	NI	X	can sell for future delivery
MI	VI	I	SI	NI	X	good market management
MI	VI	I	SI	NI	X	buyer may be responsible for hauling
MI	VI	I	SI	NI	X	seller can establish a reputation for his/her cattle
MI	VI	I	SI	NI	X	cattle do not have to be hauled to market on sale day
MI	VI	I	SI	NI	X	less effort or troublesome to me
MI	VI	I	SI	NI	X	lower commission fees
MI	VI	I	SI	NI	X	seller can "no-sale" cattle more easily
MI	VI	I	SI	NI	X	other (list)_____

KEY:

MI-most important

VI-very important

I-important

SI-somewhat important

NI-not important

X-irrelevant

Rate the importance of the reasons why you **do not like** to use satellite video sales.

MI	VI	I	SI	NI	X	not available in my geographic area
MI	VI	I	SI	NI	X	minimum lot size is too large for my size operation
MI	VI	I	SI	NI	X	poor market management
MI	VI	I	SI	NI	X	descriptions do not represent my cattle well enough
MI	VI	I	SI	NI	X	higher commission fees
MI	VI	I	SI	NI	X	dislike selling with a price "slide" on weight
MI	VI	I	SI	NI	X	cattle must be consigned and filmed in advance
MI	VI	I	SI	NI	X	lower price received for cattle
MI	VI	I	SI	NI	X	other (list) _____

5. _____% sold **directly to buyers** who came to your farm or ranch in 1991.

Rate the importance of the reasons why you **like** to sell directly to buyers on your farm.

MI	VI	I	SI	NI	X	can sell at any time I wish
MI	VI	I	SI	NI	X	seller can establish a reputation for his cattle
MI	VI	I	SI	NI	X	higher price received for cattle
MI	VI	I	SI	NI	X	tradition or habit
MI	VI	I	SI	NI	X	no commission or yardage fees
MI	VI	I	SI	NI	X	cattle do not have to be hauled to market
MI	VI	I	SI	NI	X	buyer may be responsible for hauling
MI	VI	I	SI	NI	X	buyer can see my cattle better
MI	VI	I	SI	NI	X	other (list) _____

Rate the importance of the reasons why you **do not like** to sell directly to buyers on your farm.

MI	VI	I	SI	NI	X	cannot get bids from a large number of buyers
MI	VI	I	SI	NI	X	no open, competitive bidding
MI	VI	I	SI	NI	X	dislike selling with a price "slide" on weight
MI	VI	I	SI	NI	X	my operation is too small to attract buyers
MI	VI	I	SI	NI	X	tradition or habit
MI	VI	I	SI	NI	X	lower price received for cattle
MI	VI	I	SI	NI	X	too many opportunities for dishonest buyers
MI	VI	I	SI	NI	X	possibility of getting a bad check
MI	VI	I	SI	NI	X	other (list) _____

II. *Please fill in the requested information for your farm or ranch.*

1. Number of brood cows in 1991 _____ (number beef _____ ; number dairy _____).

2. Number of stocker calves bought during 1991 _____ .

3. Number of acres of pasture (owned plus rented) in 1991 _____ .

4. Number of feeder cattle and calves sold during 1991 _____ .

5. What type of equipment do you use to haul cattle? (check the types)
   ____ gooseneck trailer
   ____ bumper-hitch trailer
   ____ pick-up truck
   ____ 1 to 2½ ton truck
   ____ other _____.

6. Number of feeder cattle and calves sold during 1991 in each weight category:
   _____ less than 500 lbs.
   _____ 500 to 700 lbs.
   _____ more than 700 lbs.

7. What is your principal farm enterprise? _____.

8. Do you or your spouse have an off-farm job? You_____; spouse_____. If yes, what percent of your total family income is from off-farm jobs? _____%.

9. Your number of years of formal education (check highest): 8 or less _____; 9-12 _____; Some college _____; College graduate _____; Graduate or professional school _____ .

10. Your age: _____ .

THANK YOU FOR YOUR HELP WITH THIS RESEARCH PROJECT!

Please return this survey in the enclosed postage-paid envelope.

APPENDIX C

CORRELATION COEFFICIENTS FOR SIZE VARIABLES

Table 49. Correlation Coefficients for Size Variables

	Number of Brood Cows	Number of Acres	Number Sold
Number of Brood Cows	1.0000	0.8875	0.9135
Number of Acres	0.8875	1.0000	0.8558
Number Sold	0.9135	0.8558	1.0000

VITA

Robert Wayne Holland, Jr. was born in Shelbyville, Tennessee on November 30, 1969. He attended elementary and high school in the Giles County School system in Southern Middle Tennessee. After graduating from Richland High School in June of 1988, he entered The University of Tennessee, Martin in August of the same year. He received his Bachelor of Science, Cum Laude, in Agricultural Business from UTM in December of 1991. Rob entered The University of Tennessee, Knoxville with a Graduate Research Assistantship to pursue his Master of Science in January of 1992. He received his Master of Science in Agricultural Economics in August of 1993.

Mr. Holland is married to the former Connie Harvey from Milan, Tennessee. He is a member of The American Agricultural Economics Association and Gamma Sigma Delta.