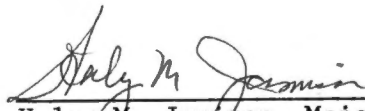
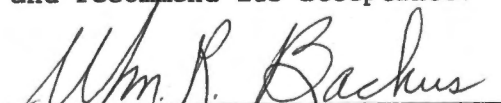
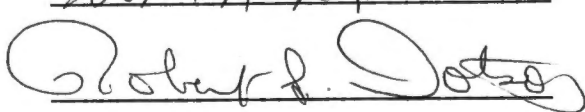


To the Graduate Council:

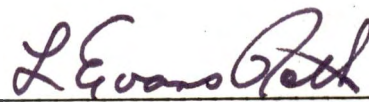
I am submitting herewith a thesis written by Willard Lacy Upchurch entitled "Effect of Selected Variables on Prices Received for Feeder Pigs in the Cookeville Feeder Pig Sales." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Science.


Haley M. Jamison, Major Professor

We have read this thesis
and recommend its acceptance:

Accepted for the Council:


Vice Chancellor
Graduate Studies and Research

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EFFECT OF SELECTED VARIABLES ON PRICES RECEIVED FOR FEEDER
PIGS IN THE COOKEVILLE FEEDER PIG SALES

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

Willard Lacy Upchurch

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ABSTRACT

Records from 3,061 pens (409,256 pigs) sold in the Cookeville Feeder Pig Sales from 1970 through 1973 were studied to determine the effects of grade, pen size, and average weight per pen on average price per hundredweight and price per head for feeder pigs.

Grade of pigs had a highly significant effect on price per hundredweight and price received per head in both analyses. Pigs grading U.S. No. 1 and No. 2 sold for an average of \$0.65 more per head and \$1.86 more per hundredweight than pigs grading U.S. No. 3; \$3.84 per head and \$7.36 per hundredweight more than U.S. No. 4 and \$7.20 per head and \$11.74 more per hundredweight than U.S. Utility.

There was a definite price advantage per hundredweight and per head for pigs selling in larger pens; however, as pen size increased beyond an undetermined point, the price received for larger pens decreased slightly. These data indicated that buyers were willing to pay a premium for pen sizes that would accommodate a deck load. If average number of pigs per pen exceeded that of a deck and not equal to two decks, the price paid would be somewhat less.

Differences in average weight per pen were a highly significant source of variation in price. When price received per hundredweight was regressed on average weight per pen, with all other sources of variation held constant, these data indicated that as average weight per pen increased the price per hundredweight decreased.

When average price received per head was regressed on average weight per pen, with all other sources of variation held constant, these data indicated that the buyers were willing to pay more for heavier pigs when numbers accommodating multiple decks existed.

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CHAPTER I

INTRODUCTION

The Cookeville Tennessee feeder pig sales have established themselves as an important part of the livestock industry and the economy of the upper Cumberland area of the state.

A large percentage of the farmers in the upper Cumberland area are part-time farmers that supplement their income by producing and selling feeder pigs. Until the organization of the Cookeville feeder pig sale in 1958, there was very little competitive buying and pig producers were at the mercy of pig buyers who traveled from farm to farm. The organized feeder pig sale provided pig producers an opportunity to market large groups of pigs which were uniform in size and quality.

Farm income from feeder pigs sold in the Cookeville feeder pig sales has risen from \$8,165.00 in 1958 to \$2,904,319.00 in 1973. During this same period the number of pigs sold annually increased from 553 to over 90,000.

Cookeville feeder pig sales are now held weekly and provide a consistent mode of marketing for producers in the upper Cumberland area.

The objective of this study was to evaluate the effects of: grade, weight, and pen size on the prices received per hundredweight and per head during the period of November 1970 through September 1973.

It is hoped that conclusions drawn from this study will be beneficial to swine producers in Tennessee in planning their pig marketing schedule and also yield information that may be useful in improving existing sales or establishing new feeder pig sales.

CHAPTER II

REVIEW OF LITERATURE

There have been few published reports dealing with the effects of various factors on price received for feeder pigs sold through organized sales. Much of the information available is found in general surveys. Few critical analyses of data have been made.

Hoss et al. (1962) reported that producers in a six-state area pooled approximately 157,700 feeder pigs in 1959. These workers found pen size to be an important factor affecting the price of pooled feeder pigs and one over which the market agency had no control. The smallest number of pigs that should be sold as a pen appeared to be 10 to 29 pigs, the most common pen size being 50 to 74 pigs, and the largest pen size being 125 to 224. The larger volume agencies attracted larger numbers of pigs and buyers. It was concluded that if producers are to realize full value for feeder pigs they must have an effective marketing system that provides efficient movement and handling.

Waddell (1965) found in a study of the Cookeville, Tennessee, feeder pig sale that pen size or number of pigs in the pen indicated a definite price advantage for feeder pigs sold in larger pens. Pigs sold in pens of 1 to 15 averaged less than any other pen size. The pigs sold in pens of 16 to 30 averaged more than those of any other grouping. These pigs in pens of 16 to 30 head averaged \$0.75 more per hundredweight than did the 1 to 15 head pen size. The analysis indicated very little difference between the 16 to 30 pen size and 31 and

over pen size classification. The results indicate the desirability of penning pigs in uniform pens of 16 head or more.

Donaldson (1970) also found a significant difference ($P < .01$) in price received per hundredweight and price per head for pigs in larger lots. Pigs in pens of 1-10 and 71-80 sold for less per hundredweight than pigs in any other pen size classification.

Jamison et al. (1970) found in a study of the Weakley County pig sales that there was a definite price advantage for pigs sold in larger pens. The pigs penned in pens of 1 to 15 and 16 to 30 pigs averaged less per hundredweight than did those penned in lots of 31 to 73 pigs. The pigs in pens of 31 and more sold for an average of \$3.18 per hundredweight more than those penned in pens of 1 to 15 pigs. Similar results were found by McFall (1969).

Sharp (1974) reported that pen size had a significant ($P < .05$) effect on price both per hundredweight and per head. The pigs in pens of 181-190, 151-160, and 131-140 sold for more per hundredweight and per head than any other pen size classification.

However, McDaniel (1975), in a study of the Carthage Feeder Pig Sale found that pen size did not have a significant effect on prices received for feeder pigs. This may have been influenced by a high percentage being purchased by farmer feeders or regrouping by order buyers prior to final shipment.

I. AVERAGE WEIGHT

A study of the feeder pig sales held in Sevierville, Tennessee, by O'Neal (1964) indicated the main purpose of the feeder pig sale

was to combine a large volume of pigs into uniform pens to attract several buyers and realize a satisfactory price. The producer can market all his pigs at one time where there is a sufficient volume of pigs to attract several buyers. Buyers can purchase in a short time a large volume of pigs of the weight and grades that fulfill his requirements. O'Neal (1964) also indicated that buyers were interested in high quality uniform pens of pigs weighing 45 to 60 pounds.

Sewell (1962) reported that in the Missouri marketing cooperatives where feeder pigs were delivered to feeders the first preference was for pigs weighing 40-50 pounds. The Missouri sales were accepting pigs up to 100 pounds. Powell and Houston (1962) found similar results. The best weight to sell was 40-50 pounds.

Waddell (1965) found that pigs in pens averaging 31-40 pounds sold for the highest price while pigs in pens averaging 66 pounds or more sold for the lowest price per hundredweight. There was a price difference of \$16.00 per hundredweight between the two weight groups, which was highly significant ($P < .01$). It was found also that price decreased in a linear fashion from the 31-40 pound weight class to the class including weights of 66 pounds and more. Results from this study indicated that a 31-40 pound pig is the first preference of the buyer and a 41-50 pound pig is the second preference.

McFall (1969), Donaldson (1970) and McDaniel (1975) found similar results. As average weight of pigs increased, price per hundredweight decreased. McFall (1969) found that pigs weighing 31-40 pounds averaged higher in price per hundredweight than pigs in any of the other weight classes. Pigs in pens averaging 31 to

40 pounds sold for \$39.73 per hundredweight as compared with \$27.34 for pigs weighing 66 pounds or more with a difference of \$12.39 ($P < .01$). Differences among all other weight classes also were highly significant.

II. GRADE

The grade (USDA 1974) of a feeder pig is determined by evaluating its logical slaughter potential and its thriftiness. The logical slaughter potential of a thrifty feeder pig is its expected slaughter grade at a market weight of 220 pounds after a normal feeding period.

Waddell (1965) found that grade had a significant effect on the price producers received for feeder pigs. Although the difference in price between grade 1 and 2 pigs was not as marked as the difference between grade 2 and 3, the grade 1 pigs sold for an average of \$0.77 per hundredweight more than grade 2 and \$2.65 more than grade 3 pigs. The grade 2 pigs sold for an average of \$1.88 more than grade 3 pigs.

Donaldson (1970) and Jamison et al. (1970) reported the effect of grade on price received to be very similar to that reported by Waddell (1965).

An analysis of Sharp (1974) showed a highly significant effect of grade on price per hundredweight. Grade 1 and 2 pigs were combined and sold for \$9.73 more per hundredweight and \$4.16 per head more than grade 5 pigs, for \$5.71 per hundredweight and \$2.33 per head more than grade 4 pigs, and for \$1.72 more per hundredweight and \$0.85 more per head than grade 3 pigs. Similar results were found by McDaniel (1975).

CHAPTER III

EXPERIMENTAL PROCEDURE

I. SOURCE OF DATA

Records were available from the Cookeville, Tennessee, Feeder Pig Sale beginning with the first sale which was held in 1958. However, the data from sales held during the years 1970 through 1973 were selected for analysis in this study.

A total of 409,256 pigs varying in grade and weight and divided into 3,061 pens of varying size were analyzed to determine the effects of several variables on the price received per hundredweight and per head for feeder pigs in the Cookeville sale.

II. RULES AND REGULATIONS OF THE COOKEVILLE

FEEDER PIG SALE

The following regulations and procedures apply to all sales that are held:

1. Pigs must be farrowed and raised on the farm of the consignor.
2. Consignors must be certified annually by a County Extension Agent or feeder pig committee.
3. Each producer must obtain a Tennessee Feeder Pig Marketing card.
4. Pigs will not be accepted from anyone that buys or deals in feeder pigs.

5. Pigs must be healthy and from a healthy herd.
6. All breeds and crosses will be accepted.
7. Male pigs must be castrated and healed.
8. Pigs must arrive at the sale barn between 6:00 a.m. and 12:00 noon.
9. Pigs will be inspected at the receiving dock.
10. Pigs weighing 30-90 pounds will be graded.

III. INSPECTION

It is suggested by the Tennessee State Department of Agriculture and the Cookeville feeder pig sale that county feeder pig committees make an on farm inspection of all new consignors. All pigs are inspected at the auction by a sale committee or veterinarian. Pigs are checked for indications of disease and other conditions of abnormalities that the producer may have overlooked as he loaded his pigs for market. Pigs that show signs of disease or abnormalities are rejected.

IV. GRADE

The pigs at the Cookeville sale are farm and producer identified by numbered ear tags provided by the Tennessee Department of Agriculture. These ear tag numbers are recorded on a receiving ticket with the producer's name and address.

The pigs are sorted by size then graded into the various feeder pig grades as described in the USDA Marketing Bulletin No. 50 (1974).

1. Grade 1: Feeder pigs in this grade near the borderline of the U.S. No. 2 grade are long and have thick muscling throughout. Thickness of muscling is particularly evident in thick and full hams and shoulders. The hams and shoulders are thicker than the back, which is well rounded. They usually present a well-balanced appearance. In no case may a feeder pig be grade U.S. No. 1 with less than moderately thick muscling. Feeder pigs in this grade are expected to produce U.S. No. 1 grade carcasses when slaughtered at 220 pounds.

2. Grade 2: Feeder pigs in this grade near the borderline of the U.S. No. 3 grade are moderately long and have moderately thick muscling throughout. Thickness of muscling is particularly evident in moderately thick and full hams and shoulders. The back usually appears slightly full and well-rounded. They usually present a well-balanced appearance. This grade also includes feeder pigs which otherwise qualify for the U.S. No. 1 grade but have less than moderately thick muscling. Feeder pigs in this grade are expected to produce U.S. No. 2 grade carcasses when slaughtered at 220 pounds.

3. Grade 3: Feeder pigs in this grade near the borderline of the U.S. No. 4 grade are slightly short and have slightly thin muscling throughout. The hams and shoulders are slightly thin and flat and the back usually appears moderately full and thick. Feeder pigs in this grade are expected to produce U.S. No. 3 grade carcasses when slaughtered at 220 pounds.

4. Grade 4: Feeder pigs typical of the U.S. No. 4 grade are short and have thin muscling throughout. The hams are thin and rather flat, particularly in the lower parts toward the shanks. The back

usually appears slightly flat and the width at the topline usually is greater than at the underline. Feeder pigs in this grade are expected to produce U.S. No. 4 grade carcasses when slaughtered at 220 pounds.

5. Utility: Feeder pigs typical of this grade are small for their age and appear unthrifty. They often have a rough, unkempt appearance indicating the effects of disease or poor care. The hams and shoulders usually are thin and flat and taper toward the shanks. The back is thin and lacks fullness. Pigs in this grade near the borderline of the U.S. No. 1, U.S. No. 2, U.S. No. 3, and U.S. No. 4 grades are slightly small for their age and appear slightly unthrifty. It is recognized that U.S. Utility grade feeder pigs will produce U.S. No. 1, U.S. No. 2, U.S. No. 3, or U.S. No. 4 grade carcasses when slaughtered at 220 pounds provided their unthrifty condition is corrected. U.S. Utility grade feeder pigs whose unthrifty condition is not corrected will produce U.S. Utility grade carcasses.

V. WEIGHING OF PIGS

As the pigs are unloaded, they are graded and sorted by the grader into uniform lots according to size. Each lot is then weighed. The consignor receives a copy of the weight ticket which lists (1) total weight, (2) number of pigs, (3) grade of pigs, and (4) pen number of each group. After the consignor's pigs are graded and weighed, he will have several tickets which provide a complete record of his pigs.

VI. PENNING OF PIGS

As each lot of pigs comes off the scales, they are penned according to grade and weight. The carbon copy of the weight ticket is sent to the auction company office. The information is then recorded on the pen sheet which has a complete listing of the information concerning each consignor's pigs in that pen.

VII. SELLING OF PIGS

Pens of pigs are sold in order by grade and weight from highest grade and lowest weight to the lowest grade and highest weight. The price per hundredweight is recorded on the pen sheet along with the buyer's name and the sheet is returned to the sale office for necessary calculations and payment to consignors.

VIII. CLASSIFICATION OF DATA AND METHOD OF ANALYSIS

Since weights were not obtained on individual pigs because pigs were penned in groups of varying size (number), depending upon grade and average weight, it was not feasible to include these factors in the analyses. Thus, the pen was used as the experimental unit in the analyses of the data.

Pen summary sheets, which included grade, pen size, average weight, week, month, year, selling price per hundredweight and selling price per head were available for all of the pigs used in this study. The data were taken directly from these sheets, coded and punched into IBM cards.

Based on past experience and research findings, U.S. No. 1 and U.S. No. 2 were combined. Previous workers have found that pen size had a great effect on the prices received for feeder pigs. From observations made, price differences between U.S. No. 1 and U.S. No. 2 are extremely small.

The number of pigs sold in a particular pen (pen size) was determined by the grade and weight classification. The sale pens varied from 3 to as many as 350 head.

The fixed environmental effects of week within month and month within year existed. Estimates for these effects would be uninformative. Inferences concerning the effects would be purely conjunctive; therefore, these effects were absorbed.

Because of disproportionate subclass frequencies, least-squares methods, as described by Harvey (1960), were used in the analyses to obtain estimates of the effects of grade, and the continuous variable of average weight per pen and average pen size on the price received per hundredweight and price received per head for feeder pigs.

No attempt was made to separate the means for the effects of grade.

The assumed mathematical models considered appropriate for these analyses were:

$$Y_{ij} = a + b_1 X_{1ij} + b_2 X_{1ij}^2 + b_3 X_{1ij}^3 + b_4 X_{2ij} + b_5 X_{2ij}^2 + b_6 X_{2ij}^3 + e_{ij}$$

Y_{ij} = price per cwt. or average price per head received for
 j^{th} pen in i^{th} sale

$i = 1, 2, \dots, s$

$j = 1, 2, \dots, P_i$

P_i = number pens in i^{th} sale

s = number of sales

$$a = \bar{Y} \dots - b_1 \bar{X}_{1i} - b_2 \bar{X}_{1i}^2 - b_3 \bar{X}_{1i}^3 - b_4 \bar{X}_{2i} - b_5 \bar{X}_{2i}^2 - b_6 \bar{X}_{2i}^3.$$

X_{1ij} = average weight of pigs in j^{th} pen in i^{th} sale

X_{2ij} = number of pigs in j^{th} pen and i^{th} sale

b_1, b_2 and b_3 are coefficients of partial regression of Y on
 X_1, X_1^2 and X_1^3 , respectively;

b_4, b_5 and b_6 are coefficients of partial regression of Y
on X_2, X_2^2 and X_2^3

s_i = effect of i^{th} sale

e_{ij} = random error in Y_{ij}

Variance due to differences between sales automatically contains
variance due to differences between years, months and weeks during
which sales were held.

CHAPTER IV

RESULTS AND DISCUSSION

The arithmetic means and standard errors of traits studied are presented in Table 1.

The least squares constants of the environmental effects on prices received per hundredweight and prices received per head of feeder pigs and the corresponding analyses of variance are presented in Tables 2 and 3.

I. GRADE EFFECTS

Grade of pig had a highly significant effect on both dependent variables, price received for feeder pigs per hundredweight and price received per head, in both analyses.

Pigs grading U.S. No. 1 and No. 2 sold for an average of \$7.20 per head and \$11.74 per hundredweight more than pigs grading U.S. Utility, and \$3.84 per head and \$7.36 per hundredweight more than pigs grading U.S. No. 4. Pigs grading U.S. No. 1 and No. 2 sold for an average of \$0.65 more per head and \$1.86 more per hundredweight than pigs grading U.S. No. 3. These findings are in general agreement with those reported by Waddell (1965), Jamison et al. (1970), Donaldson (1970), Sharp (1974), and McDaniel (1975).

II. PEN SIZE EFFECTS

The regression of the average price received per hundredweight

TABLE 1

ARITHMETIC MEANS AND STANDARD ERRORS OF TRAITS EVALUATED

Variable	Number of Pens	Avg. Wt./ Pig/Pen	Avg. No. of Pigs/ Pen	Avg. Price Received Per Cwt.	Avg. Price Received Per Head
Overall	3061	50.14 $\pm$.25	133.70 $\pm$ 1.73	42.11 $\pm$.38	20.35 $\pm$.18
Year					
1970	238	49.07 $\pm$.88	155.26 $\pm$ 5.88	19.78 $\pm$.24	9.48 $\pm$.15
1971	1170	49.49 $\pm$.40	144.53 $\pm$ 2.80	26.30 $\pm$.21	12.62 $\pm$.11
1972	901	50.82 $\pm$.48	125.74 $\pm$ 3.23	47.93 $\pm$.42	23.30 $\pm$.17
1973	752	50.53 $\pm$.51	119.57 $\pm$ 3.42	66.80 $\pm$.69	32.30 $\pm$.30
Grade					
1 and 2	1178	53.72 $\pm$.47	150.80 $\pm$ 2.81	45.26 $\pm$.64	23.02 $\pm$.30
3	819	47.60 $\pm$.34	175.22 $\pm$ 2.91	46.00 $\pm$.74	21.57 $\pm$.35
4	602	47.16 $\pm$.55	126.37 $\pm$ 3.31	41.07 $\pm$.82	18.57 $\pm$.36
Utility	462	49.41 $\pm$.57	26.07 $\pm$ 1.40	28.52 $\pm$.67	13.71 $\pm$.32
Pen Size					
1-10	259	63.08 $\pm$.99	5.47 $\pm$.18	33.76 $\pm$.94	21.14 $\pm$.69
11-20	198	57.82 $\pm$ 1.20	16.17 $\pm$.82	33.93 $\pm$ 1.12	19.59 $\pm$.75
21-30	178	56.92 $\pm$ 1.19	26.20 $\pm$ 1.03	35.84 $\pm$ 1.26	20.50 $\pm$.86
31-40	138	55.73 $\pm$ 1.31	35.28 $\pm$.24	36.80 $\pm$ 1.50	20.53 $\pm$.89
41-50	104	55.67 $\pm$ 1.54	45.22 $\pm$.29	37.77 $\pm$ 1.83	20.92 $\pm$ 1.14
51-60	96	54.46 $\pm$ 1.51	55.88 $\pm$.44	34.53 $\pm$ 1.77	18.95 $\pm$ 1.12
61-70	77	57.74 $\pm$ 1.67	64.84 $\pm$.75	37.61 $\pm$ 1.78	21.53 $\pm$ 1.11
71-80	89	52.97 $\pm$ 1.47	76.72 $\pm$ 1.14	40.00 $\pm$ 1.90	20.38 $\pm$.93
81-90	88	51.47 $\pm$ 1.53	85.55 $\pm$.30	43.50 $\pm$ 2.26	21.50 $\pm$ 1.11
91-100	81	47.90 $\pm$ 1.54	96.30 $\pm$.33	40.68 $\pm$ 2.19	19.19 $\pm$ 1.11
101-110	83	45.13 $\pm$ 1.41	105.33 $\pm$.33	43.22 $\pm$ 2.33	18.61 $\pm$.95
111-120	65	48.69 $\pm$ 1.75	115.42 $\pm$.41	45.13 $\pm$ 2.56	21.19 $\pm$ 1.22
121-130	81	44.99 $\pm$ 1.33	126.25 $\pm$.30	55.58 $\pm$ 2.83	23.97 $\pm$ 1.16
131-140	78	46.49 $\pm$ 1.51	135.71 $\pm$.32	43.10 $\pm$ 2.60	19.23 $\pm$ 1.12
141-150	97	47.30 $\pm$ 1.15	146.01 $\pm$.43	45.24 $\pm$ 2.12	20.69 $\pm$.95
151-160	92	44.51 $\pm$ 1.04	155.83 $\pm$.31	47.81 $\pm$ 2.38	20.80 $\pm$ 1.02
161-170	104	44.76 $\pm$ 1.05	165.54 $\pm$.29	46.99 $\pm$ 2.32	20.40 $\pm$ 1.00
171-180	88	44.02 $\pm$.99	175.24 $\pm$.31	47.61 $\pm$ 2.68	20.22 $\pm$ 1.07
181-190	101	44.57 $\pm$.92	184.99 $\pm$.30	45.35 $\pm$ 2.49	19.80 $\pm$ 1.08
191-200	88	44.05 $\pm$.77	195.48 $\pm$.31	48.30 $\pm$ 2.48	21.04 $\pm$ 1.06
201-210	89	44.07 $\pm$.88	204.30 $\pm$.31	48.06 $\pm$ 2.57	20.93 $\pm$ 1.10
211-220	106	46.50 $\pm$.96	215.45 $\pm$.27	43.19 $\pm$ 2.19	19.10 $\pm$.81
221-230	88	44.91 $\pm$.89	226.07 $\pm$.27	43.28 $\pm$ 2.24	18.99 $\pm$.92
231-240	100	44.16 $\pm$.81	235.31 $\pm$.33	51.15 $\pm$ 2.07	21.72 $\pm$.75
241-250	66	43.91 $\pm$.90	245.20 $\pm$.35	46.49 $\pm$ 3.03	19.72 $\pm$ 1.12

TABLE 1 (continued)

Variable	Number of Pens	Avg. Wt./ Pig/Pen	Avg. No. of Pigs/ Pen	Avg. Price Received Per Cwt.	Avg. Price Received Per Head
251-260	69	45.07 $\pm$.87	254.91 $\pm$.33	45.64 $\pm$ 2.77	20.13 $\pm$ 1.16
261-270	76	26.26 $\pm$.84	266.67 $\pm$ 1.33	46.79 $\pm$ 3.01	20.44 $\pm$ 1.05
271-280	49	45.39 $\pm$ 1.18	275.84 $\pm$.37	46.19 $\pm$ 3.24	20.39 $\pm$ 1.35
281-290	48	45.44 $\pm$ 1.26	285.63 $\pm$.43	41.52 $\pm$ 2.97	18.03 $\pm$ 1.06
291-300	50	44.38 $\pm$.91	295.48 $\pm$.39	41.91 $\pm$ 2.77	18.26 $\pm$ 1.18
301-310	42	45.29 $\pm$ 1.15	305.71 $\pm$.43	44.07 $\pm$ 3.23	19.66 $\pm$ 1.38
311-320	26	45.50 $\pm$ 1.33	314.92 $\pm$.64	44.34 $\pm$ 3.78	19.98 $\pm$ 1.66
321-330	31	45.55 $\pm$ 1.30	325.29 $\pm$.55	44.70 $\pm$ 3.54	19.91 $\pm$ 1.45
331-340	21	45.05 $\pm$ 1.45	335.33 $\pm$.56	50.12 $\pm$ 4.98	21.97 $\pm$ 1.94
341-350	15	47.73 $\pm$ 1.53	346.27 $\pm$.84	48.48 $\pm$ 3.87	22.78 $\pm$ 1.74

TABLE 2
LEAST-SQUARES CONSTANTS OF PRICES RECEIVED

Variable	Avg. Price Received Per Cwt.	Avg. Price Received Per Head
Grade of pig		
U.S. Grade 1 and 2	5.19	2.92
U.S. Grade 3	3.53	2.27
U.S. Grade 4	-2.17	-0.92
U.S. Utility	-6.55	-4.28
Regression of Y on: Average wt./pen	-0.2453	0.8805
Regression of Y^2 on: Average wt./pen	-0.0075	-0.0112
Regression of Y^3 on: Average wt./pen	0.0001	0.0001
Regression of Y on: Average number of pigs/pen	0.1267	0.0370
Regression of Y^2 on: Average number of pigs/pen	-0.0005	-0.0002
Regression of Y^3 on: Average number of pigs/pen	0.0000	0.0000

TABLE 3
ANALYSIS OF VARIANCE OF PRICES RECEIVED

Source	Degrees of Freedom	Mean Squares	
		Avg. Price Received Per Cwt.	Avg. Price Received Per Head
Grade of pig	3	10713.050****	3627.037****
Regression of Y on: Average wt./pen		23,851	307.378****
Regression of Y ² on: Average wt./pen		67.855*	150.940****
Regression of Y ³ on: Average wt./pen		198.469**	110.786****
Regression of Y on: Average number of pigs/pen		4229.475****	361.335****
Regression of Y ² on: Average number of pigs/pen		1629.800****	232.129****
Regression of Y ³ on: Average number of pigs/pen		778.746****	160.329****
Residual	2914	29.600	4.117
R ²		.94	.96

*P < .05.

**P < .01.

****P < .0001.

on the average number of pigs per pen indicated that as pen size increased the price received per hundredweight increased \$0.13.

The cubic effect of average number of pigs per pen indicated that as pen size increased beyond an undetermined point that the price received for the larger pens decreased slightly. The inclusion of the quadratic effect of this variable did not indicate it was significant.

The inclusion of the linear, quadratic, and cubic effect of average number of pigs per pen, with all other sources of variation held constant, on the average price received per head was small but significant.

From these data one could conclude that buyers were willing to pay a premium for pen sizes that would accommodate a deck load. On the other hand if average number of pigs per pen exceeded that of a deck and not equal to two decks, the price paid would be somewhat less.

Donaldson (1970) reported that the capacity of a 14-foot double deck hog van for 55-pound pigs is approximately 120 head. Buyers were willing to pay more per hundredweight for a truck load than they were for partial loads of any size. When pigs were sold by the load, individuals desiring 120 head or twice that many were willing to pay a premium.

Other workers including McFall (1969), Jamison et al. (1970), and Sharp (1974) have indicated advantages for selling pigs in larger lots.

III. AVERAGE PEN--WEIGHT EFFECTS

Differences in average weight per pen was a highly significant source of variation in prices in both analyses. When the price received per hundredweight was regressed on average weight per pen, with all other sources of variation held constant, these data indicated that as average weight per pen increased the price per hundredweight decreased. This reflects the generally recognized buyers' willingness to pay more per hundredweight for lightweight pigs than for heavy pigs.

On the other hand, when the cubic effect of prices received was regressed on average weight per pen, these data indicated that the buyers were willing to pay more for heavier pigs when numbers accommodating multiple decks existed.

Waddell (1965), McFall (1969), Donaldson (1970), and McDaniel (1975) reported that as average weight per pen increased the price per hundredweight decreased.

One could conclude from the R^2 values obtained that a large source of environmental variation was removed. Ninety-four percent and 96 percent of variation was removed in the analyses where the dependent variable was average price received per hundredweight and average price received per head, respectively.

CHAPTER V

SUMMARY

Records from 3,061 pens (409,256 pigs) sold in the Cookeville Feeder Pig Sales from 1970 through 1973 were studied to determine the effects of grade, pen size, and average weight per pen on average price per hundredweight and price per head for feeder pigs.

Grade of pigs had a highly significant effect on price per hundredweight and price received per head in both analyses. Pigs grading U.S. No. 1 and No. 2 sold for an average of \$0.65 more per head and \$1.86 more per hundredweight than pigs grading U.S. No. 3; \$3.84 per head and \$7.36 per hundredweight more than U.S. No. 4 and \$7.20 per head and \$11.74 more per hundredweight than U.S. Utility.

There was a definite price advantage per hundredweight and per head for pigs selling in larger pens; however, as pen size increased beyond an undetermined point, the price received for larger pens decreased slightly. These data indicated that buyers were willing to pay a premium for pen sizes that would accommodate a deck load. If average number of pigs per pen exceeded that of a deck and not equal to two decks, the price paid would be somewhat less.

Differences in average weight per pen were a highly significant source of variation in price. When price received per hundredweight was regressed on average weight per pen, with all other sources of

variation held constant, these data indicated that as average weight per pen increased the price per hundredweight decreased.

When average price received per head was regressed on average weight per pen, with all other sources of variation held constant, these data indicated that the buyers were willing to pay more for heavier pigs when numbers accommodating multiple decks existed.

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VITA

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In September of 1964 he entered the University of Tennessee and received his B.S. degree in Animal Science in December of 1967.

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He is married to the former Kay Greer of Jamestown. They are the parents of three children, Gregg, Missy, and Christie.