ECONOMIC ASPECTS OF
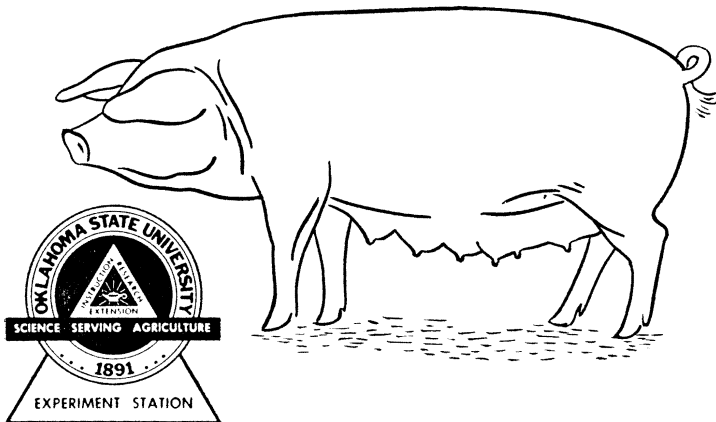
INTENSIVE

HOG PRODUCTION

SYSTEMS

IN OKLAHOMA

JAMES S. PLAXICO

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CONTENTS

Economic Aspects of Intensive Hog Production Systems in Oklahoma

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The production of hogs in confinement or under semi-confinement conditions is of considerable interest in Oklahoma at present. This interest has been stimulated by the desire for additional sources of farm income and the possibility of integration in the hog industry. This publication was prepared to provide a portion of the information being sought.[1]

It includes a summary of recent trends in production and prices of hogs and feed in Oklahoma; an economic analysis of the estimated costs and returns for several different hog-production systems; and a discussion of factors involved in the pricing of feeder pigs when these pigs are produced on one farm and fattened on another.

Trends in the Oklahoma Hog Industry

Hog Numbers

Over the period 1930-57, hog numbers in Oklahoma on January 1 ranged from a high of 1.5 million in 1933 to a low of 0.3 million in

[1] Other information on this subject is available in two Oklahoma Extension circulars: "Systems of Swine Production Adaptable to Oklahoma," E-669 and "Life Cycle: Feeding and Management of Swine Under Oklahoma Conditions, Using Oklahoma Feeds," E-670.

1954 (Figure 1). From 1930 to 1944, hog numbers fluctuated; but there was no apparent trend in numbers. Since 1944, there has been a decided trend downward. In the United States for the same period there have been year-to-year fluctuations, but no apparent upward or downward trend in hog numbers.

HOG NUMBERS ON FARMS
     JANUARY 1
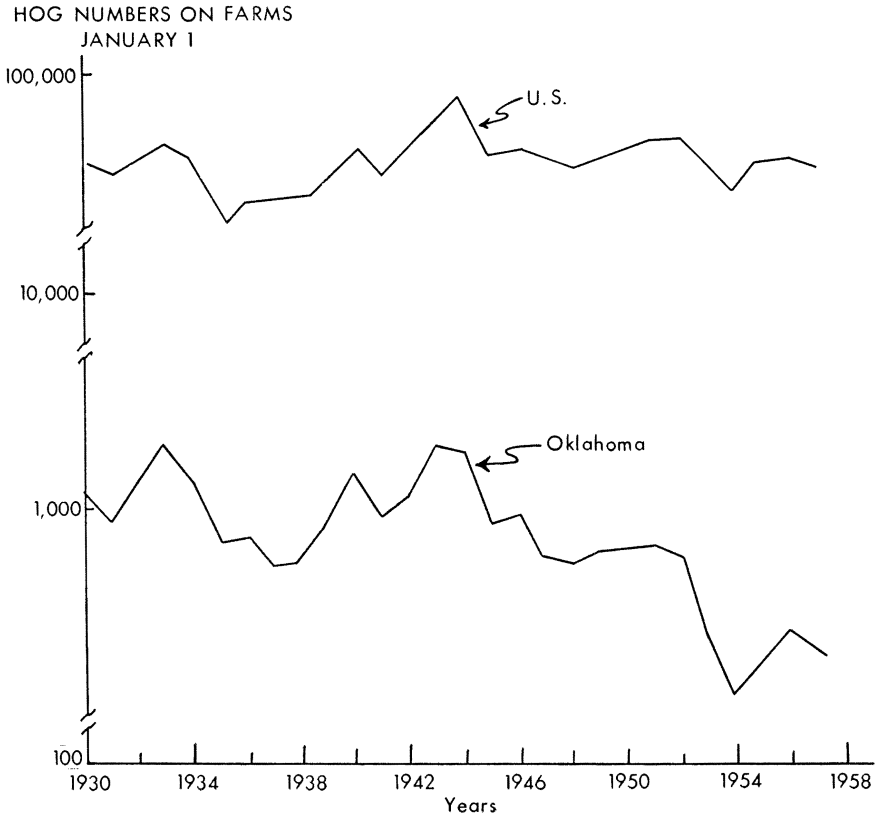
Figure 1.—Hog numbers in Oklahoma trended downward from 1943 through 1957, whereas nationally the number of hogs changed little. In this graph, plotted on a semi-log scale, the **slope** of the lines indicates the **rate** of change. SOURCE: Crop and Livestock Reporting Service, AMS, USDA.

Gross income from hogs as a percent of gross income from all livestock and livestock products in Oklahoma has declined along with the number of hogs (Table 1). In 1943, a near peak year in hog numbers, 25.1 percent of the gross income from livestock and livestock products in Oklahoma was derived from hogs. In 1955, this figure was

Table 1.—Hog Numbers in Oklahoma and the United States, Gross Income from Hogs in Oklahoma, and Percentage Which Income from Hogs was of Gross Income from Livestock and from Livestock and Crops in Oklahoma; 1930-1957.

Year	Number of Hogs (thousands)		Gross Income From hogs in Oklahoma (thousands of dollars)	Oklahoma's gross income from hogs as a percentage of gross income from ———	
	Oklahoma	United States		Livestock and Livestock Products	Both Crops and Livestock
1930	1,053	55,705	17,980	18.8	9.8
1931	927	54,835	11,547	18.1	9.1
1932	1,205	57,301	8,346	17.3	7.8
1933	1,506	62,127	10,269[1]	20.6	8.0
1934	1,180	58,621	8,974	16.0	6.9
1935	800	39,066	14,433	16.3	9.1
1936	824	42,975	21,201	22.4	14.3
1937	700	43,083	18,085	17.9	9.5
1938	730	44,525	16,121	17.5	9.8
1939	927	50,012	17,803	18.4	10.3
1940	1,225	61,165	15,944	15.9	8.4
1941	956	54,353	24,541	18.2	9.6
1942	1,099	60,607	44,105	22.0	12.4
1943	1,495	73,881	67,066	25.1	17.2
1944	1,435	83,741	43,050	20.4	11.0
1945	903	59,373	39,955	15.3	8.7
1946	962	61,306	51,187	18.2	10.0
1947	731	56,810	53,134	17.5	9.1
1948	716	54,590	55,761	16.2	8.2
1949	766	56,257	46,890	15.8	7.7
1950	766	53,937	49,428	14.5	8.8
1951	781	62,269	57,964	14.4	9.1
1952	726	62,117	46,242	12.3	6.9
1953	443	51,755	31,819	10.9	5.6
1954	306	45,114	29,203	10.0	5.4
1955	373	55,002	26,699[2]	9.2[2]	5.6[2]
1956	463	55,173	25,687[3]	8.3	4.9
1957	394[2]	51,702[2]	27,892[3]	9.5	6.2
1958	347	50,930	27,553[3]	8.6	4.3
1959	458	57,201	27,705	8.5	4.6

[1] Includes government purchases.

[2] Revised: Livestock Inventory Jan 1, 1958, Oklahoma Agri. 1957. Jan. 1, 1959.

[3] Revised: Meat Animals April 1958—(4C-5)
             Meat Animals April 1959—(4C-5)

SOURCE: U. S. Department of Agriculture.

only 9 percent. Nevertheless, hogs are still an important part of Oklahoma agriculture. In 1943, hogs accounted for 17.2 percent of the gross income from all crops and livestock in Oklahoma, and in 1954 they accounted for 5.4 percent. The 1954 figure was the low point of the 1930 to 1955 period.

Several reasons have been suggested for the decline in hog numbers in Oklahoma. The major factors cited are (1) a decline in feed grain production in the state, (2) a decline in the relative profitability of hogs as compared with alternative enterprises, and (3) a decline in cream production in the state and the consequent decline in the supply of skim milk for hog feeding. Each of these factors, and perhaps others, has been important on various farms and ranches in the state.

Feed Grain Production in Oklahoma

The decline in hog numbers in Oklahoma has been closely associated with a decline in feed grain production.

Feed grain production in Oklahoma fluctuated widely during the period 1930-56 (Figure 2). These extreme fluctuations may be attributed to (1) weather conditions, (2) acreage allotment programs, and (3) variations in the relative profitability of alternative farm enterprises. The high production for the period was 51.8 million cwt., in 1932. The low was in 1952 with 10.7 million cwt. The decline in feed grain production in the mid-30's is largely attributable to drought conditions in the state, abetted by acreage allotment programs. The exceptionally low production in 1952, 1953, and 1954 was due primarily to drought.

Corn has been the most important feed grain, from the quantity produced standpoint, in the state each year in the 1930-56 period with the exception of 1953-57, when sorghum grains or oats achieved this position. Throughout the period barley and rye have been of relatively minor importance. Production of sorghum grains and oats was about equal until the last few years. Now sorghum grain production greatly exceeds that of oats.

The Milo-Hog and Corn-Hog Ratios

Feed constitutes by far the largest single item in the cost of producing hogs. Therefore, the relative price of hogs and feed grains is
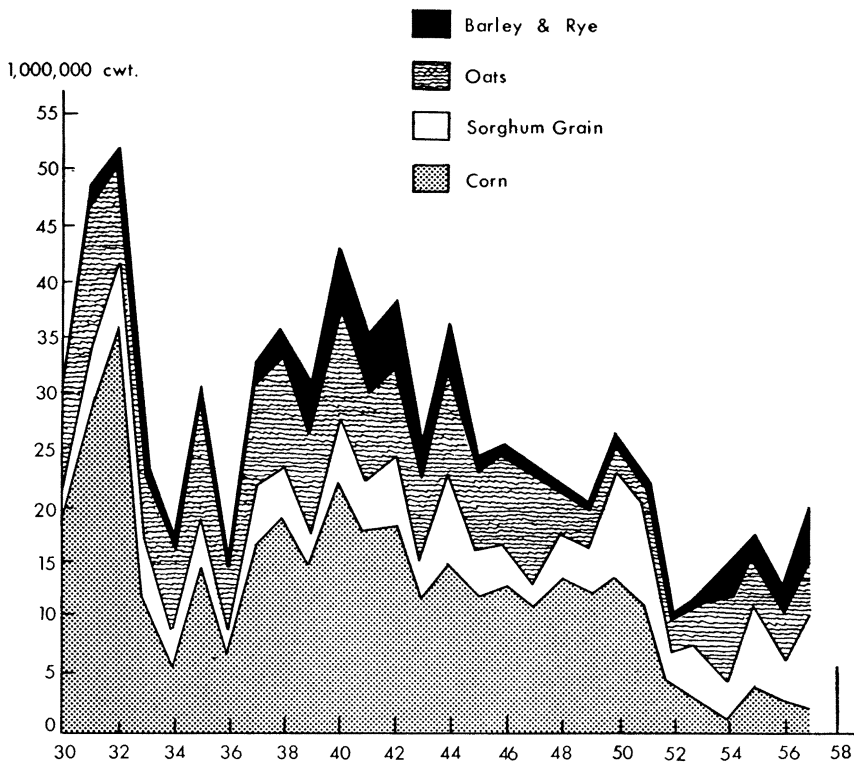
Figure 2.—Feed grain production in Oklahoma has varied widely from year to year, but seems to be trending downward.

a measure of the relative profitability of hog production over a given time period.

The corn-hog ratio (the number of bushels of corn equal in value to 100 pounds of hogs has fluctuated greatly in Oklahoma during the period 1930-1956; but, on the average, it has trended upward at the rate of 0.14 units per year (Figure 3). Thus, in Oklahoma, hogs appear to have offered an increasingly profitable market for corn. The same has been true of the corn-hog ratio in the U.S. (Figure 4). The rate of change in the U.S. has been much less than in Oklahoma, although the ratio in the U.S. has been persistently higher.

Extreme fluctuations of the corn-hog ratio are of considerable importance to hog producers. For example, a 100-pound hog would buy only 5½ bushels of corn in 1934 as compared to a high of 15 bushels in 1949.

Figure 3.—The corn-hog ratio in Oklahoma has trended upward over the period 1930 through 1956.
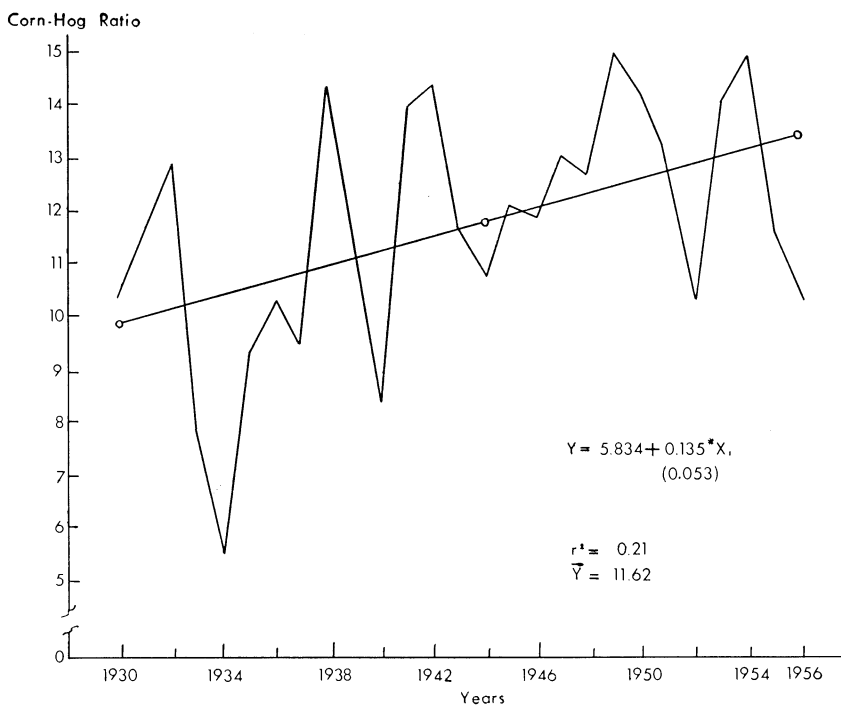
The milo-hog ratio (the number of hundred weights of milo equal in value to 100 pounds of hogs) has trended upward in Oklahoma at a rate similar to that for the corn-hog ratio (Figure 5). It also has shown rather violent fluctuations between years. The pattern of fluctuation, as would be expected, is similar to that of the corn-hog ratio.

The fact that the corn-hog and the milo-hog ratios have trended upward over time may be evidence that farmers and ranchers have found a more profitable or less risky market for feed grains than that provided by hogs. They apparently have been increasingly unwilling to commit feed grains to hog production, despite the fact that there has been a progressive downward trend in the pounds of feed required to produce 100 pounds of hogs. It is likely that the various price support programs, and the resulting stable feed grain market, have in part created this situation. In addition, over the period analyzed, costs other than feed have increased faster than feed cost. Thus a greater margin above feed cost is now required to cover labor, buildings, and other items than was formerly the case.

Corn-Hog Ratio

$$\hat{Y} = 9.03 + 0.083X_1$$

(0.050) b value significant

at the 0.2% level

$$r^2 = 0.10$$

$$\bar{Y} = 12.61$$

Years
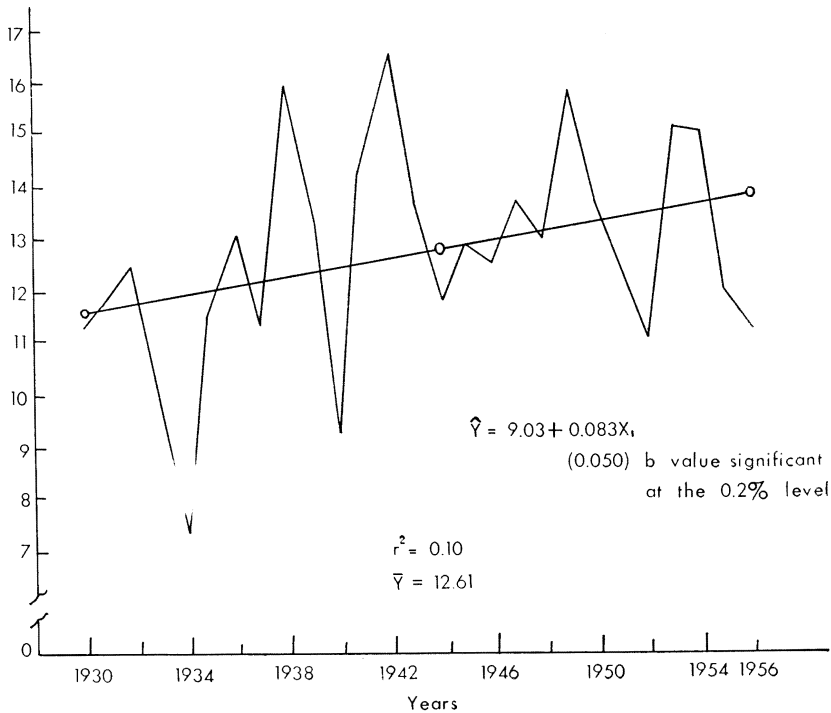
Figure 4.—The corn-hog ratio for the United States has fluctuated widely over the period 1930 through 1956, and has trended upward.

Seasonal Movement of Hog and Milo Prices

The seasonal movement of **hog prices** over the period 1930-56 has shown considerable regularity and predictability,[2] but there have been important changes in the pattern (Figure 6). The major changes are: (1) a reduction in the range of seasonal fluctuation, most of which occurred prior to 1947; and (2) a progressive shift in the peak price month from September to June, with most of the shift taking place during recent years.

The seasonal movement of **milo prices** has changed significantly (Figure 7). The range of price fluctuation now is much less than in earlier years, and the seasonal low presently comes in October where-

<hr>

[2] Monthly price differences are significant at the 5 percent probability level as revealed by analysis of variance. The change in the yearly price pattern is also statistically significant. See Appendix Table 1, Page 27.

Milo-Hog Ratio

$$\hat{y} = 5.3 + 0.139 X_i^{\bullet} \quad (0.038)$$

$$r^2 = 0.35$$

$$\bar{y} = 7.24$$
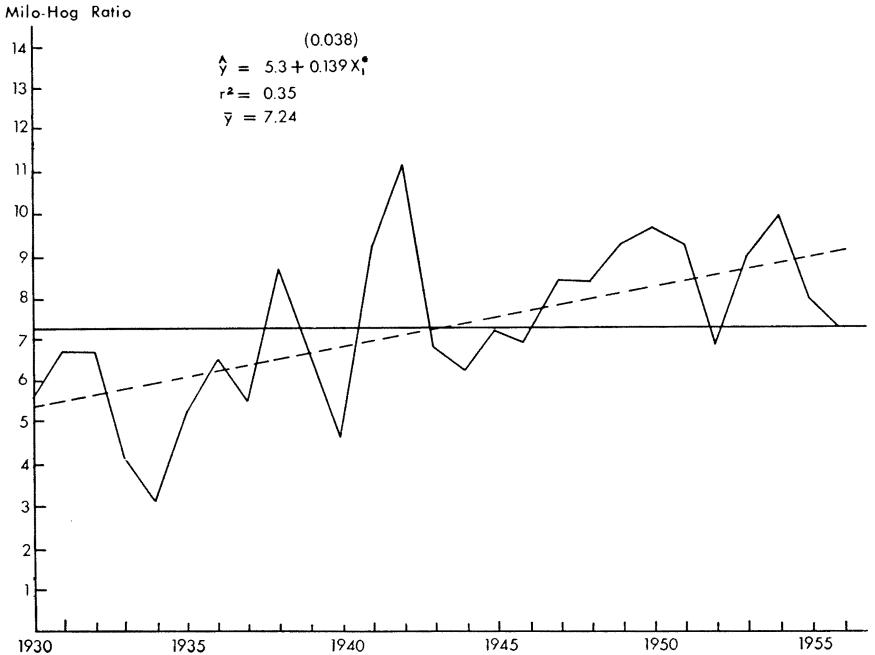
Figure 5.—The milo-hog ratio in Oklahoma has trended upward during the period 1930 through 1956.

as in earlier years it occurred in November. Despite the fact that the seasonal movement of milo prices is currently much less than in former years, the difference in the monthly prices over the 1930-57 period is statistically significant.

Adapting the Budgets to Specific Conditions

The following pages present estimates of the requirements, costs, and income expectations of six different systems of hog production having possible application in Oklahoma. These systems are further described in Oklahoma Extension Circular E-669, "Systems of Swine Production Adaptable to Oklahoma." The six systems budgeted herein are:

(1) Feeder pig production, with sows farrowing once each year. (System I, Plans A and B, in E-669.)
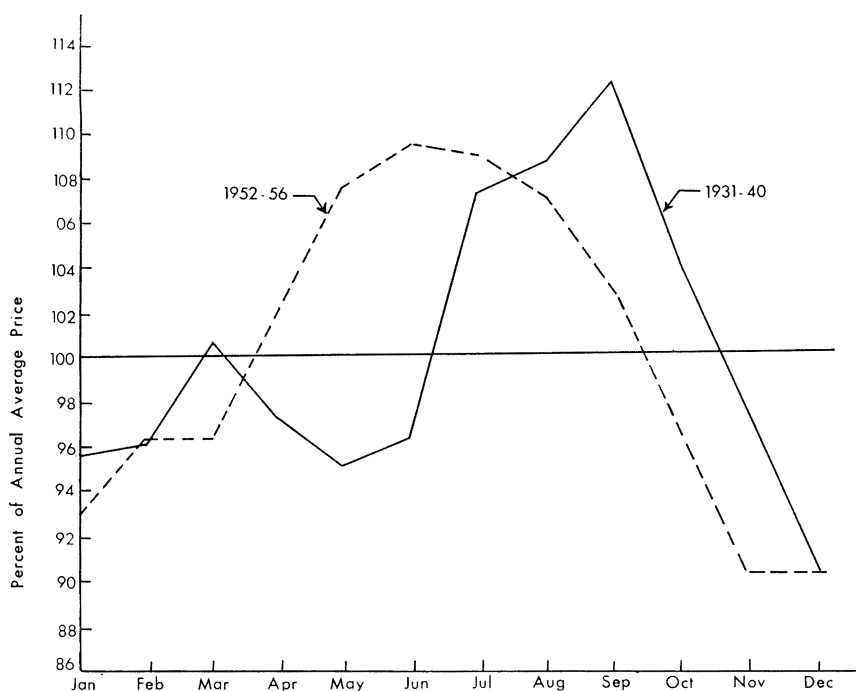
Figure 6.—The seasonal price peak for hogs now comes earlier in the year and is somewhat less pronounced than was the case in earlier years.

(2) Feeder pig production, with sows farrowing twice each year. (System I, Plan C, in E-669.)

(3) Pig feeding, with three lots handled per year. (System II, Plan A, in E-669.)

(4) Pig production and feeding, with sows farrowing once each year. (System III, Plan A, in E-669, but only one litter per year.)

(5) Pig production and feeding, with sows farrowing twice each year. System III, Plan A, in E-669.)

(6) A 24-sow, multiple-farrowing and feeding plan. System IV, Plan A, in E-669.)

The size of units budgeted for each system is based on the capacity of house and equipment plans in the OSU Plan Series. Obviously, two or more units could be combined to achieve different levels of production.
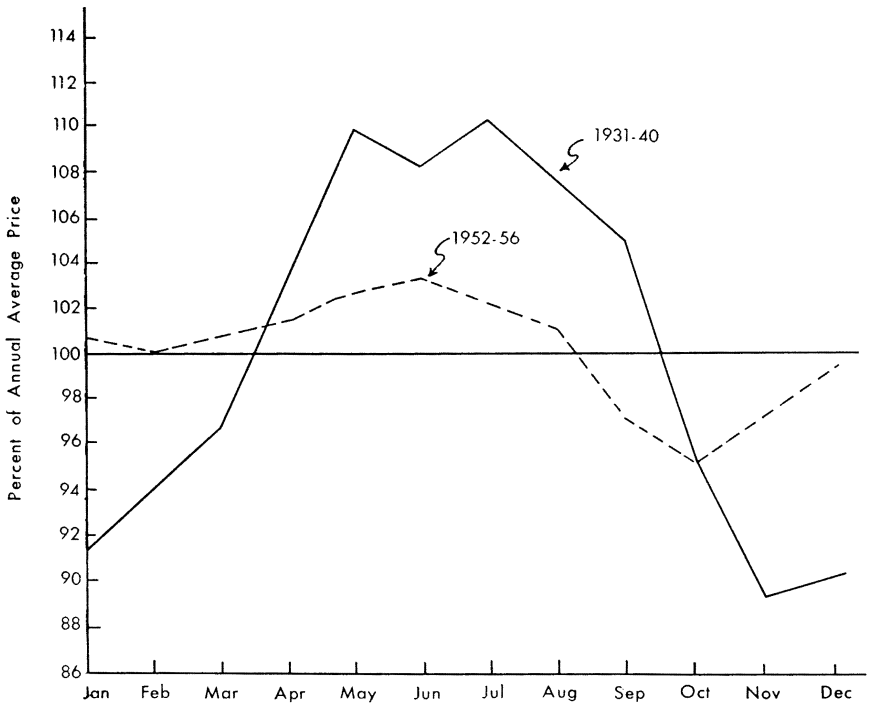
Figure 7.—The amplitude of fluctuation in milo prices is now much less than during earlier periods. The month of lowest prices also comes earlier now.

Adapting the Budgets To Specific Conditions

The budgets shown herein for various systems of hog production obviously cannot be applied to all of the varieties of conditions existing on different farms. Adjustments must be made to specific, individual situations. The basic data used in preparing the budgets, and described in the following paragraphs, will be helpful in making these adjustments. Additional information useful in adjusting these budgets to specific situations will be found in the two publications listed in the footnote on Page 3.

Basic Data Used in the Budgets

Feed requirements, pigs per litter, rates of gain, and time required to reach different weights are based on estimates made by animal husbandry specialists. These estimates reflect both experimental results and farmer experiences. Investment figures for the various housing units are based on estimates from agricultural engineering specialists. The capital costs of feeders, waterers, and other equipment are based on current cost quotations.

The hog price information used in the various budgets is based principally on average prices during the five-year period 1952-56.

The price used for feeder pigs is an arbitrary one, since no Oklahoma quotations are available for feeder pigs weighing 50 pounds or less. Some of the factors involved in pricing feeder pigs are discussed on Pages 24 to 26.

Investment in equipment used in connection with several enterprises, such as the farm truck, is not included in the budgets.

Labor is charged at $1 per hour.

Labor requirements are based on a survey of hog producers in Oklahoma. For production of feeder pigs, the labor requirement is estimated to be 20 hours per sow farrowing once, and 30 hours per sow farrowing twice. For growing pigs from feeder weight to market, labor requirements are estimated at 2.0 hours per pig (See Figure 8). These labor estimates probably are conservative, since the type of buildings and equipment budgeted would permit an appreciable saving in labor as compared to the buildings and equipment used by the producers surveyed.

Estimated Budgets

Production of Feeder Pigs
(System I, Plans A and B)

Two plans of producing feeder pigs are budgeted in Tables 2 and 3. The first involves a six-sow unit farrowing once a year, and the second a six-sow unit farrowing twice each year.

The one-litter plan might be suitable for producers who want to avoid competition with other enterprises for labor. It might also be

Hours per 100 Pigs
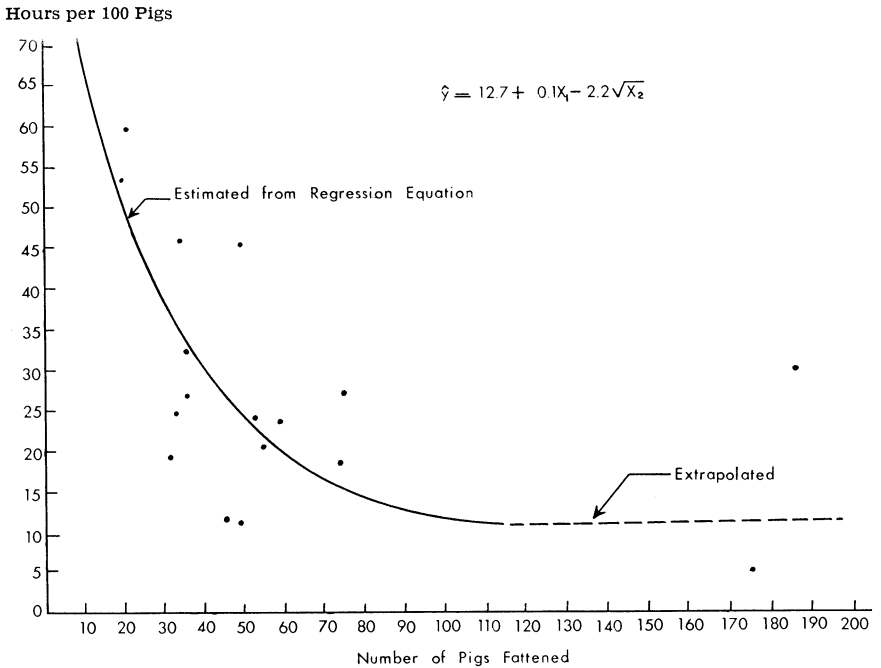
Figure 8.—Labor requirements per pig fed decline as the size of the unit increases.

Estimated Production Requirements, Costs, and Returns;
considered by a person who does not have housing suitable for farrowing in cold weather. However, the buildings budgeted in the capital requirement section are suitable for year-around farrowing.

The capital investment in buildings and equipment used directly in hog production for the two systems is estimated to be $774, or almost $130 per sow. Additional facilities such as lots and sheds would be required for dry sows; but it is assumed that such facilities are available on typical Oklahoma farms and ranches.

Under these two systems of pig production it is assumed that a boar will be purchased each year and sold at market prices. Obviously the boar cost would be reduced if the boar were sold to another breeder at higher than market price. It is also assumed that the producer would buy sows each year. In some cases a producer might raise his own sows. Nevertheless, in order to determine the income to be expected from the pig production enterprise, home raised sows are charged at market rates.

These estimates show that, **under the assumptions made,** the once

Production of Feeder Pigs (System I, Plans A and B)
Table 2.—Estimated Capital Investment and Annual Production Requirements and Returns; Six Sows Farrowing Once Each Year.*

	Unit	Quantity	Price per unit	Value
CAPITAL				
House (OSU Plan No. H5904)	each	1	$700	$700
Feeders				32
Waterers		4		30
Heat bulbs	each	5	3	12
Sows	each	7	42	294
Boars	each	1	100	100
				$1,168
ANNUAL INPUTS, PRODUCTION, AND NET RETURN				
Inputs				
Boar	each	1	$100.00	$100.00
Sows (210 lb.)	each	7	50.00	350.00
Milo	cwt.	100	2.29	229.00
Supplement	cwt.	25	6.00	150.00
Creep feed for pigs	cwt.	14.4	4.50	64.80
Labor	hours	120	1.00	120.00
Building and equipment				151.00
Veterinarian and medicine				50.00
				$1,214.80

	no.	avg.	cwt.		
Production		wt.			
Feeder pigs	48	50	24.0	$27.00	$643.00
Sows	6	350	21.0	15.20	319.20
	1	280	2.8	16.22	45.42
	1	300	3.0	10.53	31.74
			50.8		$1,044.16
Returns above specified costs					$—170.44

* The following assumptions apply to the estimates in this table and in Tables 3 through 7:

(1) Capital requirements do not include (a) equipment ordinarily used by several enterprises, such as trucks, etc., nor (b) lots, sheds, etc., for dry sows, which are assumed to be already available on most Oklahoma farm and ranches.

(2) One sow in seven assumed not to breed.

(3) Daily feed requirement for sows that farrow is based on: 5 lbs. until bred; 6 lbs. during gestation; 12 lbs. during lactation, and 10 lbs. during conditioning. Less feed is required by non-breeders. 20 percent of ration is supplement.

(4) Creep feed for pigs assumed to be 30 lbs. per pig.

(5) Feed for fattening pigs from 50 to 210 lbs. assumed to be 300 lbs. grain and 50 lbs. supplement per cwt. gain.

(6) Inputs include: (a) Depreciation based on 10 years for the house and 5 years for equipment; (b) interest and taxes; (c) estimated repairs; and (d) estimated electricity requirements.

(7) Labor requirements: 30 hours per sow farrowing twice; 20 hours per sow farrowing once; 2 hours per pig from weaning to market.

Production of Feeder Pigs (System I, Plan C)
Table 3.—Estimated Capital Investment and Annual Production Requirements and Returns, Six Sows Farrowing Twice Each Year, Sell April and October*

	Unit	Quantity	Price per unit	Value
CAPITAL				
House (OSU Plan No. H5904)	each	1	$700	$700
Feeders				32
Waterers				30
Heat bulbs	each	4	3	32
Sows	each	7	42	294
Boars	each	1	100	100
				$1,168

ANNUAL INPUTS, PRODUCTION, AND NET RETURN				
Inputs				
Boar	each	1	$100.00	$100.00
Sows	each	7	50.00	350.00
Milo	cwt.	211	2.29	483.19
Supplement	cwt.	53	6.00	318.00
Pig creep feed	cwt.	28.8	4.50	129.60
Labor	hours	180	1.00	180.00
Buildings and equipment	dollars	---	------	165.00
Veterinarian and medicine				90.00
				$1,815.79

	no.	avg. wt.	cwt.		
Production					
Feeder pigs	96	50	48	27.00	1,296.00
Sows	6	450	27.0	14.27	385.29
	1	280	2.8	15.70	43.96
Boar	1	400	4.0	10.49	41.96
			81.8		$1,767.21
Returns above specified costs					$— 48.58

* For assumptions, see footnote on Table 2.

a year farrowing system results in a loss of $170 per year compared to a net loss in the twice a year system of $48 per year. Thus, with prices, etc., as shown in the tables, these systems of production more than cover out-of-pocket cost for feed, sow and boar depreciation, etc., but fail to pay market rates for labor or building and equipment costs.

Finishing Feeder Pigs (System II, Plan A)

Table 4 presents a budget for finishing feeder pigs from 50 pounds

Finishing Feeder Pigs (System II, Plan A)
Table 4.—Estimated Capital Investment and Annual Production Requirements and Returns, Three Lots of 70 Pigs Fed from 50 Pounds to 210 Pounds*

	Unit	Quantity	Price per unit	Value
CAPITAL				
Fattening shed				
(OSU Plan No. H5301)	each	1	$1,600	$1,600
Waterers	each	2	10	20
Feeders	each	1	110	110
				$1,730
ANNUAL INPUTS, PRODUCTION, AND NET RETURN				
Inputs				
Feeder pigs (50 lbs.)	50 lbs.	210	$13.50	$2,835.00
Milo	cwt.	1008	2.29	2,308.32
Supplement	cwt.	168	6.00	1,008.00
Veterinarian and medicine	dollars			105.00
Labor	hours	42.0	1.00	483.00
Housing and equipment	dollars			275.00
				$6,951.32
	no.	avg.	cwt.	
Production		wt.		
	206**	210	432.6	19.72	8,530.87
Returns above				
specified costs				$1,579.55

*For assumptions, see footnote on Table 2.
**Assumes that one per lot dies.

to market, with pigs kept in confinement. It is based on handling three lots of 70 pigs each during a year.

The estimated investment in facilities for a fattening operation of this size is $1,730. In addition, of course, capital would be required to purchase the feeder pigs and the feed. Under the assumptions made, the expected returns from feeding 210 pigs per year is $1,579 or about $7.50 per pig started.

Pig Production and Feeding (Farrow-Feed)

Farrowing Once or Twice a Year (System III, Plan A)

Tables 5 and 6 present estimated requirements and returns from two farrow-feed systems utilizing a multi-use building. In this system, the sows farrow in crates placed in the houses. After weaning, the sows

Pig Production and Feeding (System III—Farrow Once)
Table 5.—Estimated Capital Investment and Annual Production Requirements and Returns, Eight Sows Farrowing Once Each Year with Pigs Fattened (Farrow in January, Market in July)*

	Unit	Quantity	Price per unit	Value
CAPITAL				
House (OSU Plan H5801)	each	1	$1,600	$1,600
Farrowing crates	each	8	25	200
Waterers: Sows and fattening				
pigs	each	2	10	20
Pigs	each	2	5	10
Feeders: Sows	each	2	11	22
Pigs	each	2	5	10
Fattening pigs	each	1	110	110
Heat bulbs	each	4	3	12
Sows	each	9	42	378
Boar	each	1	100	100
				$2,462

ANNUAL INPUTS, PRODUCTION, AND NET RETURN				
Inputs				
Boar	each	1	$100.00	$100.00
Milo: Sows and boars	cwt.	131	2.29	299.99
Fattening pigs	cwt.	307.2	2.29	703.49
Supplement: Sows, boars, pigs	cwt.	33	6.00	198.00
Fattening pigs	cwt.	51.2	6.00	307.20
Pigs creep feed	cwt.	19.2	4.50	86.40
Labor: Sows, boars, pigs	hours	150	1.00	150.00
Fattening hogs	hours	128	1.00	129.00
Veterinarian and medicine	dollars			66.00
Housing and equipment costs	dollars			320.00
				$2,359.08

	no.	avg. wt.	cwt.		
Production**					
Slaughter hogs†	54	210	113.4	$21.44	$2,431.30
Sows after farrow-					
ing	8	350	28.0	15.20	425.60
Non breeds	1	280	2.8	16.22	45.42
Boars	1	300	3.0	10.58	31.74
			147.2		$2,934.06
Returns above specified costs					$ 574.98

* For assumptions, see footnote on Table 2.
**56 pigs saved, 9 held for breeding, one lost during feeding.
† Market dates: slaughter hogs — June 15   1 sow — September 15
                8 sows — March 1   1 boar — September 15

Pig Production and Feeding (System III, Plan A—Farrow Twice)
Table 6.—Estimated Capital Investment and Annual Production Requirements and Returns, Eight Sows, Farrowing Twice Each Year and Fatten Pigs (Farrow and Market in February and August)*

	Unit	Quantity	Price per unit	Value
CAPITAL				
House (OSU Plan No. H5801)	each	1	$1,600	$1,600
Farrowing crates	each	8	25	200
Waterers: Sows and fattening pigs	each	2	10	20
Pigs	each	2	5	10
Feeders: Sows	each	2	11	22
Pigs	each	2	5	10
Fattening Pigs	each	1	110	110
Heat bulbs	each	4	3	12
Sows	each	9	42	378
Boar	each	1	100	100
				$2,462
ANNUAL INPUTS, PRODUCTION, AND NET RETURN				
Inputs				
Boar	each	1	$100.00	$100.00
Milo: Sows, boar	cwt.	274	2.29	627.46
Fattening pigs	cwt.	614.4	2.29	1,406.98
Supplement: Sow, boar	cwt.	69	6.00	414.00
Fattening pigs	cwt.	102.4	6.00	614.40
Pig creep feed	cwt.	38.4	4.50	172.80
Labor: Sows, boars, and pigs	hours	240	1.00	240.00
Fattening Pigs	hours	256	1.00	256.00
Veterinarian and medicine	dollars			130.00
Housing and equipment cost	dollars			359.00
				$4,320.64

	no.	avg. wt.	cwt.	
Production**				
Fat hogs† (mkt. in Feb.)	63	210	132.3	$18.99	$2,412.38
(mkt. in Aug.)	54	210	113.4	21.10	2,392.74
Sows: (after 2 litters mkt. Nov.)	8	450	36.0	14.23	512.28
(non-breeders)	2	280	5.6	15.70	87.92
Boar (June)	1	400	4.0	11.25	45.00
			291.3		$5,450.32
Returns above specified costs					$1,129.68

* For assumptions, see footnote on Table 2.
** 1st set of litter
    64 pigs saved, 1 lost during feeding
  2nd set of litter
    64 pigs saved, 9 held for breeding, 1 lost during feeding
† Marketing date: Slaughter hogs — February and August; Sows after farrowing — December; Non-breeders—September; Boar—April.

Pig Production and Feeding (System IV, Plan A)
Table 7.—Estimated Capital Investment and Annual Production Requirements and Returns 24 Sows Farrowing Twice Each Year Using a Farrowing House and Two Finishing Sheds (Farrow Each Set of 12 Sows Twice a Year, January-August and April-October)*

	Unit	Quantity	Price per unit	Value
CAPITAL				
Farrowing house	each	1	$1,400	$1,400
Fattening pen (OSU Plan No. H5801)	each	1	3,200	3,200
Waterers: Sows	each	4	10	40
Pigs	each	4	5	20
Fattening pigs	each	4	10	40
Feeders: Sows	each	4	11	44
Pigs	each	4	5	20
Fattening pigs	each	2	110	220
Heat bulbs	each	8	3	24
Sows	each	28	42	1,176
Boar	each	2	100	200
				$6,384
ANNUAL INPUTS, PRODUCTION, AND NET RETURN				
Inputs				
Boar	each	2	$100.00	$200.00
Milo: Sows and boars	cwt.	800	2.29	1,832.00
Fattening pigs	cwt.	1843.2	2.29	4,229.93
Supplement: Sows, boars, pigs	cwt.	199	6.00	1,194.00
Fattening pigs	cwt.	307.2	6.00	1,843.20
Pig creep feed	cwt.	115.2	4.50	518.40
Labor: Sow, boars and pigs	hours	720	1.00	720.00
Fattening pigs	hours	768	1.00	768.00
Veterinarian and medicine	dollars			520.00
Housing and equipment	dollars			895.00
				$12,711.53

	no.	avg. wt.	cwt.		
Production**					
Fat hogs†					
Market in January	94	210	197.4	$18.34	$3,620.32
Market in April	94	210	197.4	20.01	3,949.97
Market in August	81	210	163.1	21.10	3,589.11
Market in October	81	210	163.1	19.05	3,240.40
Sows after 2 litters	24	450	108.0	14.27	1,541.16
Non-breeders	8	230	22.4	15.70	351.68
Boars	2	400	8.0	10.49	83.92
			869.2		$16,292.25
Returns above specified costs					$ 3,580.72

* For assumptions, see footnote on Table 2.
**384 pigs saved, 30 saved for replacement, 6 lost during feeding.
† Marketing dates: Slaughter hogs—January, April, August and October; Sows—December and September; Boar—April.

and crates are removed and the same unit used for fattening the pigs. The total building and equipment investment of such a facility is estimated to be $1,984 for 8 sows or approximately $248 per sow.

The one-litter-per-year system for 8 sows would result in the production of approximately 147 cwts. of pork and would suggest a net return, under the assumptions made, of about $575. The two-litter system would involve the same investment but would result in the production of 291 cwts. of pork and suggest an expected return, under the conditions assumed, of $1,130 or about $140 per sow.

Multiple Farrowing (System IV, Plan A)

Table 7 presents estimates for a 24-sow unit on a multiple farrowing plan involving a farrowing house and 2 feeding pens. The total building and equipment investment for such a facility is estimated to be $5,008, or slightly more than $208 per sow. Under the price and other conditions assumed, the expected return from such a unit would be $3,581 or about $150 per sow.

Break-Even Estimates

As the preceding budgets show, feed is the major cost in producing pork. The extreme variation in the relative prices of feed and pork make it desirable to examine expected returns and costs under alternative price assumptions. This can be done by determining the break-even values for alternative feed and hog prices.[3] Such estimates are presented in Tables 8 and 9.

In Table 8, the costs used include the overhead costs of building, equipment and labor, as well as out-of-pocket costs. In Table 9, the costs include only the out-of-pocket items.

In both tables, the break-even point is figured from two standpoints: (1) that of the producer of 50-pound feeder pigs; and (2) that of the pig feeder who buys animals weighing about 50 pounds and finishes them for market. Basically, the break-even price for the pig

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[3] It might also be done by applying different feed and pork prices to the basic input-output data in Tables 2 through 7. Or it might be done by applying different input-output assumptions (such as feed requirements per pound gained, and pigs per litter) in order to test the implications of variations in these relationships on expected earning.

Break-even Prices; Overhead Included in Costs
Table 8.—Estimated Break-even Prices for 50-Pound Feeder Pigs, from the Standpoint of the Pig Producer and from the Standpoint of the Feeder, for Selected Prices of Slaughter Hogs and Milo.**

(All figures are dollars)

When price of milo per cwt. is ____	And price of slaughter hogs per cwt. is:					
	10.00	14.00	18.00	22.00	26.00	30.00
	"Break-even" Price for Pig Producer					
1.50	12.63	12.11	11.59	11.08	10.56	10.05
2.00	13.88	13.36	12.85	12.33	11.82	11.30
2.50	15.13	14.62	14.10	13.59	13.07	12.55
3.00	16.39	15.87	15.36	14.84	14.33	13.81
3.50	17.65	17.13	16.61	16.10	15.58	15.07
	"Break-even" Price for Feeder					
1.50	4.49	12.73	20.97	29.21	37.45	45.69
2.00	2.09	10.33	18.57	26.81	35.05	43.29
2.50	— .31	7.93	16.17	24.41	32.65	40.89
3.00	—2.71	5.53	13.77	22.01	30.25	38.49
3.50	—5.11	3.13	11.37	19.61	27.85	36.09

* Cost includes estimates for feed, labor, buildings and equipment. The price for replacement sows is assumed to be 110 percent of the fat hog price, and the cull sow price is assumed to be 80 percent of the fat hog price. Supplement prices are assumed to be $6.00 per cwt. and the creep mix is assumed to be $4.50 per cwt. Each $1.00 per cwt. change in the price of supplement will change the cost of producing a 50-pound pig by 63 cents per pig, and each $1.00 per cwt. change in the price of creep mix will change the cost of pig production by 30 cents per pig. In similar fashion a $1.00 increase in the price of supplement will reduce the break-even price from the standpoint of the feeder by 88 cents per pig. Each one pig change in litter size (pigs weaned) changes the cost of producing pigs by $1.35 per pig.

Break-even Prices: Overhead NOT Included in Costs

Table 9.—Estimated Break-even Price Above Labor and Fixed Costs for 50-Pound Feeder Pig from the Standpoint of the Pig Producer and from the Standpoint of the Feeder, for Selected Slaughter Hog and Milo Prices*

(All figures are dollars)

When price of milo per cwt. is ____	And price of slaughter hogs per cwt. is:					
	10.00	14.00	18.00	22.00	26.00	30.00
	"Break-even" Price for Pig Producer per 50 Pound Pig					
1.50	8.51	8.00	7.48	6.97	6.45	5.93
2.00	9.77	9.25	8.74	8.22	7.71	7.19
2.50	11.03	10.51	9.99	9.48	8.96	8.45
3.00	12.28	11.76	11.25	10.73	10.22	9.70
3.50	13.53	13.02	12.50	11.99	11.47	10.95
	"Break-even" Price for 50 Pound Pig for Feeder					
1.50	8.10	16.34	24.58	32.82	41.06	49.30
2.00	5.70	13.94	22.18	30.42	38.66	46.90
2.50	3.30	11.54	19.78	28.02	36.26	44.50
3.00	.90	9.14	17.38	25.62	33.86	42.10
3.50	—1.50	6.74	14.98	23.22	31.46	39.70

* Assumptions same as shown in footnote on Table 8 *except* costs do NOT include charges for labor or buildings and equipment.

producer is the cost of producing a 50-pound pig. For the feeder, it is total receipts per pig started minus total costs per pig other than the cost of the feeder pig. Specifically, in Tables 8 and 9 the estimates from the standpoint of the pig producer are based on Table 3, and those from the standpoint of the pig feeder are based on Table 4.

It can be noted in both tables that, from the standpoint of the pig producer, that break-even price declines as the price of market hogs increases. This is because of the increased salvage value of the cull sows.

Including Overhead Costs

Table 8 shows estimated break-even points when the overhead costs of building, equipment and labor are included. As an example of how this table can be used, assume $18 slaughter hogs and $2 milo.

For the pig producer, the estimated break-even point is $12.85 (the boldface figure in the top half of Table 8). In other words, the estimated cost of producing a 50-pound pig is $12.85. Thus if the pig producer receives $12.85 per 50-pound pig ($25.70 per cwt.), his receipts would be sufficient to pay out-of-pocket and overhead costs and make a return of $1.00 per hour of labor used.

For the feeder, the estimated break-even point is $18.57 (the boldface figure in the bottom half of Table 8). Thus he could afford to pay as much as $18.57 per 50-pound pig ($37.14 per cwt.) and still pay out-of-pocket and overhead costs and make $1.00 per hour of labor used.

Not Including Overhead Costs

Table 9 shows estimated break-even points when overhead costs of building, equipment and labor are disregarded. Again assuming $18 slaughter hogs and $2 milo, the break-even price per 50-pound pig would be $8.74 from the standpoint of the pig producer and $22.18 from that of the feeder.

Pricing Feeder Pigs

Producers interested in specializing in producing or in feeding pigs have found need for some way of arriving at an equitable price for feeder pigs. No market quotations on such animals are available in Oklahoma; the quotations on feeder pigs at terminal markets refer to animals of much heavier weights. Consequently, feeder pig prices must be negotiated at each sale or else be based in some fashion on the price

of some other commodity for which price quotations are available. For example, feeder pig prices could be based on slaughter hog prices and the price of feed grains, or on the hog-feed ratio.

There tends to be more variation in the price of feeder pigs than in the price of slaughter hogs. Consequently, if the price and other conditions of the transaction are negotiated at each sale, the pig producer's income will tend to be highly variable and his outlets uncertain.

Contract Pricing

Contracts between pig producers and pig feeders might do much to stabilize the entire hog industry, and also to improve the quality of pork offered consumers. Most of the traits influencing efficiency and meat quality tend to be heritable, therefore many of the basic improvements in efficiency must originate with the pig producer. Thus operation under contractual arrangements might be advantageous to both the producer and the feeder. Both could benefit from stabilized prices and incomes, and quality improvements would be beneficial to the entire industry.

The price arrangement included in contractual agreements must of course be negotiated by the contracting parties. In such negotiations, the requirements and cost information in Tables 1 through 9 can be helpful, IF the individual pig producer and feeder alter the estimates used in the tables to make these estimates fit their specific conditions.

Tables similar to Tables 8 and 9 facilitate the estimating of returns to be shared between the pig production and pig feeding segments of the hog enterprise. For example (again assuming $18 slaughter hogs and $2 milo), the cost above labor and equipment to produce a 50-pound pig is $8.74 and the break-even for the feeder is $22.18 (see table 8). Thus under these assumptions there would be a return above labor and building and equipment costs of $13.44 per pig ($22.18—$8.74=$13.44) to be shared by the pig producer and the pig feeder.

Alternative Pricing Schemes

The most obvious means of arriving at a contract price for feeder pigs is to tie feeder pig prices to the price of slaughter hogs on some selected market. For example, feeder pigs could be priced at some given percentage of the price per cwt. of No. 1 slaughter hogs on some terminal market on the day that the feeder pigs are delivered to the feeder. Analysis of feeder pig price quotations at the Little Falls, Minnesota, feeder pig market indicates that the price of feeder pigs per

cwt. has been about 160 percent of the respective fat hog prices on the St. Paul terminal market in corresponding months. However, over the three-year period for which data were analyzed (1954, 1955, 1956) there has been a great deal of variation in the relationships between feeder pig and slaughter hog prices on the two markets.

An alternative is to base feeder pig prices on slaughter hog prices the day the hogs are sold. This would, of course, have a tendency to encourage the pig producer to produce pigs which would be ready for the market during seasonal high periods.

An alternative to, or compromise between, the foregoing two pricing systems would be to establish a fixed amount per pig to be paid when the pigs are delivered to the feeder, plus some percentage of the market price at the time the pigs are sold. In such a scheme, the pig producer would have an incentive to produce pigs which would be ready for market at the appropriate time, and the pig producer would share market losses or gains in slaughter hogs.

Obviously the best scheme for individuals depends on individual circumstances. However, these three alternatives, plus the budget information presented, should provide a basis for determining prices.

Appendix Table 1.—Seasonal Price Indices, Standard Deviation, and Trends of Monthly Ratio for Moving Averages, Price 200-220 Lb. Hogs, Oklahoma City, 1930-57

Month	Index	Standard Deviation	Linear Trend Equation $\hat{Y} = b_o + b_1 t$ where $\hat{Y}$ = estimates index t = time where 1930=0 1931=1 etc.
January	93.0	7.00	$\hat{Y} = 95.3 + .02\ t$
February	96.3	5.95	$\hat{Y} = 95.2 + .10\ t$
March	96.3	6.98	$\hat{Y} = 100.6 - .15\ t$
April	101.9	7.18	$\hat{Y} = 95.9 + .12\ t$
May	107.2	7.97	$\hat{Y} = 90.5 + .46\ t*$
June	109.3	9.21	$\hat{Y} = 90.9 + .57\ t**$
July	108.7	7.92	$\hat{Y} = 102.8 + .17\ t$
August	107.0	9.10	$\hat{Y} = 106.3 + .04\ t$
September	102.8	8.23	$\hat{Y} = 111.9 - .36\ t^{\circ\circ}$
October	96.6	6.34	$\hat{Y} = 105.3 - .23\ t^{\circ}$
November	90.2	6.55	$\hat{Y} = 100.0 - .28\ t^{\circ\circ}$
December	90.4	7.09	$\hat{Y} = 92.1 + .04\ t$

° Estimated parameter significantly different from zero at the .2 level.
°°Estimated parameter significantly different from zero at the .1 level.
* Estimated parameter significantly different from zero at the .05 level.
**Estimated parameter significantly different from zero at the .01 level.

A parameter significantly different from zero indicates that the price during that month has been changing relative to other months over the period 1930-57. A positive coefficient indicates that the price during that month has been increasing relative to the annual average while a negative coefficient indicates that prices during that month have been decreasing relative to the annual average.