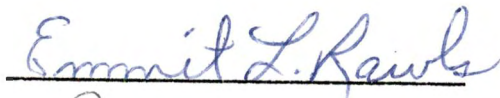


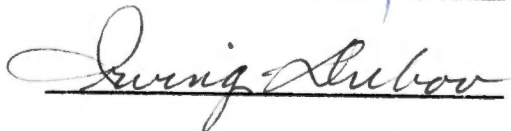
To the Graduate Council:

I am submitting herewith a thesis written by Thomas Hewes Loose entitled "An Analysis of Marketing Costs Incurred, Methods Used, and Prices Received by Producers Utilizing Tennessee Organized Feeder Pig Sales." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science with a major in Agricultural Economics.


John Brooker, Major Professor

We have read this thesis and
recommend its acceptance:





Accepted for the Council:


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AN ANALYSIS OF MARKETING COSTS INCURRED, METHODS USED,
AND PRICES RECEIVED BY PRODUCERS UTILIZING
TENNESSEE ORGANIZED FEEDER PIG SALES

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

Thomas Hewes Loose

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ABSTRACT

The primary objective of this study was to evaluate the marketing practices and costs incurred by producers selling feeder pigs through Tennessee organized sales.

Data were obtained from 15 organized feeder pig sales in Tennessee during the summer of 1976. Producers were personally interviewed at every sales location. The total sample consisted of 274 feeder pig producers.

Marketing costs consisted of transportation and labor expense, costs due to bruising and crippling, and the selling charge at the market. Producers travelled an average of 24.4 miles to market their pigs. The average time spent was 2.5 hours. The average marketing cost per head was \$0.69.

Only 17 percent of the producers used any form of pricing or marketing information. Eighty-eight percent of the producers marketed at the location nearest their farm and only 7 percent marketed at specific times of the year.

A secondary objective of this study was to utilize an econometric model employing theoretically relevant variables to analyze price variations in and among 13 selected Tennessee feeder pig sales locations. Two equations were specified--one to show the impact of expected prices of hogs and corn on feeder pig prices and another to show the effects of cross sectional variables on geographic price differentials.

Data were obtained from the U.T. Extension Service and U.S.D.A.'s "Livestock Market News." Least squares regression was used to estimate the coefficients of the two equations.

The expected prices of hogs and corn were shown in the first equation to have positive and negative influences, respectively, on feeder pig prices. Dummy variables were incorporated into this equation to estimate the price differences due to location and month of sale.

It was shown in a second equation that three cross section variables--average quality, average weight, and average number of head per sale--accounted for a large proportion (91 percent) of the price differentials among market locations. The fact that the residuals in this equation were fairly small shows that none of the markets studied had any unusual advantages or disadvantages not accounted for by the three variables utilized.

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CHAPTER I

THE PROBLEM AND OBJECTIVES OF THE STUDY

I. DEVELOPMENT OF FEEDER PIG SALES

The sale of feeder pigs has been a source of income to farmers in many areas of the United States for many years. Many of these farmers kept only one or a few sows and did not produce enough grain to feed the pigs to slaughter weight. Others had a small sow herd as a supplemental enterprise to their farming operation. The sale of pigs as feeders contributed to their income but these producers frequently were unable to realize maximum return because of marketing problems.

In the past there were two major outlets for feeder pigs. They were either sold direct to farmer buyers or they were sold to country buyers (or local livestock dealers). Both methods of selling, however, had their respective problems.

Traditionally, market hog production has been a farrow to finish enterprise where farmers in feed-grain producing areas raised their own pigs and fed them to slaughter weight. These producers bought feeder pigs only when they needed extra pigs to consume their grain crop. Also, hog producers were often reluctant to buy feeder pigs for fear of infecting their herds with some disease. Another problem facing the small feeder pig producer was his inability to offer buyers a large, uniform group of pigs. Buyers usually wanted

pigs a certain weight and quality and would buy only if they could take such pigs without buying all the producer had to sell. The producer, therefore, was in a weak bargaining position and often was left with a few pigs for which he had to find another buyer.

Country buyers were another outlet for feeder pigs. They could usually resell pigs of all types and weights and consequently would buy all the pigs a farmer was willing to sell. Although the producer could sell all of his pigs at one time, he frequently found himself at a disadvantage in bargaining with these buyers because they had more knowledge of market conditions and feeder pig values. Consequently, neither country buyers nor farmer buyers furnished feeder pig producers a competitive market.

The arrival of the auction market gave the feeder pig producer a new outlet for his pigs but did not solve all his marketing problems. While buyers had to bid openly against one another, there were often not enough interested buyers present to insure sufficient competition. Also, since pigs were sold in individual ownership lots, the producer still could not offer buyers a large, uniform lot of pigs which could obtain the highest possible price.

Recently, many hog producers have become very large and highly specialized in their feeding operations. Farmers in these specialized operations have turned to feeder pig producers for their pigs instead of raising their own or to supplement their pig crop. Thus the demand for feeder pigs increased but producers in many areas still do not have satisfactory marketing channels through which to sell their pigs.

Since that time, the Agricultural Extension Service and local Livestock Associations have assisted producers in getting "special" feeder pig sales set up and operating at various locations in Tennessee and other states. These sales enable a large number of pigs to be concentrated at these points and through the use of advertising attempt to attract a large number of buyers. Through commingling, producers can offer buyers large, uniform lots of feeder pigs and improve their selling position. However, many problems remain with respect to marketing feeder pigs.

II. INTRODUCTION TO TENNESSEE FEEDER PIG SALES

Since the establishment of organized feeder pig sales in 1958, the number of feeder pigs marketed in Tennessee and total receipts have grown tremendously.¹

In 1976, 34.9 percent (642,393 head) of the total Tennessee pig crop was sold through 425 organized feeder pig sales at fifteen separate locations (Table 1). In 1966, only 7 percent (125,252 head) of the total pig crop was sold through 111 organized feeder pig sales at the same number of locations. Sale receipts in 1966 were 2.4 million dollars, while in 1976 cash receipts exceeded 23 million dollars.² Tennessee organized feeder pig receipts have accounted

¹"Organized" refers to the existence of a local cooperative association of feeder pig producers who have joined together for the purpose of operating feeder pig sales for the association members and other eligible pig producers.

²These figures do not account for any of the feeder pigs sold through private sales, contracts, dealers, and open auctions.

Table 1. Number of feeder pigs sold and prices received at organized feeder pig sales in Tennessee, 1966-1976.

Year	No. of Sales Locations	No. Sales Held	Avg. No. Pigs Per Sale	No. Pigs Sold	Percent of Total Tenn. Pig Crop	Avg. Price Per Head
1966	15	111	1,128	125,252	7.0	19.19
1967	15	158	1,123	177,467	9.6	15.18
1968	19	210	1,344	282,223	15.4	14.36
1969	18	270	1,532	413,874	23.5	18.39
1970	21	385	1,646	633,526	31.5	17.51
1971	21	432	1,483	641,085	35.7	12.89
1972	20	384	1,258	483,228	NA	23.56
1973	23	504	1,220	614,735	NA	31.45
1974	18	442	1,377	608,684	43.0	22.54
1975	16	407	1,361	554,121	37.0	43.19
1976	15	425	1,511	642,393	34.9	35.95

Source: University of Tennessee Agricultural Extension Service. Summary Tennessee Feeder Pig Sales, 1976. College of Agriculture, Knoxville, 1976.

for approximately 1/5 of the total cash receipts received by Tennessee swine producers over the past few years.

There are currently fourteen organized sales locations across the state from Sevierville in the east to Brownsville in the west. None of the locations conduct feeder pig sales more frequently than one day per week, and at some locations only one day per month. All sales use the auction form of selling and conform to several basic regulations. The regulations are as follows:

1. Sales are organization sponsored and approved by the Tennessee Department of Agriculture and the Animal Health Division (USDA).
2. Pigs are marketed directly off the farm of the producer.
3. Pigs are ear tagged for identification back to the producer.
4. Consignors are required to obtain a marketing card which certifies they are a feeder pig producer and do not traffic or trade in feeder pigs in any way.
5. Pigs are graded by a representative from the Tennessee Department of Agriculture according to USDA standards.
6. Sale barns have concrete pens and sale area.
7. Pigs are farm inspected, and/or inspected at the sale by representatives of the sponsoring organization.
8. Pigs are inspected at the sale by an accredited veterinarian.

These regulations apply to all organized feeder pig sales and other specific regulations may be in effect at any one sale.

III. THE PROBLEM

It has been hypothesized that Tennessee organized feeder pig producers do not market their pigs in the most efficient manner. In order to maximize his net return, the feeder pig producer must be interested in effectively marketing his pigs. He needs to produce feeder pigs at the weight and grade that is most profitable. He must also sell at the most profitable time and location. Other factors such as stress in hot and cold weather and minimizing health problems contribute to the overall marketing strategy a producer must employ to maximize his net returns.

Buyers of Tennessee feeder pigs include farmer buyers both in Tennessee and out-of-state and order buyers who buy for farmers in Tennessee and out-of-state. Buyers are concerned with such factors as weight, grade, health, breed, gainability, thriftiness, size of lots and transportation. Producers have control over some of these factors and should attempt to produce feeder pigs with those qualities that buyers look for. Thus, producers must realize that marketing their pigs starts in the farrowing house and not when they are unloaded at the sale. Good management, breeding stock, and feeding practices all mean additional returns for the feeder pig producer.

This study attempted to determine costs and factors influencing costs which feeder pig producers incur when selling through Tennessee organized feeder pig sales. The study also sought information from producers regarding management practices employed on the farm, marketing information used, and attitudes of producers toward feeder pig

sales. This information should be useful to the producers who market feeder pigs through Tennessee organized feeder pig sales.

Variations in prices received for Tennessee feeder pigs during the year and from sale to sale affect the net returns of producers. For example, prices per hundredweight varied from \$32.23 to \$127.95 over the study period January 1974 to April 1977. Spatially, the average price per hundredweight varied from \$64.65 at one location to \$78.59 in another for the year 1976. For the producer of feeder pigs, large price changes, at least to the extent that they are not anticipated, make production planning difficult. It is hoped that this part of the study will aid producers in anticipating price changes and adjust production levels accordingly. Also, with a knowledge of spatial price variations, the feeder pig producer should be able to market his pigs more effectively.

IV. OBJECTIVES OF THE STUDY

The primary objective of this study was to evaluate the marketing practices and costs incurred by producers selling feeder pigs through Tennessee organized sales. Specific objectives were to:

1. Identify problems and determine costs of transporting feeder pigs to the sales locations.
2. Determine marketing costs incurred at different organized feeder pig sales locations.
3. Identify the marketing information producers use in selecting a feeder pig sale.
4. Identify the handling and management practices used by producers.

5. Identify attitudes of feeder pig producers regarding different Tennessee organized feeder pig sales.

A secondary objective of this study was to utilize an econometric model to explain price variation in and among Tennessee organized feeder pig sales. One hypothesis is that feeder pig prices (expressed in \$/cwt) are influenced by slaughter hog prices, corn prices, and there exists price differentials among markets. Another hypothesis, relative to geographic price differences, is that feeder pig prices are affected by average quality, average weight, and average size of the sale.

V. SOURCE OF DATA

Data for this study were gathered from 15 organized feeder pig sales in Tennessee during the summer of 1976. Producers were personally interviewed at every sales location.

An attempt was made to determine the number of producers utilizing each organized feeder pig sale by contacting Tennessee County Extension Leaders in the appropriate counties. Data was obtained on the number of producers who were issued marketing cards in 1976, which was the best estimate of the feeder pig producer population that sold pigs through organized sales. However, the figures contained some double-counting due to the fact that some producers sold pigs at more than one sales location and it was not possible to determine how many producers had obtained more than one marketing card.

Twelve of the fifteen sales locations answered the inquiry as to the number of producers who obtained marketing cards in 1976.

Those sales locations reporting, however, accounted for 89.4 percent of the questionnaires administered. The following formula was used to determine the sample size:

$$n = \frac{N}{1 + Ne^2}$$

where,

n = sample size

N = population size

e = error of the estimation (17, p. 581).

The estimated feeder pig producer population who marketed at the twelve organized sales responding to the inquiry was 10,135. Using an error of .05, the sample size necessary was 385 while an error of .10 required 99 observations. A total of 274 surveys were administered (.063 error).

In order to have adequate representation from every sales location, the number of producers interviewed at each location approximated, on a relative basis, the percentage each sale contributed to the overall number of pigs sold through Tennessee organized feeder pig sales in 1976. Sales locations were placed in three categories--large (over 100,000 pigs per year), medium (44,000 - 63,000 pigs per year), and small (5,000 - 24,000 pigs per year)--based on 1976 summary statistics for Tennessee organized feeder pig sales (16). A minimum of 10 percent of the total number of producers in the survey should represent each of the 2 large sales, each of the 5 medium sized sales should be represented by 5-10 percent of the total sample, and the 8 small sales should each be represented by less than 5 percent of the sample. The major concern was that each sale be represented

according to its size. Figure 1 illustrates percentages of total head sold and of total producers interviewed at each location. Each sales location had at least 6 producers interviewed.

Thirteen markets were selected for the econometric aspect of the study. These were the locations that held sales regularly throughout the study period used in this analysis. These locations were: Brownsville, Carthage, Cookeville, Dickson, Huntingdon, Lawrenceburg, Lewisburg, Lexington, Pulaski, Savannah, Sevierville, Unionville, and Woodbury.

Unpublished Tennessee feeder pig prices were obtained from Dr. Emmitt L. Rawls of the Extension Service of the University of Tennessee, Knoxville campus. The data contained information only on those pigs grading Nos. 1-4 from January 1974 to April 1977. The following variables were summarized for each sale operating during the study period: (1) location, (2) date, (3) total number of pigs sold, (4) average weight of pigs, (5) average price per hundredweight, and (6) percent of pigs grading No. 3.

Data needed on slaughter hog and corn prices were obtained from Livestock Market News (12), a weekly publication of the United States Department of Agriculture.

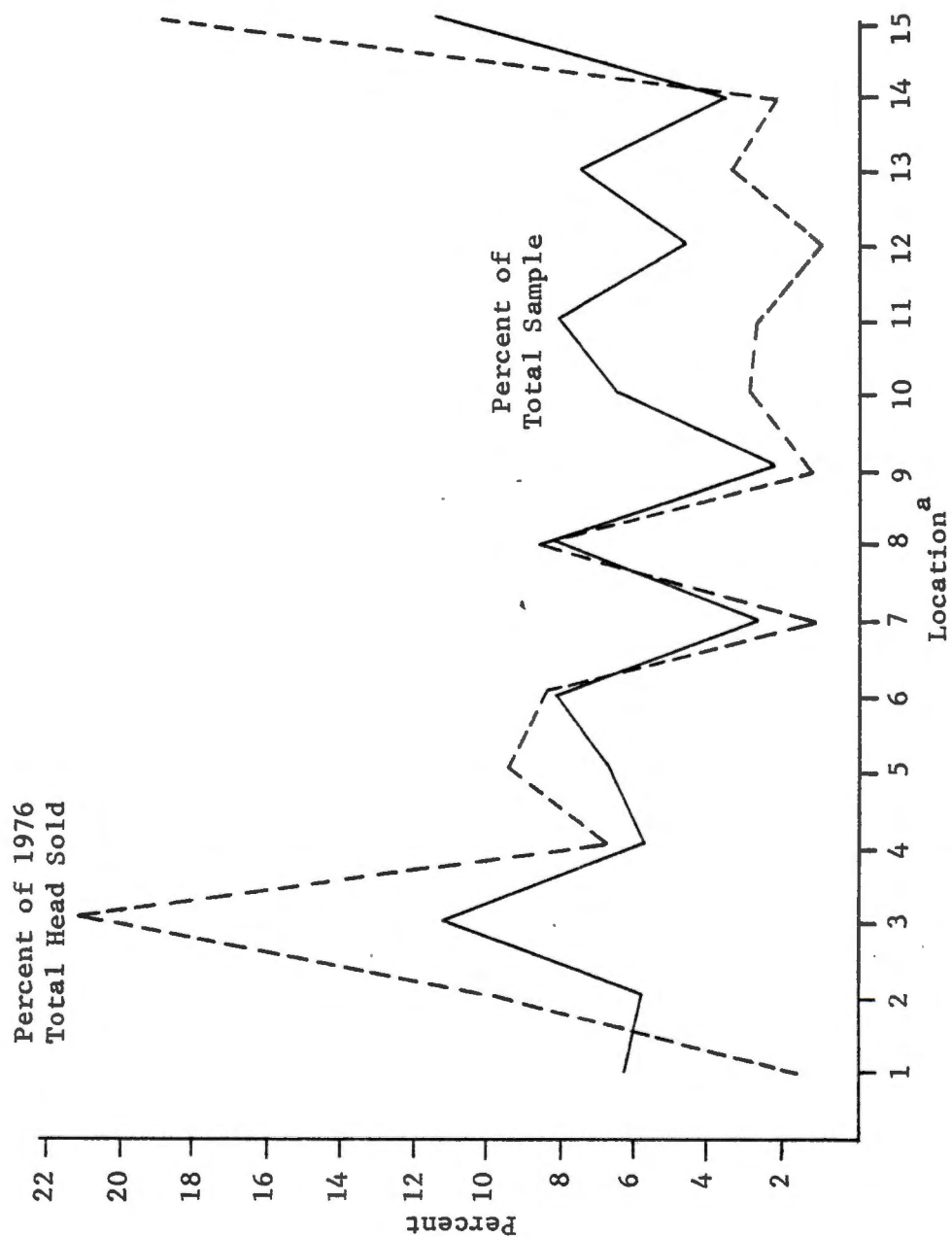


Figure 1. Percent of total head sold in 1976 and sample size for each sales location.

^aSee Appendix Table 13 for location identification.

CHAPTER II

LITERATURE REVIEW

Prior research to determine the marketing costs incurred by feeder pig producers is limited except for relatively simple transportation functions. Other studies concerning factors affecting the prices received for feeder pigs are more numerous.

An early study by O'Neal (1964) analyzed the development, organization, and operation of the Sevier County Demonstration Feeder Pig Sale beginning 1961 through 1963 (8). This sale was the basis for establishing organized feeder pig sales that exist across the state today. The study estimated that returns to producers were \$1.00 to \$1.50 per head above the farm price after sale expenses were deducted and the general concensus was favorable for the continued growth of this type of marketing outlet. The study showed that as more sales were held over the period of analysis, the volume of pigs sold grew and producers learned about improving their swine program. Over the period studied, the volume of pigs grew from 1,035 marketed in 1961 to 3,571 sold in 1963. A summary of each sale was sent to producers and they began to request information regarding fitting their production program to market demands. O'Neal also identified current and potential problems related to feeder pig sales in Sevier County. The problems were as follows: low volume; lack of continuous support by producers; the marketing of pigs that are of the improper weight, grade, and quality; inadequate grading system; disease; and sale facilities.

Hill and Kirtley (1966) identified five major problem areas in the feeder pig industry: (1) quality, (2) marketing efficiency, (3) pricing, (4) volume, and (5) operation of facilities (7). The buyers' chief complaint was the quality of the pigs or more specifically the age-weight relationship. The study found that the market could not reflect differences between pigs regarding feed efficiency, rate of gain, and cut-out characteristics and that producers would be slow to improve quality above present levels until it became a basis for price determination. Hill and Kirtley also found that costs to producers marketing through auction sales were higher than through a co-op or tele-auction, but net returns to producers were approximately the same for all. In addition, the study found a positive influence with respect to size of lot and sale volume and a negative influence with respect to average weight on prices received.

Rawls (1977) studied the effects of grade and average weight on feeder pig prices for each organized feeder pig sale in Tennessee (13). Using 1976 average prices the study concluded that where shipper buyers are predominant, the return after feed cost beyond 45 pounds is less than that from 35 to 45 pounds. Shipper buyers usually prefer pigs 45 pounds and under, while farmer feeders prefer heavier pigs.

Brasher (1973) studied costs associated with the operation of different size organized feeder pigs sales in Tennessee (1). He found that all public sales and medium size sales operating in private facilities to be operating unprofitably and small sales operating in private facilities showing a profit only because their labor was free. The study also showed there was little justification for any feeder

pig sale to be started where volume of at least 1,000 head per sale is not ascertained to be available. The budgets developed for sales of 3,000 and 5,000 head capacity indicated that the operation of feeder pig sales could be a very profitable private venture if the conditions assumed in deriving the budgets were existent. Brasher also hypothesized that 12 strategically located sales could handle all the feeder pigs that were sold in 1971 rather than the twenty sales that existed at that time assuming transportation costs remained constant.

Fox (1975) determined costs which buyers incur while purchasing pigs through organized feeder pig sales and costs of shipping feeder pigs to their final destination (4). He concluded that buyers were not purchasing feeder pigs under conditions of maximum efficiency at Tennessee feeder pig sales. The implication from the study was that returns to buyers and the overall efficiency of the feeder pig marketing systems could be improved by reducing the number of organized feeder pig sales and increasing the number of feeder pigs per sale.

Donaldson (1970) studied the effects of pen size on prices for feeder pigs at two locations in Tennessee (2). He concluded that pen sizes of at least 31 pigs or more in each weight and grade was desired by most buyers.

Elam (1971) sought to explain the price variations in and among Tennessee feeder pig markets (3). Two variables which accounted for a large proportion of price changes of feeder pigs within markets were shown to be expected prices of hogs and corn. Price differences among markets were also found. A second equation demonstrated that

three cross section variables--average quality, average weight, and average number of head--accounted for a large proportion (85 percent) of the price differentials among market locations.

CHAPTER III

MARKETING PRACTICES OF FEEDER PIG PRODUCERS

I. BACKGROUND

To study the marketing and management practices of producers selling pigs through Tennessee organized feeder pig sales, a questionnaire was developed and administered in the summer of 1976. Producers were personally interviewed at every sales location. The responses of each questionnaire were coded for computer analysis. All producers interviewed owned the pigs they were hauling. The average age of most producers was noted by interviewers and there appeared to be more middle-aged producers (46.8 percent) than young or old producers (28.0 percent and 25.2 percent respectively).

II. MARKETING COSTS

There are two types of cost involved in getting pigs from the farm to the market. One type is a direct expense for transportation and labor; the other is more or less a hidden cost due to bruising and crippling enroute to market. The selling charge at the market is another cost associated with marketing feeder pigs through organized sales.

Transportation costs are relatively more important to farmers who market a large number of pigs, than to the small producer.³ Small

³Transportation costs include both a cost per mile and per hour.

producers usually market on regular trips to town. Large producers must plan ahead in order to use equipment and labor efficiently.

The distance to market for the 274 producers interviewed ranged from one mile up to 150 miles, with an average distance of 24.4 miles. The average time spent by producers marketing their feeder pigs ranged from 30 minutes to 10 hours, with an average time of 2.5 hours.

The average number of pigs marketed was 20.9 with a maximum of 98 pigs and a minimum of 1 pig. Eighty-five percent of the producers interviewed transported their pigs in pick-up trucks, 11 percent in one-ton trucks, and the remainder in 2-ton trucks or trailers.

To compare transportation costs, sales were divided into three categories--large (over 100,000 pigs per year), medium (44,000-63,000 pigs per year), and small (5,000-24,000 pigs per year)--based on 1976 Tennessee feeder pig summary statistics (16). Table 2 shows how transportation costs varied with the size of sale. The overall average cost per animal marketed was \$0.69 per head.⁴ However, a load of only 10 pigs increases the cost per head to \$1.44 while a load of 30 pigs decreases the cost per head to \$0.48 assuming the mileage and labor costs remained constant.

The average number of pigs marketed per producer was relatively the same in each category. Transportation cost and labor expense increased as the size of sale increased. This is mainly due to the

⁴Cost per animal was calculated at 17.9¢/mile (6) and labor cost at \$2.27/hour (10).

Table 2. Average number of pigs marketed, transportation expense, and labor expense for the 274 feeder pig producers interviewed at Tennessee organized sales in 1976.

	Large Sales	Medium Sales	Small Sales
Average number of pigs marketed (head)	20.92	20.94	20.80
Transportation expense (dollars) ^a	11.59	9.01	6.93
Labor expense (dollars) ^b	6.60	5.16	5.76
Average cost per pig (\$/head)	0.87	0.68	0.61

^aUsing round-trip mileage.

^bFrom the time the producer leaves the farm until he returns.

fact that the smaller sales draw producers from a smaller radius around the sales location than the larger sales. However, some producers bypass a certain sale in favor of another (usually larger) sale. The majority of the producers gave price as the reason they would bypass a sale.

The loss to farmers from bruising and crippling can be greatly reduced through proper handling. Much of the bruising and crippling is caused by neglect which is in turn a result of faulty loading and hauling practices. Two practices which greatly reduce injury to animals are the use of loading chutes at the farm and the use of bedding in the truck for transporting pigs to market. Ninety percent of the producers indicated they used bedding in their trucks of which 66 percent used hay or straw, 21 percent used sawdust or wood shavings, and 3 percent used some other sort of bedding. In an analysis of hog

marketing practices in Georgia, Frazier and Padgett (1959) found that 83 percent of the producers interviewed used loading chutes (5).

Only 38 percent of the producers interviewed covered their truck during extremely hot or cold weather. Heat and cold stress, however, was only a problem to those driving a long distance or attending a sale where long lines exist.

Fifty-three percent of those producers who traveled more than the average number of miles (24.4) and took longer than the average amount of time to market their pigs (2.5 hours) covered their truck. This indicates that a majority of the producers are aware that stress is a problem and took steps to reduce it. Also, most of the producers arrived at the sale location early in the morning to help prevent heat stress. Average arrival time was 7:30 a.m.

Another producer expense is the selling cost at the market. The most common method was to charge a flat rate per head plus a percentage of the gross value of the animal. Selling charges had little influence on where farmers marketed their pigs. Charges at markets within the same vicinity tended to be the same. Table 3 shows the selling charges by areas in Tennessee, 1976.

III. MARKETING PRACTICES

A major marketing decision that producers face is the weight at which to market their pigs. Producers marketing pigs at sales that are held on a weekly basis can market their pigs at a more precise weight than others.

The most profitable weight to market feeder pigs depends on the particular markets price structure and the producers feed cost.

Table 3. Charges for selling feeder pigs through organized sales, by areas, Tennessee, 1976.

<u>East Tennessee</u>			<u>East Middle Tennessee</u>			<u>West Middle Tennessee</u>			<u>West Tennessee</u>		
<u>Charges</u>			<u>Charges</u>			<u>Charges</u>			<u>Charges</u>		
	<u>\$/Head</u>	<u>% of Gross</u>		<u>\$/Head</u>	<u>% of Gross</u>		<u>\$/Head</u>	<u>% of Gross</u>		<u>\$/Head</u>	<u>% of Gross</u>
Location			Location			Location			Location		
Sevierville	.96	--	Carthage	.50	1.0	Dickson	.60	1.5	Brownsville	.75	--
			Cookeville	.50	1.0	Lawrenceburg	.65	1.0	Huntingdon	.75	--
			McMinnville	.60	1.0	Lewisburg	.65	1.0	Lexington	.75	--
			Woodbury	.50	1.5	Pulaski	.65	1.0	Savannah	.75	--
						Unionville	.50	1.0	Selmer	1.00	--

At sales where local farmer buyers predominate, the preference is usually toward buying heavier pigs because farmers feel they have less health related problems. Where order buyers predominate, the preference is usually towards lighter pigs because the more pigs a shipper can haul, the lower the transportation cost per head. Also, the order buyers clients feel that they can put weight on pigs cheaper than they can buy heavier pigs at the market because their feed cost is lower.⁵

Generally speaking, where order buyers are predominant at a sale, the return after feed cost beyond 45 lbs. is less than that from 35 to 45 lbs. (13, p.1). Those producers interviewed at sales where farmer buyers predominate sold pigs averaging over 45 lbs. while those attending sales where order buyers predominate sold pigs averaging under 45 lbs. This tends to indicate that producers are aware of the differences among sales and their attempt to market pigs at a more profitable weight. However, most locations where farmer buyers predominate hold sales less frequently than those where order buyers predominate. Thus, the larger average weights are expected at sales held less frequently.

Another decision the producer faces is: when to market his feeder pigs? Feeder pig prices normally tend to peak in March or April and again around August or September (Figure 2). Year to year variations, however, are not unusual. Fewer feeder pigs are available during the March-April period because some producers do not farrow in mid-winter. Feeder pig demand tends to be strong at this time because farmer buyers anticipate seasonally high hog prices in the summer

⁵Most order buyers ship pigs to the corn belt.

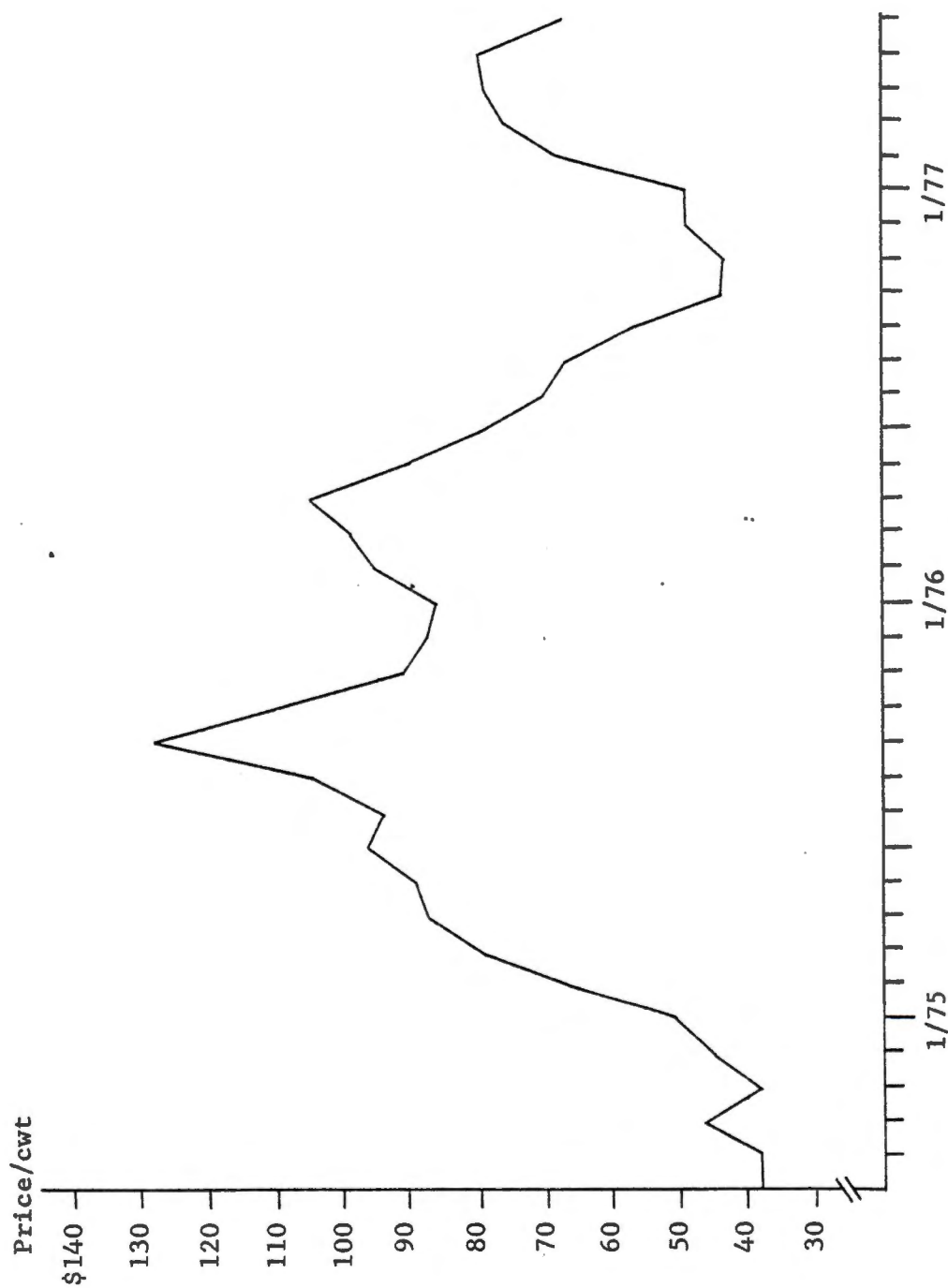


Figure 2. Monthly prices of feeder pigs in Tennessee, August, 1974-June, 1977.

months. However, pigs weaned per litter tend to be smaller and operating costs higher during the winter, thus raising the cost of production per pig. So, marketing pigs when prices are highest is not always the most profitable time. Producers must be concerned with costs as well as revenues. Prices are usually high in August and September because many producers hold pigs off the market to glean corn fields. Demand is strong at this time because feed corn is usually at its seasonally low price.

The results of the survey showed that only 7 percent of the producers interviewed marketed at specific times of the year. Other producers bred sows continuously throughout the year. Most of these were large feeder pig producers. The majority (91 percent) bred sows shortly after the pigs were weaned with no particular concern as to seasonal price movements. The few producers who did market at specific times of the year were aware of feeder pig price fluctuations and did attempt to market in the spring and fall of the year.

Producers also need to be aware of the current situation and outlook for slaughter hogs and feeder pigs. Feeder pig demand and prices are affected by current and expected prices for slaughter hogs as well as feed costs. Long-run trends and outlook affect production planning while short-run changes in these price influencing factors may suggest marketing a little sooner or later than normal. However, only 17 percent of the producers interviewed used any form of pricing or marketing information (Table 4).

Another factor that producers should incorporate into their marketing strategy is where to sell their feeder pigs. Eighty-eight percent of the producers marketed at the sale location nearest their

Table 4. Sources of pricing and marketing information utilized by 274 Tennessee feeder pig producers surveyed during the summer of 1976.

Type of Information	Number of Producers	Percent
Market news letter	21	7.6
Extension agent	10	3.6
Radio	7	2.5
Newspaper	6	2.2
Telephone	3	1.1
USDA or extension service publication	2	0.7
Other ^a	10	3.6
None	228	83.2

^aOther responses were word of mouth, use of previous sale results, and stockman's paper.

farms. When asked why they marketed their pigs at that particular location, 59 percent had no other reason than its close proximity (Table 5). Producers giving another reason mentioned price most frequently (15 percent). These results indicate that distance is the most important factor used by feeder pig producers in determining where to market their feeder pigs.

Twelve percent of the surveyed feeder pig producers bypassed the nearest sale location on a regular basis. Some producers live close to a sales location that hold auctions less frequently than others. Therefore, these producers must attend other sales so that

Table 5. Reasons given for attending a particular sales location by 274 Tennessee feeder pig producers interviewed during the summer of 1976.

Reason	Those Marketing at Nearest Location n = 241	Those Bypassing the Closer Location n = 33
	percent	percent
Farm is close to market location	58.7	-
Receive better price	14.8	37.5
Likes sale management	5.6	-
Stockholder and/or association member	5.1	-
Receive better grade	3.1	5.0
More buyers present	1.5	-
Lower selling charges	0.5	2.5
Habit	0.5	10.0
Pigs not ready for regular sale	-	5.0
No reason	0.0	15.0
Other ^a	8.7	20.0
	100.0	100.0

^aOther responses were that producers like the people attending a particular sale and that they do not know about other sales or cannot get information about other sales.

their production facilities will not become overcrowded and/or their pigs will not become too heavy.

Since proximity was hypothesized as being the major reason producers marketed at a particular location, interviewees were asked if they would consider participating in a "pooling operation."⁶ The majority (77 percent) responded that they would not be interested (Table 6). The negative reason mentioned most frequently was that they were close to a sales location and did not comprehend any benefit from "pooling" their pigs with other producers. The most frequently mentioned positive reason was that "pooling" would save time and/or gasoline. These producers were willing to pay an average of \$0.60 per head for this service.

IV. MANAGEMENT PRACTICES

Good management and efficient marketing go hand-in-hand. Producers cannot market efficiently if they have not done a good job of raising their pigs. They need to market healthy pigs from large litters that have gained weight quickly and efficiently. A detailed analysis of feeder pig management was beyond the scope of this study. However, an attempt was made to identify general management practices, types of facilities used, and the size and importance of the feeder pig enterprise to the surveyed producers.

After pigs are farrowed there are six recommended practices to be performed before they reach the market. These practices are:

⁶A "pooling operation" is when one man and a large truck take a group of farmers' pigs to market.

Table 6. Reasons given for or against participation in a "pooling operation"^a by 274 Tennessee feeder pig producers surveyed during the summer of 1976.

Would Not Like to Participate		Would Like to Participate	
Reason	n=212	Reason	n=62
	percent		percent
Lives too close to sale	39.8	Save time and/or gas	53.6
Rather haul and handle his own pigs	28.4	If handled and organized properly	21.4
Small producer, not enough pigs to justify pooling	9.0	If it meant a better price would be received	12.5
Afraid of sickness and crowding	6.2	If it meant fewer locations and more volume	5.3
Likes the present system	5.7	Pools now	3.6
Retired, likes to drive to market	3.3	Other reasons ^c	3.6
Inconvenient	3.3		100.0
Markets on way to work	1.4		
Other reasons ^b	2.8		
	100.0		

^aA "pooling operation" is when one man and a large truck take a group of farmers' pigs to market.

^bOther responses were going out of hog business and working at the sale.

^cOther responses were a need to borrow a truck and a need to pool only if pigs are ready.

worming, castration, iron shots, treatment for lice and mange, clipping needle teeth, and feeding a well balanced medicated creep feed (15). Good management also includes sow management and proper farrowing facilities.

The results show that the majority of the producers interviewed followed the six recommended practices (Table 7). The least followed practice was the iron treatment for anemia, however this was not indicative of poor management. Over 75 percent of the producers who did not give iron treatments raised their pigs on dirt, and thus, adequate iron intake was achieved.

Table 7. Production management practices from farrowing to sale followed by 274 Tennessee feeder pig producers surveyed during the summer of 1976.

Practice	Yes	No
	percent	percent
Worm	78.0	22.0
Castrate	100.0	0.0
Iron treatment	30.8	69.2
Lice and mange treatment	88.3	11.7
Clip needle teeth	60.4	39.6
Use medicated creep feed	90.1	9.9

Several of the recommended practices were to be performed at specific stages during the growth of the feeder pig. The results (Table 8) showed that these producers were not worming and castrating pigs at the recommended time (15).

Table 8. Comparison of recommended and actual times for treating feeder pigs, 274 Tennessee feeder pig producers surveyed during the summer of 1976.

Treatment	Average Survey Response Days	Recommended Time ^a Days
Clip needle teeth	1.7	1-2
Iron treatment	7.0	4.0
Castration	25.0	7.0
Worming	33.9	56.7

^aSource: University of Tennessee Agricultural Extension Service. More Pigs Weaned Means More Net Dollars. Publication 669. College of Agriculture, Knoxville, 1974.

The types of facilities used by the feeder pig producers surveyed are shown in Table 9. The majority of the producers (65 percent) raised their pigs on dirt lots that provided at least a minimum amount of shelter. Another 27 percent raised feeder pigs on sheltered concrete floors.

Slightly more than half of the feeder pig producers were part-time farmers (58 percent) with primarily blue collar jobs (Table 10). The average part-time farmer devoted approximately 64 percent of his farming time to producing feeder pigs. Full-time farmers devoted an average of 42 percent of their time to the production of feeder pigs. Other important enterprises in which feeder pig producers were engaged in were beef production, corn, tobacco, soybeans, and hay.

The average number of sows per producer was 12.84. Sow herds ranged from 1 to 100. The majority of the producers (56 percent)

weaned pigs prior to marketing. Eighty-nine percent of these pigs had been weaned between one and three weeks.

Table 9. Types of facilities used to raise feeder pigs by 274 Tennessee Producers Surveyed During the Summer of 1976.

Facility	Number	Percent
Dirt floor, with shelter	179	65.3
Dirt floor, no shelter	3	1.1
Wood floor, with heat	10	3.6
Wood floor, no heat	7	2.6
Concrete floor, heat bulbs	51	18.6
Concrete floor, floor heat	14	5.1
Concrete floor, no heat	9	3.3
Plastic floor, with heat	1	0.4
	<u>274</u>	<u>100.0</u>

Table 10. Occupations of 274 Tennessee feeder pig producers surveyed during the summer of 1976.

Occupation	Number	Percent
Full-time farmers	116	42.3
Part-time farmers		
Construction worker	32	20.1
White collar job	27	17.0
Factory work	23	14.5
Mechanic	16	10.1
Agriculture and related jobs	14	8.8
Unskilled	12	7.5
Truck Driver	11	6.9
Retired	10	6.3
Small business owner	5	3.1
Other	9	5.7
	<u>274</u>	<u>100.0</u>

V. ATTITUDES AND SUGGESTIONS CONCERNING ORGANIZED FEEDER PIG SALES

Producers were generally satisfied with the operation of organized feeder pig sales in Tennessee (Table 11). Some producers were not satisfied with the grading system and the way pigs were handled at the sales. Most of the producers not satisfied with the grading system felt their pigs received too low a grade. Inconsistent grading was also mentioned by the dissatisfied producers. Rough treatment of pigs was the complaint reported by the producers not satisfied with the way pigs were handled at the sales.

Table 11. Attitudes concerning the management of organized feeder pig sales as reported by 274 Tennessee feeder pig producers surveyed during the summer of 1976.

Activity	Very Satisfied	Satisfied	Not Satisfied
		percent	
Grading system	0.8	81.7	17.5
Handling of pigs	0.8	89.9	9.3
Sale facilities	1.2	97.7	1.2
Penning of pigs	1.1	97.8	1.1
Management of sale	2.2	97.8	--
Auctioning procedures	2.4	97.6	--

Producers expressed satisfaction with the number of organized feeder pig sales locations across the state. The majority of producers, 74 percent, thought that the present number of locations was sufficient. Twenty-three percent thought there were not enough

locations. Reasons given were long unloading lines at particular sale locations and driving a long distance to a sale. Only 18 percent of the producers wanted to see more sales per month at a particular location. None of the producers recommended closing an existing sale.

Number of pigs sold at a sale was also considered satisfactory by the majority of producers. Almost 89 percent of the producers interviewed were satisfied with the volume of pigs being sold at each sale. However, one-half of the producers interviewed at two sales locations were dissatisfied with the volume of pigs being sold.⁷

VI. CONCLUSIONS

The results of this study appear to support the hypothesis that feeder pig producers utilizing Tennessee organized feeder pig sales do not market their pigs in the most profitable manner. The survey results showed that producers were following most of the recommended management and handling practices, but showed little interest in effectively marketing their feeder pigs once they were produced. Apparently producers need to be educated with respect to the importance of marketing feeder pigs as opposed to just selling them.

The majority of the feeder pig producers were marketing pigs at recommended weights, but only 7 percent attempted to sell pigs at specific times of the year and only 17 percent used the pricing or

⁷One of these sales locations is no longer conducting a feeder pig sale.

marketing information that was available. Furthermore, producers marketed their feeder pigs at the sales location nearest their farms, apparently unaware that other sales locations could possibly provide larger net returns.

CHAPTER IV

FEEDER PIG PRICE ANALYSIS

I. BACKGROUND

An earlier study by Elam (1971) attempted to explain the price variations in and among Tennessee feeder pig markets. This segment of the study sought to up-date the analysis used in the earlier study with slight modification.

Variations in price received for Tennessee feeder pigs during the year and from sale to sale affect the net returns of producers. For the producer of feeder pigs, large price changes, to the extent they are not anticipated, make production planning difficult. The purpose of this part of the study was to reveal temporal price patterns that could assist producers in anticipating price changes and adjust production levels accordingly. Also, with information regarding spatial price variations, the feeder pig producer could market his pigs more effectively.

II. THE TWO EQUATIONS

Equation (1) of the model estimates the influence of hog and corn prices on feeder pig prices within markets. Dummy variables on locations were included in this equation so as to account for all variation in feeder pig prices attributable to locational differences. Dummy variables for the sale month were also included so as to account for seasonal price variations.

Coefficients for the location variables became the dependent variable in a second equation--Equation (2). Three cross section variables--quality, average weight, and number of head per sale--were then employed to explain geographic price differences.

III. DEFINITION OF VARIABLES

Equation (1)

Y = the average price in \$/cwt. of all feeder pigs sold (grades I-IV) through a market on a sale day.

X_1 = weighted average price in dollars per hundredweight of barrows and gilts on the Omaha market during the week before the feeder pig sale.

X_2 = average price in cents per bushel of No. 2 yellow corn on the Omaha market during the week before the feeder pig sale.

$X_3 - X_{14}$ = month of sale expressed as twelve 0, 1 type dummy variables.

$X_{15} - X_{27}$ = the 13 selected market locations expressed as 0, 1 type dummy variables.

Equation (2)

Z = average price differential which existed between Cookeville and the other twelve market locations. These are the b coefficients estimated for the 13 0, 1 dummy variables used for market locations in Equation (1); i.e., b_{15} - b_{27} .

X_{28} = overall average percent of pigs grading Nos. 1 and 2 for a single market location.

X_{29} = overall average weight of all pigs sold through a single market location.

X_{30} = overall average number of feeder pigs per sale day for a single market location.⁸

IV. RESULTS

Equation (1)⁹

$$\begin{aligned}
 Y = & -16.83 + 2.69X_1 - 0.10X_2 + 0.28X_3 + 10.94X_4 \\
 & (0.03)* (0.01)* (1.17) (1.20)* \\
 & + 20.23X_5 + 26.60X_6 + 14.60X_7 + 8.66X_8 - 7.85X_9 \\
 & (1.175)* (1.18)* (1.245)* (1.24)* (1.26)* \\
 & - 1.75X_{10} + 1.92X_{11} - 1.07X_{12} - 0.07X_{13} + 0.00X_{14} \\
 & (1.27) (1.27) (1.25) (1.29) . \\
 & - 10.84X_{15} - 2.44X_{16} + 0.00X_{17} - 4.88X_{18} - 4.11X_{19} \\
 & (1.54)* (0.89)* (0.99)* (0.97)* \\
 & - 3.62X_{20} - 7.32X_{21} - 6.79X_{22} - 5.46X_{23} - 5.10X_{24} \\
 & (1.14)* (1.46)* (1.12)* (1.26)* (1.46)* \\
 & - 10.14X_{25} - 6.38X_{26} + 0.85X_{27} \\
 & (1.12)* (1.12)* (0.89)
 \end{aligned}$$

where:

* = significant at the .01 level.

⁸Values for variables X_{28} - X_{30} are given in Appendix Table 14.

⁹Dummy variables X_{14} and X_{17} were set equal to zero to avoid singularity.

The number in parenthesis indicate standard errors for the coefficients. For this equation $R^2 = 0.89$ and $Se = 8.20$. These results were quite similar to those found by Elam (1971) except for the standard error (3, p. 18). This can be explained by greater price variability during the present study period than during the previous study.

As expected, the signs of b_1 (hog price) and b_2 (corn price) were positive and negative, respectively. The dummy variables for months-- X_3 through X_{14} --were included in this equation to account for the seasonal fluctuations of hog prices on feeder pig prices. In other words, the feeder pig purchaser takes into account not only present prices of hogs but also seasonal price movements since seasonal movements in this market are fairly stable.

If feeder pig purchasers do behave in this manner the dummy coefficients for month should be correlated with seasonal hog price movements. This relationship is dependent on the time period between purchase and disposition of the pigs as well as the particular seasonal index utilized.

A seasonal hog price index was developed for the study period using average monthly price per hundredweight for Omaha barrows and gilts (11). This seasonal index was used to check the previously mentioned relationship.

A time period of four months was used between purchase and disposition of pigs. It requires approximately four months to fatten a 45-50 pound feeder pig to 220 pounds (9). The correlation coefficient between the dummy coefficients and the adjusted seasonal hog

price index was 0.885, which, supports the hypothesis that feeder pig buyers do consider seasonal hog price variations (Figure 3).

Variables X_{15} - X_{27} were placed in Equation (1) in order to capture variation attributable to location. These coefficients represent price differentials which existed among the 13 markets. They are interpreted as the difference between the Cookeville market and the other twelve. All the location coefficients are negative except X_{27} because the Cookeville (X_{17}) and Woodbury (X_{27}) sales locations exhibited the highest prices received over the study period. Brownsville (X_{15}) and Sevierville (X_{25}) exhibit large negative coefficients because they experienced the lowest prices received.

Most of the price differentials that existed among the 13 markets were attributable to three cross section variables as shown in Equation (2).

Equation (2)

$$\hat{Z} = 35.19 + 0.059X_{28} - 0.91X_{29} + 0.002X_{30}$$

(0.038) (0.124)* (0.0006)*

where:

* = significant at the .01 level.

The numbers in parenthesis indicate standard errors for the coefficients. In this equation, $R^2 = 0.91$ and $Se = 1.08$. These results were also quite similar to those found in the previous study (3, p. 23).

A positive coefficient was expected for the quality variable (X_{28}) due to the fact that buyers pay a premium for higher grading

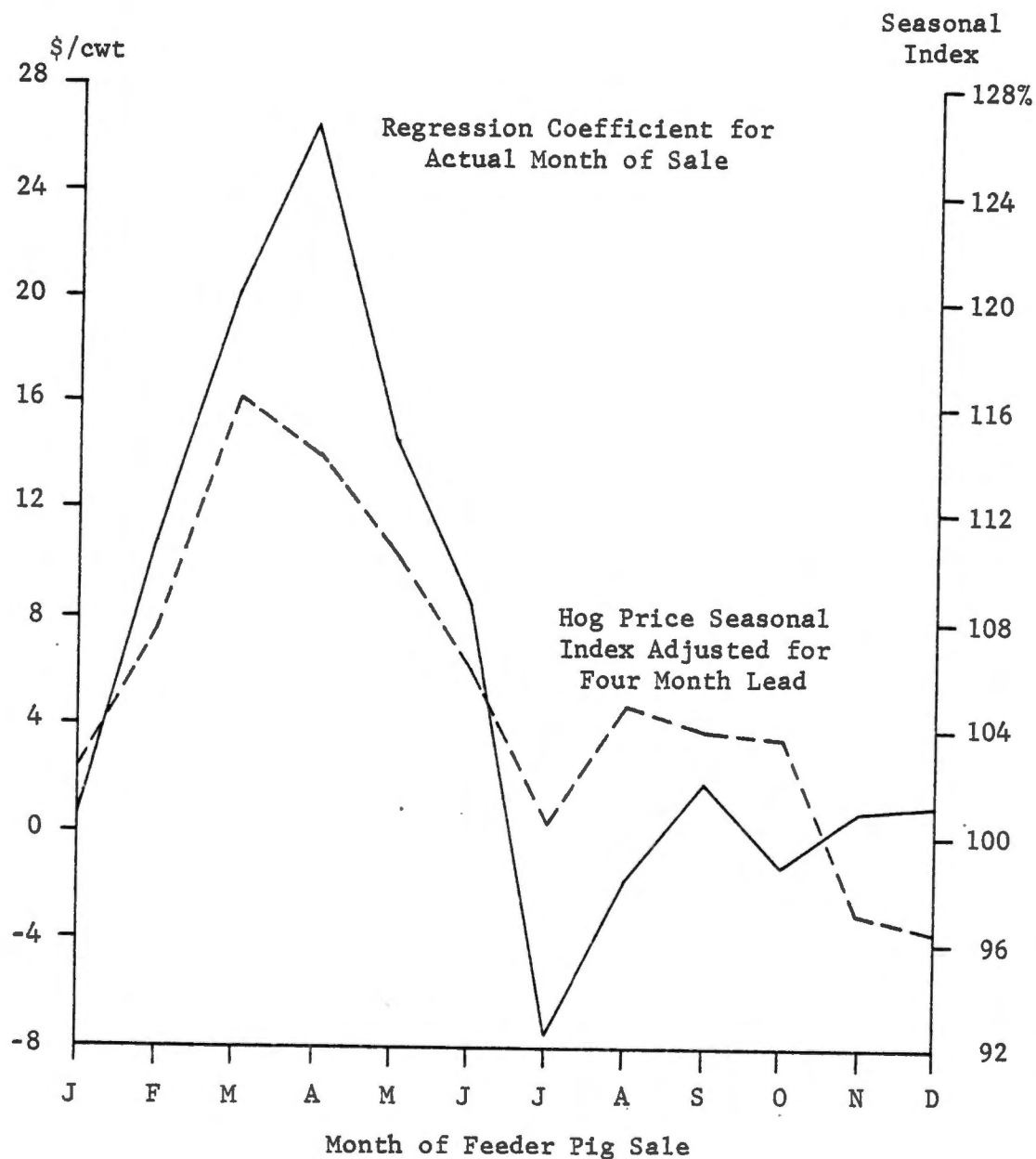


Figure 3. Regression coefficients for months from equation (1) and seasonal hog price index lagged four months.*

*Seasonal price index for Omaha barrows and gilts, January, 1974-May, 1977.

pigs. As anticipated, b_{28} was positive, indicating that as average quality rose among markets, average price did also. However, this variable was not significant at the .10 level. Perhaps this could be due to the inconsistent grading standards among markets.

The negative coefficient was expected for the average weight variable (X_{29}). As initial weight of a pig rises, the cost of feeding to a given weight drops; therefore, price per head increases. In this analysis, however, price of feeder pigs was measured in terms of dollars per hundredweight rather than price per head.

The slaughter hog producer (feeder pig buyer) buying a 50 pound pig over a 45 pound pig is willing to pay only what that extra five pounds would have cost him to add. This leads to an increase in price per head and a decrease in price per hundredweight. For example, a five pound gain in weight will cost about \$1.16 under 1976 cost conditions.¹⁰ The average weight of pigs (grades 1-4) sold during the study period was approximately 48 pounds which sold for an average price of \$35 per head or \$72.92 per hundredweight. So, if 48 pound pigs are selling for \$35 per head then a 53 pound pig is worth \$36.16 or \$68.23 per hundredweight, to the buyer. The price per hundredweight is thus \$4.69 less for the heavier pig.

The coefficient for the average weight variable (X_{29}) indicates that a 53 pound feeder pig would sell for \$4.55 per hundredweight less than a 48 pound pig. This small difference of 14 cents between these two approaches is excellent evidence that slaughter hog

¹⁰ Assuming an 18 percent ration costs \$0.11 per pound and a 2.1 feed efficiency (13).

producers are willing to buy weight on a heavier pig at the approximate cost of adding that weight.

The average number of head per sale should exert a positive influence on price per hundredweight for several possible reasons. The larger a sale, the more buyers attending the sale and bidding on pigs. Another possible reason is that buyers pay premiums for large uniform lots of pigs which are found at larger sales. Thus, as average number of head rises, the number of pigs at a given weight and quality should also increase.

The residuals from Equation (2) are shown in Table 12. The largest residual was only about 73 cents per head. If a particular residual was extremely large then it would have indicated that there was something peculiar about that market not explained by the three variables; thus, a relatively large residual would imply that a market had some unexplained advantage or disadvantage over other markets.

Table 12. Z , $\hat{Z}$ and residuals for equation (2).

Location	Z	$\hat{Z}$	Residual
Brownsville	-10.8384	-9.7697	-1.0687/cwt
Carthage	- 2.4424	-3.5474	1.1050
Cookeville	0.0000	0.3341	-0.3341
Dickson	- 4.8847	-5.6358	0.7511
Huntingdon	- 4.1129	-4.9765	0.8636
Lawrenceburg	- 3.6175	-4.2133	0.5958
Lewisburg	- 7.3189	-6.6196	-0.6993
Lexington	- 6.7901	-7.0673	0.2772
Pulaski	- 5.4623	-5.3234	-0.1389
Savannah	- 5.0976	-6.0369	0.9393
Sevierville	-10.1412	-8.7369	-1.4043
Unionville	- 6.3829	-7.0082	0.6253
Woodbury	- 0.8549	0.6572	-1.5121

CHAPTER V

SUMMARY

The overall objective of this study was to determine whether Tennessee feeder pig producers market their pigs in the most efficient manner. The specific objectives were as follows: (1) identify problems and determine costs of transporting feeder pigs to the sales locations, (2) determine marketing costs incurred at different organized feeder pig sales locations, (3) identify the marketing information producers use in selecting a feeder pig sale, (4) identify the handling and management practices used by producers, and (5) identify attitudes of feeder pig producers regarding Tennessee organized feeder pig sales.

Data were gathered from 15 organized feeder pig sales locations in Tennessee during the summer of 1976. Producers were personally interviewed at every sale location. The total sample consisted of 274 feeder pig producers.

Marketing costs consisted of transportation and labor expenses, costs due to bruising and crippling, and the selling charge at the market. Producers travelled an average of 24.4 miles to market their pigs. The average time spent was 2.5 hours. The average number of pigs marketed per producer was 20.9 pigs. The average cost per head marketed was \$0.69.

To compare transportation costs, sales were divided into three size categories. It was found that the average number of pigs

marketed was relatively the same in each category, while the average cost per pig marketed increased as the size of sale increased.

The loss to farmers from bruising and crippling was not found to be a major problem. Most producers (90 percent) used bedding in their trucks and the majority traveling a long distance covered their truck in extremely hot or cold weather.

The most common method of determining selling charges at the sale was a flat rate per head plus a percentage of the gross value of the animal. Selling charges had little effect on where farmers marketed their pigs. Charges at markets within the same area tended to be the same.

Producers at sales where order buyers predominate sold pigs averaging under 45 pounds, while producers at sales where farmer buyers predominate sold pigs averaging over 45 pounds.

Only 7 percent of the producers interviewed marketed at specific times of the year. Most producers bred sows shortly after the pigs were weaned with no particular concern as to seasonal price movements. This is reflected in the fact that only 17 percent of the producers used any form of pricing or marketing information.

Eighty-eight percent of the producers marketed at the location nearest their farm. The majority (59 percent) gave proximity as the only reason they marketed at that particular location. Of those who did bypass the nearest sale, 38 percent reported price as the reason for doing so.

Producers were generally not interested in "pooling" their pigs with other producers. Most producers mentioned that they lived too close to the sale location to justify such a venture. Many were

skeptical of improper handling, sickness, and crowding problems and would rather stay with their own pigs. Time and/or gasoline saved were the most frequent answers given by those in favor of "pooling" operations. These producers were willing to pay an average of \$0.60 per head if this service was available.

The results of the study showed that the majority of the producers follow recommended management practices. However, castration and worming were not being performed at recommended times in the pigs development.

Most of the feeder pigs were raised on dirt lots with shelter. The majority of the producers (58 percent) were part-time farmers. The average part-time farmer devoted approximately 64 percent of his farming time to producing feeder pigs. Full-time farmers devoted an average of 42 percent of their time to the production of feeder pigs. Beef production followed by corn were other important enterprises for both types of producers.

The average number of sows per producer was 12.84. The majority of the pigs were weaned 1-3 weeks prior to marketing.

Producers were generally satisfied with the operation of organized feeder pig sales in Tennessee. Some producers (18 percent) were not satisfied with the present grading system and the way pigs were handled at feeder pig sales (9 percent). Low grades and inconsistent grading accounted for most of the producers dissatisfaction with the grading system. All the producers not satisfied with the way pigs were handled specified rough treatment as their major complaint.

Producers were also satisfied with the number of feeder pig sale locations across the state. Twenty-three percent thought there were not enough locations. The volume of pigs per sale was also satisfactory to the majority of the producers.

A secondary objective of this study was to utilize an econometric model employing theoretically relevant variables to analyze price variations in and among 13 selected Tennessee feeder pig sales locations. Two equations were specified--one to explain price changes within markets and one to explain geographic price differentials.

Data were collected for the period January 1974 to April 1977. Feeder pig data were obtained from Dr. Emmet Rawls of the University of Tennessee Extension Service. Hog and corn prices were obtained from U.S.D.A.'s "Livestock Market News" (12). Coefficients of the model were estimated by ordinary least squares.

In Equation (1), prices of hogs and corn explained a large proportion of changes in feeder pig prices. It was found that feeder pig buyers react to current hog and corn prices. It was also shown that buyers take seasonal hog movements into consideration when arriving at expected price.

Equation (2) showed that three cross section variables--average quality, average weight, and average number of head per sale--accounted for a large proportion (91 percent) of the price differentials among market locations. The fact that no residuals in this equation were large shows that none of the markets studied had any unusual advantages or disadvantages not accounted for by the three variables utilized.

Both equations showed similar results to those found by Elam (1971).

From a producer standpoint, two of the three variables in Equation (2)--quality and weight--are producer controlled. Thus, producers should study their particular sales location and produce pigs which will maximize net returns. The implication derived from the positive sign for the number of head per sale variable is that a feeder pig producer should favor large sales over small ones.

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APPENDIX

Table 13. Location identification.

Location	No.
Brownsville	1
Carthage	2
Cookeville	3
Dickson	4
Huntingdon	5
Lawrenceburg	6
Lewisburg	7
Lexington	8
McMinnville	9
Pulaski	10
Savannah	11
Selmer	12
Sevierville	13
Unionville	14
Woodbury	15

Table 14. Values for overall average quality (X_{28}), weight (X_{29}), and number of head (X_{30}) for 13 selected Tennessee feeder pig sales, January 1974 to April 1977.

Location	X_{28}	X_{29}	X_{30}
	<u>Percent</u>	<u>Pounds</u>	<u>Number</u>
Brownsville	26.6052	53.3829	975
Carthage	43.0566	47.7276	1008
Cookeville	49.7678	46.6557	2271
Dickson	28.3676	48.9597	935
Huntingdon	34.6937	49.7248	1459
Lawrenceburg	23.4150	49.4829	2093
Lewisburg	25.6101	48.8278	533
Lexington	39.7932	53.6033	2035
Pulaski	28.5768	48.6056	974
Savannah	44.2946	51.0455	1244
Sevierville	43.2999	52.8784	756
Unionville	24.7440	49.1804	520
Woodbury	36.6734	44.7779	1991

VITA

Thomas Hewes Loose was born in Cleveland, Ohio, on January 3, 1953. He completed elementary and junior high schools in Maryland. He then moved to Chatham, New Jersey where he was graduated from Chatham High School in 1971. The following September he entered the University of Tennessee at Martin, and in June 1975, he received a Bachelor of Science degree in Agricultural Business.

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