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An Economic Analysis of Hog Production on Farms of Northern Utah 1958 and 1960

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AN ECONOMIC
ANALYSIS OF HOG
PRODUCTION
ON FARMS
OF NORTHERN UTAH
1958 and 1960

Earnest M. Morrison



UTAH STATE UNIVERSITY



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UTAH RESOURCES 12 • AGRICULTURAL
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LOGAN • MARCH 1962

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SUMMARY

This study of hog production as an alternative farm enterprise was undertaken to develop information that could be used to help answer the question frequently asked of what comparative economic position hog production has on Utah farms.

Utah is a deficit hog producing area at a time when demand for pork products is increasing. There seems to be a ready market for large increases in hogs.

A cost and return study was conducted with selected northern Utah hog farmers in 1958 and again in 1960. A complete survey of hog production in Cache, Box Elder, and Weber Counties of northern Utah was attempted. Some growers had no basis for making a breakdown of feed fed to hogs and in those cases a schedule could not be obtained. The study was restricted to enterprises where hogs were produced as a regular farm enterprise. At least two sows must have been farrowed during the year and the young pigs raised to slaughter market weight. Purposely excluded were enterprises where the hogs were all purchased, fed, and resold, or where all young pigs were sold as weaners. Only 11 of the same enterprises appear in each study.

A total of 23 enterprise records covering the year from July 1, 1957, to June 30, 1958, was obtained. These enterprises averaged 7 sows farrowing twice per year.

A total of 224 pigs was farrowed with a 13.5 percent death loss between birth and weaning. Expressed in hundred pounds of live hog produced, the total investment in the hog enterprise was \$23.45, the cost of producing hog was \$18.52, and total receipts were \$23.09 with a net return of \$4.57. It required 405 pounds of feed to produce 100 pounds of hog. This represented 59 percent of the total cost. It required 3.24 man hours of labor per 100 pounds of hog produced. Labor accounted for 18 percent of the total cost.

The 1960 study covered the year beginning January 1, 1960, and ending December 31, 1960. A total of 28 records was obtained. Enterprises averaged 9 sows farrowing 15 litters of 9.3 pigs per litter. A total of 3794 pigs were farrowed with a death loss of 12.3 percent from birth to weaning. Average investment per hundred pounds of hog produced was \$23.80, the costs of producing hog were \$17.47, and total receipts were \$19.67, with net return of \$2.20. It required 402 pounds of feed to produce 100 pounds of hog, which was 59 percent of total cost. It required 2.36 man hours of labor per 100 pounds of hog produced. Labor accounted for 15 percent of total cost.

From the study a simplified method was devised to assist growers to estimate the chances for a net

return at a given level of grain prices and prospective hog prices. The value of approximately 700 pounds of grain must be received for each 100 pounds of live hog sold for the producer to cover all costs of production.

There are several livestock enterprises into which Utah farmers can place their resources. Comparisons of seven other such alternative uses of feed grain were made from data available from previous studies. Of these eight enterprises compared, market milk production showed an absolute advantage. Production of this product also indicated a comparative advantage in Utah. The market for market milk is limited, however, and Utah producers in general must turn some of their resources

to areas of less comparative disadvantage. Hog production seems to be the best alternative for these resources but it has not expanded.

Midwestern states have a comparative advantage in hog production. Using 1949-58 average costs, Midwestern hogs can be placed on Utah's markets at cost plus transportation charges of \$17.80. This is \$3.01 less than Utah's average production cost calculated on the same basis.

Hogs have not competed for Utah's resources because they have not met market competition. In order for them to compete, the advantage held by Midwestern states will have to be overcome.

AN ECONOMIC ANALYSIS OF HOG PRODUCTION ON FARMS OF NORTHERN UTAH, 1958 AND 1960

Ernest M. Morrison

Utah is a deficit hog producing area. In the period from July 1, 1957, to June 30, 1958, the total slaughterer for Utah was approximately 307,500 hogs as reported by the Office of Agricultural Statistician, Utah Branch of Agricultural Marketing Service. Of the total hogs slaughtered in Utah plants, approximately 40 percent were raised in Utah and the rest were shipped in from outside the state. In addition to those shipped in and slaughtered here, 1,283,839 hogs were shipped from Midwestern States through North Salt Lake Union Stockyards to western destinations during this same period as reported by the Office of the State Veterinarian. Another 305,272 were shipped from Midwestern States through Ogden Union Stockyards. In addition, many hogs were shipped through Utah by truck although there was no record of the number. Thus, there seems to be a good potential market for Utah's hogs. Not only is Utah a deficit area, but the Pacific Coast market presents a great potential if Utah producers can compete for it.

A study predicting industrial and population growth in Utah indicated a growth in population from 797,000 in 1955 to between 1,200,000 and 1,500,000 by 1975^{1/}. It is estimated that by 1975 consumption of pork in Utah will range from 90 to 112 million pounds as compared with the 53 million pounds consumed in 1955. If hog production in Utah remains at present levels; by 1975 there will be a deficit production of more than 65 million pounds annually.

Production of hogs in Utah has fluctuated greatly in past years (table 1 and fig. 1). From a low point in 1935, production started an extremely rapid climb that reached its peak in 1944 when government stored wheat was released for feed. Production after 1944 fell as rapidly as it had risen. The decline reached a low in 1954 compared to hog production in the United States. Utah production increased and dropped much faster and farther than had production for the United States.

Two main reasons have been given for this decline in production since 1944. Utah farmers believed that: (1) other enterprises could use the feeds that were on the market more profitably and (2) on some farms other enterprises gave a better opportunity to invest labor profitably.

^{1/} W. P. Thomas. Industrial and population growth in Utah, U.S. Dept. Agr., Farm Economics Research Division, Logan, Utah, March 1959.

Few economic analyses have been made of hog production in this area but in a major sense the question is one of economic alternatives.

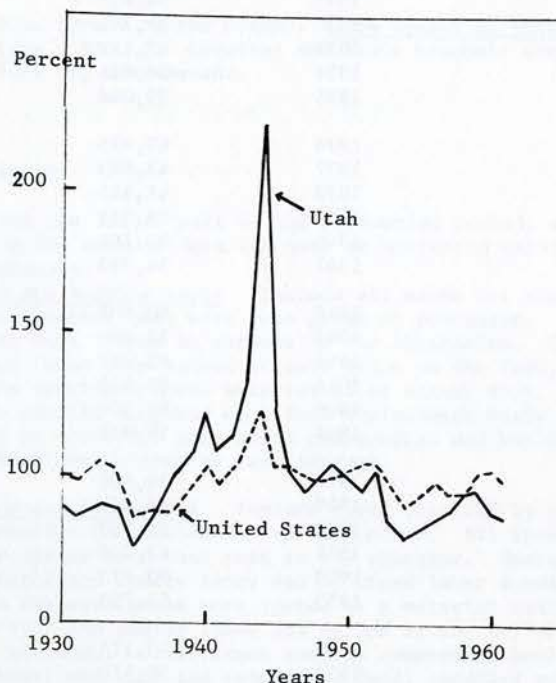


Figure 1. Index of inventory of hogs on farms in Utah and the U. S., January 1, 1930-61. (Index based on 1947-49 = 100)

When we attempt to discover why certain commodities are produced in any given area, we find that producers tend to produce those commodities that are most profitable. This is determined not only by what they can produce best but also by what others can produce and how efficiently they can produce it. Changes in prices and costs can alter the position of producers or areas.

This general tendency, which helps to explain the location of various kinds of production, has been given the formal designation in economic considerations of the principle of advantage. It is generally recognized to have a part called absolute advantage and an application called comparative advantage.

The first principle called absolute advantage refers to the actual amount of margin between costs for using resources and returns from using them. This principle then, considers only the size of the net return to the enterprise. A given enterprise in an area has absolute advantage when its net return is greater than that of any other enterprise which uses the same resources.

Absolute advantage in an enterprise, however, does not insure that it will be the major one of any given area. In the long run, the enterprise in which producers in an area specialize is governed by the principle of comparative advantage. This principle holds that: Whenever you have two or more producers and they are considering producing two or more products and the relative effectiveness of each in production is different, they will tend to produce and trade with the other producer the product for which they have a comparative advantage. Hence, a superior producer may find it to his advantage to produce his second best alternative and trade with someone else who produces the other alternative.

Table 1. Inventory of hogs on farms in Utah and in the United States, January 1, 1930-61. (Index based on 1947-49 = 100)

Year	United States		Utah	
	Numbers thousands	Index percent	Numbers thousands	Index percent
1930	55,705	99.7	70	80.4
1931	54,835	98.1	64	73.5
1932	59,301	106.1	67	77.0
1933	62,127	111.1	70	80.4
1934	58,621	104.9	68	78.1
1935	39,066	69.9	47	54.0
1936	42,975	76.9	56	64.3
1937	43,083	77.1	70	80.4
1938	44,525	79.7	90	103.4
1939	50,012	89.5	102	117.2
1940	61,165	109.4	125	143.6
1941	54,353	97.2	105	120.6
1942	60,607	108.4	115	132.1
1943	73,881	132.1	150	172.4
1944	83,741	149.8	196	225.2
1945	59,373	106.2	108	124.1
1946	61,306	109.7	92	105.7
1947	56,810	101.6	77	88.5
1948	54,590	97.7	85	97.7
1949	56,257	100.6	98	112.6
1950	58,937	105.4	88	101.1
1951	62,269	111.4	84	96.1
1952	62,117	111.1	92	105.7
1953	51,755	92.6	59	67.8
1954	45,114	80.7	52	59.7
1955	50,474	90.3	56	64.3
1956	55,173	98.7	61	70.3
1957	51,703	92.5	68	78.1
1958	50,980	91.2	80	91.9
1959	58,042	102.3	83	95.4
1960	59,026	105.8	68	78.1
1961	55,305	99.1	66	77.5

Source: U. S. Department of Agriculture. Livestock on farms and ranches on January 1, 1920-39, Stat. Bul. 88. 1950. pp. 34, 46.

U. S. Department of Agriculture. Livestock and poultry inventory, January 1, 1940-54, Stat. Bul. 177. 1956. pp. 34-46.

Op. cit., February 13, 1956, 1957, 1958, 1959, 1961.

There are many causes which give rise to the operation of the principle of comparative advantage. One more obvious of these is a difference in the quality and availability of the resources needed. Other things such as location of markets, differences in the quality of labor available, or wage costs, differences arising from the possibilities of using machinery, and differences in skills of management are causes giving rise to comparative advantage.

Any section, country, or individual may have comparative advantage in more than one enterprise.

METHOD OF PROCEDURE

We obtained the data for this study by a survey of hog producers in Box Elder, Cache, and Weber Counties, Utah. Two separate studies were made; one in 1958, the other in 1960. The 1954 Census of Agriculture reports that 20 percent of the hogs in Utah were produced in these three counties.^{2/} Anyone farrowing two or more sows or marketing 10 or more market hogs was classed as a producer. Records were taken only from those producers who had a complete operation from farrowing to fattening and who had been in production at least a year. Producers who sold most of their pigs as weaners or bought most or all of the ones they fattened as weaners were not included. Nearly all of the hog producers in the three counties were contacted for each study. Of these, 23 could give records that were complete and accurate enough to use in 1958 and 28 in

In this study we have attempted to ascertain the costs and returns from hog production in Utah, to discover which enterprise might have absolute advantage in using resources, and to ascertain which enterprises might have comparative advantage with those in other areas.

The comparative advantage aspects were considered by noting production of hogs in the Corn Belt from which hogs originate to compete in Utah markets.

1960. These represented about 60 percent of the hog enterprises falling within the above limitations. A sample of this size is not adequate for all purposes, but it does give an adequate sample for analysis of cost and return relations. The fact that average inputs were about the same for the two samples adds acceptability to the data.

Our study includes the entire hog enterprise on a farm for one year. Feed, capital, buildings, and all other input requirements for a year's operation as well as output and returns were collected.

^{2/} U.S. Bureau of the Census. 1954 census of agriculture. Vol. 1. Counties and state economic areas. Part 31, Utah-Nevada.

DEFINITION OF TERMS

We have used the following terms to mean the things described:

Total pounds live hog produced was the total of all hog produced, both breeding stock and market hogs. This figure was used in calculating average of all summary items on a hundredweight basis. Weight of all hogs on hand at both the beginning and ending inventories was taken. Net change in weight from the beginning to the end of the year was then added to total pounds of hogs sold. Weight of hogs purchased was subtracted from this figure to get total pounds of live hog produced.

Total investment was capital investment in the hog enterprise. It includes investment in buildings and land, equipment and machinery, hogs, and operating capital.

An inventory of buildings, equipment, and machinery, including age and value of each, was taken of all items used in the enterprise. Depreciation was calculated by using the straight line method. Stationary buildings were depreciated 3 percent of the original price. Movable buildings were depreciated at a rate of 5 percent per year. A rate of 10 percent was used for depreciating fences. Equipment and machinery were depreciated at a 5 percent rate. The charge to hogs was calculated by using the percent of total use of buildings, equipment, or machinery that went to the enterprise. An average of beginning and ending inventory was used for the investment for hogs.

Operating capital investment was computed on the following basis: Power and other material costs were used the full period so half the cost for these items was used. Labor and purchases were used 50 percent during the first 2 months and 50 percent during the last 4 months so half the value of these cost items was used. As the major portion of the feed was used

during the latter part of the production period, a third the cost of feed was used as operating capital investment.

Feed and bedding costs include all costs for these items whether they were home grown or purchased. These were listed as expense to the enterprise. Home grown feeds were valued at sale price on the farm, while purchased feeds were valued at actual cost. Pasture expense computed on a feed replacement basis as well as costs for commercial preparation and hauling of feed were listed as feed expense.

Other material costs include costs incurred by the enterprise and incidental to production. All items were listed at actual cost to the operator. Hours of operator and family labor and of hired labor spent with the enterprise were listed as a material cost. Operator and family labor was valued at one dollar per man hour. Other items such as commercial hauling of hogs, medicine and veterinary fees, supplies purchased, and electricity, were summarized as material costs.

Overhead costs include interest on investment, taxes, and general term investments and 6 percent on operating capital. Taxes were computed on the basis of precinct or county levy for the area in which the enterprise was located. General farm overhead or a proportional share of the overhead that couldn't be tied down to any enterprise was calculated by taking 5 percent of material plus other overhead costs.

Receipts were all monetary returns and credits to the enterprise. Value of all returns plus credit for manure and for inventory increases were included under re-

ceipts. Manure produced by the enterprise was valued for its essential elements.

Return measures are indications of the level of return after all factors of production have been paid. These include net return, return per \$100 worth of feed used, return to labor, and return to capital. Net return above all costs is the difference between all receipts and all costs, whether paid or unpaid, incur-

red by the enterprise. Return per \$100 worth of feed used was calculated by dividing value of feed used into net return plus value of feed used. It represents net gain to investment in feed. Return per hour of labor was calculated by subtracting total costs except labor from total receipts and dividing total hours of labor into the remainder. Return to capital was found by subtracting all costs except interest on investment from total receipts and dividing by capital investment.

ANALYSIS OF DATA

Hog production practices varied among the enterprises studied. Most enterprises, however, followed about the same production seasons and breeding and farrowing patterns. All producers tried to farrow sows twice per year.

The 23 enterprises studied in 1958 averaged 7 sows per farm. Average litter size was 7.6 pigs farrowed with 13.5 percent death loss between birth and weaning. Less than 1 percent of pigs weaned died between weaning and market time. Loss of breeding stock was less than 1 percent.

The 28 enterprises studied in 1960 averaged 9.6 sows per farm. Average size of litter was 9.3 pigs farrowed with 12.3 percent death loss. Death loss of pigs after weaning was 1.5 percent.

Investment in Hog Production

Items of investment required by the hog enterprise were hogs, buildings and land, equipment and machinery, and operating capital. We are reporting investment on both a per sow and a per hundredweight of hogs produced basis (table 2). Investment per sow included the sow and her share of investment in the boar, other hogs, and other items required.

A total of \$23.45 per hundred pounds of live hog produced was invested in the average enterprise in 1958

and \$23.80 in 1960. Combining the two studies, investment in hogs comprised 31.3 percent of this total. This included all hogs on the farm prorated on a basis of hundredweight of hog produced. Buildings and land comprised another major portion of investment, representing 35.6 percent. Many enterprises were equipped with separate farrowing houses for colder weather, making this part of the investment large.

Equipment and machinery comprised a minor part of the investment, making up only 7.0 percent of the total. While many enterprises had self feeders, investment in waterers and other feeding equipment was relatively small.

Operating capital, or capital needed for daily variable expenses, was the remaining 26.1 percent of capital investment in the hog enterprise.

Costs of Production

We included as costs of production all costs, both cash and non-cash, incurred for the hog enterprise for the year. Feed and bedding were the most important cost items, comprising 58.8 percent of the total in 1958 (fig. 2), and 59.4 percent in 1960 (fig. 3). Labor was also a sizeable item accounting for 17.5 percent of total cost in 1958 and 14.8 percent in 1960.

Table 2. Average investment in hog production, selected areas of Utah, 1958 and 1960

Investment item	Capital invested				Combined percent of total*
	Per sow		Per cwt live hog produced		
	1958 dollars	1960 dollars	1958 dollars	1960 dollars	
Hogs					
Boars	9.00	13.00	.31	.52	1.8
Sows	72.00	49.00	2.69	1.96	9.8
Breeding gilts	11.00	8.00	.41	.33	1.6
Feeders and market hogs	109.00	96.00	4.05	3.84	16.7
Weaners	16.00	2.00	.61	.06	1.4
Total hogs	217.00	168.00	8.07	6.71	31.3
Buildings and land	207.00	228.00	7.68	9.13	35.6
Equipment and machinery	37.00	49.00	1.37	1.96	7.0
Operating capital	170.00	150.00	6.33	6.00	26.1
Total investment	631.00	595.00	23.45	23.80	100.0

* Total investments in the 1958 and 1960 studies were added together to arrive at percent.

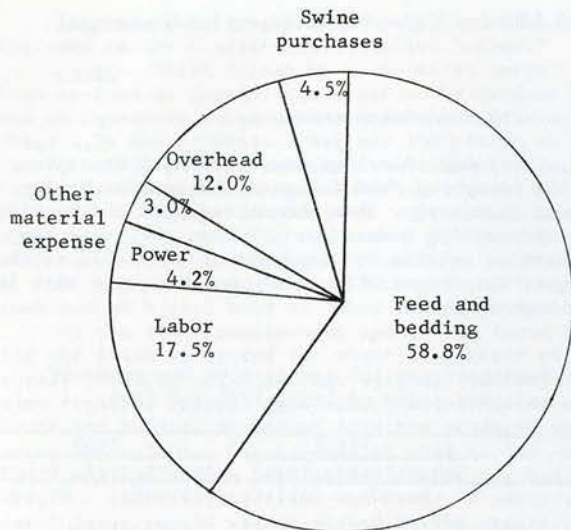


Figure 2. Proportion of cost of producing hogs, Northern Utah, 1958

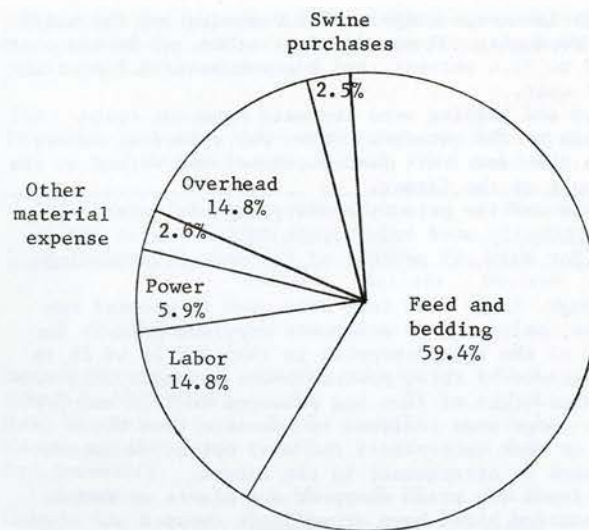


Figure 3. Proportion of cost of producing hogs, Northern Utah, 1960

Average cost of production for enterprises studied was \$18.52 per hundredweight of live hog produced in 1958 and \$17.47 in 1960 (table 3). To facilitate an-

alysis, we broke down costs into material, overhead, and hog purchases.

Table 3. Total cost per hundredweight for producing hogs, selected areas of Utah, 1958 and 1960

Item	Unit	1958		1960		Combined percent of total*
		Amount	Value dollars	Amount	Value dollars	
Material						
Feed and bedding						
Home grown feed	lb.	107.5	1.86	178.5	3.15	13.9
Purchased feed	lb.	297.1	8.63	223.2	6.74	42.6
Bedding	lb.	26.3	.18	28.5	.16	.9
Pasture	--	--	.04	--	.09	.4
Feed prep. and com. hauling	--	--	.17	--	.23	1.1
Water	--	--	.02	--	.05	.2
Labor	hr.	3.24	3.24	2.36	2.59	16.2
Power	--	--	.77	--	1.03	5.0
Commercial hauling of hogs	--	--	.03	--	.03	.2
Medicine and vet.	--	--	.27	--	.20	1.3
Supplies	--	--	.01	--	.02	.1
Electricity	--	--	.11	--	.13	.7
Breeding costs	--	--	.05	--	.01	.2
Other	--	--	.06	--	.02	.2
Total material costs			15.44		14.45	83.0
Overhead						
Interest on investment	--	--	.95	--	1.17	5.8
Depreciation and repairs	--	--	.39	--	.46	2.4
Taxes and insurance	--	--	.06	--	.11	.5
General farm overhead	--	--	.84	--	.84	4.7
Total overhead costs			2.24		2.58	13.4
Hog purchases	--	--	.84	--	.44	3.6
TOTAL COST			18.52		17.47	100.0

* Total costs of the 1958 and 1960 studies were added together to arrive at percent.

Material costs comprised 83.0 percent of the total cost of producing 100 pounds of live hog. Overhead costs amounted to 13.4 percent, and hog purchases 4.7 percent of total cost.

Feed and bedding were the main material costs. All feed grown on the enterprise farm was valued at market price on the farm. All feed purchased was valued at the actual cost to the farmer.

Straw was the primary bedding material used. Bedding was usually used only during winter months and accounted for only .09 percent of the cost of producing hogs.

Though large feed lots were used in several enterprises, only 4 of 23 producers provided pasture for any part of the hog enterprise in 1958 and 11 of 28 in 1960. Because of this, pasture costs averaged only \$.04 per hundredweight of live hog produced in 1958 and \$.09 in 1960. Hogs were confined to concrete from birth to selling on some enterprises and many operators contemplated such an arrangement in the future.

We found few grain choppers and mixers on farms. Most producers hired home grown feeds chopped and mixed. Many purchased feeds. Feed preparation and commercial hauling amounted to 1.1 percent in cost of production. Where chopping and mixing equipment was used on the farm, labor used and a proportionate share of depreciation and repair of equipment were charged against the enterprise.

We calculated the labor cost for the average enterprise to be \$3.24 per hundredweight of live hog produced in 1958 and \$2.59 in 1960. Operator and family labor was valued at \$1.00 per man hour in 1958 and \$1.10 in 1960.

We charged any use of tractors, trucks, pickups, or cars as a direct expense to the hog enterprise, and listed it as a power cost. Average use of power per hundredweight of hog produced cost \$.77 in 1958 and \$1.03 in 1960.

As most of the hog enterprises were located on farms with many other enterprises, a general purpose farm truck or pickup was found on most farms. Thus there was little commercial hauling of hogs. An average of \$.03 per hundredweight was paid for commercial hauling in each study.

Money spent for medicine and veterinary fees, 1.3 percent of total cost, included cost of such items as supplementary iron for suckling pigs, worm medicine and vaccines, as well as fees for veterinary services.

Electricity was used extensively, both in spring and fall, for brooding pigs. About .7 percent of costs was charged to the enterprise for electricity used.

Charges actually paid to someone for use of a boar were listed as breeding costs. These were small per hundredweight of live hog produced. Feed and other costs for boars owned by the enterprise were included in general expense and were not listed as breeding costs.

Total material costs were \$15.44 per hundredweight in 1958 and \$14.45 in 1960. Overhead costs were 13.4 percent of the total. The major overhead cost was interest on investment. We charged interest on all capital invested, whether borrowed or owned by the operator.

Few of the enterprises had insurance on pigs or feed. However, some of them did carry insurance on buildings.

We charged the hog enterprise a part of the general farm overhead, which could not be charged to any one enterprise.

Costs ranged from a low of \$11.22 to a high of \$32.90 per hundredweight in 1958. Five enterprises were putting 100 pounds of live hog on the market for \$14.50 or less. Six incurred costs of \$25.00 or above for every 100 pounds of hog marketed. In 1960 costs ranged from a

low of \$10.03 to a high of \$29.88 per hundredweight.

Physical Requirements

Feed. We found that hog growers used an average of about 400 pounds of feed for each 100 pounds of live hog produced (table 4). This amount included the requirements of the breeding stock (sows, boars, and gilts kept beyond marketing weights for replacement), as well as the market hogs. Weight gains in breeding stock were also included as hog produced.

Table 4. Feed cost per 100 pounds live hog produced, selected areas of Utah, 1958 and 1960

Item	1958		1960	
	Amount used pounds	Value dollars	Amount used pounds	Value dollars
Commercial mix	203.22	6.53	129.86	4.32
Barley	117.63	2.15	153.98	3.02
Milk products	26.18	.53	2.74	.03
Concentrate*	6.45	.33	13.93	.68
Oats	5.17	.12	3.39	.08
Shorts	3.59	.09	5.51	.05
Corn	3.57	.08	27.61	.60
Rye	.45	.01	--	--
Wheat	.30	.01	9.49	.22
Meat scraps	2.47	.12	4.01	.17
Antibiotics	.04	.04	.04	.03
Alfalfa	30.95	.29	38.07	.45
Pasture	--	.04	--	.09
Minerals	.42	.03	.66	.03
Salt	.79	.01	.78	.02
Other	3.42	.15	11.63	.19
Preparation and hauling	--	.17	--	.23
Total	404.65	10.70	401.70	10.21

* Commercial product produced to be mixed with home grown grains.

feed fed, barley was the most important home grown feed. Over two-thirds of this was raised on the enterprise farm. Because of the high sale value of wheat in Utah, we found little of it used as hog feed. All wheat used was homegrown. Oats and corn were used much more extensively than wheat. Of these, about 83 percent of the oats and 87 percent of the corn were home-grown.

Nearly every ration included some alfalfa. Quantity used varied widely. Some operators fed alfalfa free choice while others chopped and mixed it with the grain.

Commercial feeds were important in enterprises studied. These were used in both chopped and pelleted form. Ordinarily, where commercial feeds were used extensively, 5 major rations were used--one for starting or creep feeding, one for pigs from weaners to 75 pounds, one for pigs from 75 to 125 pounds, one from 125 to 175 pounds, and a finishing ration. In some cases commercially prepared gestation and lactation rations for sows were also purchased. Some growers used commercial starter rations quite heavily as early as possible and weaned the pigs at 3 to 5 weeks of age.

Items such as syrup, dried pulp, and fish meal were included in the classification called "other."

Labor. While it was by no means as large a cost item as feed we found labor required to produce hogs was an important amount. Growers reported using an average 3.24 man hours of labor per 100 pounds of hog produced in 1958 and 2.36 man hours in 1960 (table 5). This meant that an average of 30.9 pounds of hog were produced with each hour of labor expended in the first study and 42.4 pounds in the second study. With the feed requirement at about 400 pounds per hundredweight of live hog produced, 125 to 170 pounds of feed were combined with each hour of labor in hog production.

Of the labor requirement per job we found the feeding operation accounted for about 50 percent of the total. Bedding and cleaning, feeding, and repairing pens also required considerable time. Total number of man hours per hundred pounds of live hog produced varied among operations. One enterprise used as low as 1.01 hours and another as high as 7.43 hours per hundredweight. Little hired labor was used; 98 percent of the total labor supply was furnished by the operator and his family in 1958 and 84 percent in 1960.

Table 5. Man hours spent per 100 pounds live hog produced, selected areas of Utah, 1958 and 1960

Operation	Hours per cwt.		Percent of total	
	1958	1960	1958	1960
	hours	hours	percent	percent
Obtaining feed	.25	.22	7.7	9.2
Preparing feed	.12	.20	3.7	8.5
Feeding*	1.70	.76	52.5	32.2
Bedding and cleaning	.45	.42	13.9	17.8
Farrowing	.23	.25	7.1	10.6
Working swine	.06	.21	1.9	8.9
Spraying	.03	.03	0.9	1.3
Repairing pens	.21	.11	6.5	4.7
Marketing	.18	.16	5.5	6.8
Other	.01	--†	0.3	--
Total	3.24	2.36	100.0	100.0

* Labor for feed delivery by a feed company when charged as part of the price of feed, was not charged again as labor and hence is not part of the labor reported. More delivered feed was involved in the 1960 study than in the 1958.

† Less than .0050

Receipts and Return Measures

Our calculations show total receipts for hog production averaged \$23.09 per hundredweight of live hog produced in 1958 and \$19.67 in 1960 (table 6). These receipts include value of all hogs sold plus manure credits, increase in value of inventories, and other receipts such as breeding returns. Per hundredweight receipts were obtained by dividing total pounds live hog produced into total credits and thus are not representative of market price. Sale of market hogs was by far the most important source of return to the average enterprise.

When we deducted all costs, cash or non-cash, from total receipts, a net return of \$4.57 per hun-

dredweight was left in 1958 and \$2.20 in 1960. This represented the return to the enterprise when all production costs were paid.

Table 6. Receipts and return measures for hog production, selected areas of Utah, 1958 and 1960

Item	Per cwt. live hog produced		Percent of total	
	1958	1960	1958	1960
	dollars	dollars	percent	percent
Receipts				
Market hog sales	14.60	14.44	63.2	73.4
Breeding hog sales	.42	.25	1.8	1.3
Cull hog sales	1.42	1.30	6.2	6.6
Manure credits	.95	.95	4.1	4.8
Net inventory increase	5.66	2.73	24.5	13.9
Other	.04	--	0.2	--
Total Receipts	23.09	19.67	100.0	100.0
Return measures				
Net return above all costs	4.57	2.20		
Receipts per \$100 worth of feed used	215.79	192.65		
Return per hour of labor	2.41	2.02		
Return of capital	23.50	14.20		

In 1958, Utah hog growers studied reported receipts of \$215.79 per \$100.00 worth of feed used or a gain of \$115.79 per \$100.00 investment in feed. This was a return of \$2.41 per hour of labor. Return to all capital invested was 23.5 percent.

In 1960, Utah hog growers studied reported receipts of \$192.65 per \$100.00 worth of feed used or a gain of \$92.65 per \$100.00 investment in feed. This was a return of \$2.02 per hour of labor. Return to all capital invested was 14.2 percent.

Break-Even Prices

The question that ordinarily arises from this type of study is, What price must growers receive from their hogs to pay all costs including their own capital, labor, and management? Growers can estimate production costs on the basis of varying grain prices. To do this, it is necessary to express total cost of production in terms of pounds of grain. For example, average total cost of producing 100 pounds of hog, of about \$18.00 (table 3) was equal to about 700 pounds of grain at an average value of about \$2.57 per hundredweight (table 4). Thus, the price or value of 700 pounds of grain must be received to cover costs of feed, labor, other materials, and all overhead when grain is \$51.40 per ton.

If grain is \$60.00 per ton (3 cents per pound) growers must obtain \$21.00 (700 x .03) per hundredweight for their hogs in order to break even (fig.4). If grain is \$40.00 per ton (2 cents per pound), grow-

ers could break even selling their hogs at \$14.00 per hundredweight.

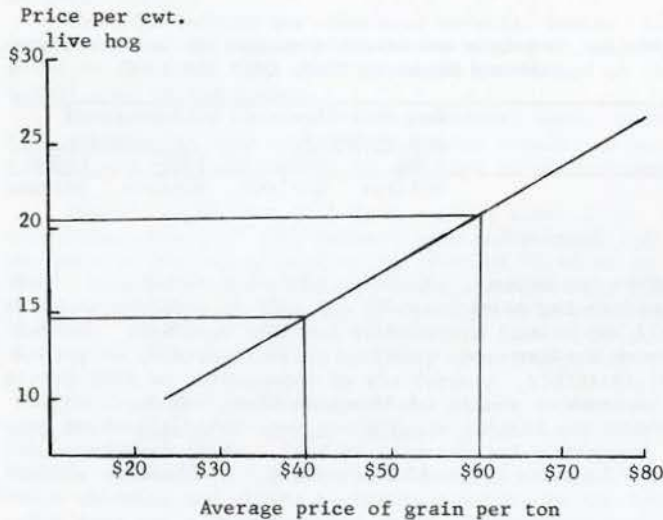


Figure 4. Break even prices for market hogs with variable factor prices

While this method is simple and does make a close approximation it assumes that costs other than grain such as labor and equipment, increase or decrease in direct proportion to the price of grain. This may not

always be true. However, the method can be used as a rough indication of prices growers must receive for hogs to cover costs.

Management Practices

We found variation in management practices among the enterprises studied. Managers reported experience in the hog business ranging from 1 to 60 years and averaged 16 years.

Water was piped directly to hogs in about 60 percent of the enterprises. It was carried from piped sources in several other enterprises. Only 3 enterprises reported canals or ditches as the main source of water.

About 25 percent of the enterprises in these studies had pens and feedlots with concrete floors. Of enterprises where pens with dirt floors were used, only 1 had a plan of rotation. The remaining enterprises were raising pigs in the same pens year after year.

We found all operators used some type of worming program. In many instances, this was the use of a commercial feed in which worm medicine was included. Breeding stock were seldom wormed.

In few of the enterprises, managers flushed sows and gilts before breeding. Many operators had not heard of this practice and many others, though they were familiar with it, did not believe it to be of any value.

Most enterprises reported a weaning age of 6 to 8 weeks, 4 reported weaning at 5 to 6 weeks, 3 reported that pigs were weaned at 3 to 4 weeks, and 1 reported a practice of letting the pigs suckle until the sow weaned them.

COMPARATIVE ECONOMIC POSITION OF HOG PRODUCTION

Using the general principle stated in the introduction as an aid, we have attempted to compare the relative position of hog production in Utah to the other livestock enterprises that compete for the use of feed, labor, capital, and management. The comparison is concerned with enterprises producing slaughter hogs, beef, fat lamb, market milk, manufacturing milk, eggs, broilers, and turkeys.

We used physical quantities of inputs taken from studies made by the Utah Agricultural Experiment Station in recent years. Studies made in previous years were adjusted to make the data comparable to 1958 requirements, the date of the first hog study.

Prices used were average for the period 1949 to 1958. For all home grown feeds, an average of prices received by Utah farmers for the 10 year period was used. Use of this figure insured that all enterprises were paying the price for the commodity that could be received by the farmer if he sold his crops instead of feeding them. An average of prices received was also used in computing sale value of livestock, poultry products, and milk or butterfat. Prices received in Utah for broilers showed a steady downward trend. A price adjusted for trend was used for broilers in place of an average price for the period. Turkey prices have also shown a definite downward trend between 1949 and 1958. They appeared to stabilize around \$.25 per pound so this value was used instead of the 10 year average.

An average of prices paid for the period 1949 to 1958 was used for all feeds and supplies purchased off the farm.

Cost and return data listed here are averages

for the enterprises considered and do not represent the most efficient for any enterprise. When all enterprises considered are put on an animal unit base, there is wide variation in the size of enterprise and economics of scale may be shown in some that are not in others. However, the purpose of this study is to compare enterprises in Utah as they are found at the present time.

Present physical requirements paired with average prices as computed showed that all enterprises considered, except market milk production, had negative net returns (table 7). After all factors of production were paid, this enterprise showed a positive net return. Thus, production of this product had absolute advantage among Utah's livestock enterprises considered in this study. It was the best alternative in those areas and on those farms for which it was suited because it had the greatest positive margin between costs in using resources and the returns.

Returns to labor gave further evidence that market milk production had absolute advantage. If all costs were allowed except labor, grade A milk enterprises returned \$.94 per hour of labor spent instead of \$.91 at which labor was valued. Return to labor by the hog enterprise was \$.88 per hour. Lamb fattening enterprises returned \$.71 per hour while the broiler enterprise lost \$2.00 for every hour spent. If it is insisted that labor be paid at the rate valued, then some other item such as feed raised or capital used would not receive the market price when devoted to enterprises other than market milk production.

Table 7. Comparison of cost and returns per unit of net gain of eight Utah livestock and poultry enterprises (prices adjusted to 1949-1958 level)*

Item	Hogs \$/cwt	Beef fat- tening \$/cwt†	Lamb fat- tening \$/cwt‡	Market milk production \$/cwt B.F.	Manufac- turing milk production \$/cwt B.F.	Egg pro- duction \$/doz	Broilers \$/lb	Turkeys \$/lb
Expenses:								
Material expense								
Feed and bedding	13.49	20.81	18.72	60.58	62.64	.26	.13	.18
Labor	2.95	2.32	2.01	30.76	30.30	.05	.01	.01
Power	.77	.10	.45	3.74	3.70	--§	--§	--
Purchases	.48	37.32	60.09	2.86	4.04	--§	.05	.05
Other	.72	1.05	1.02	14.38	5.19	.01	.01	.01
Overhead expenses	1.40	2.54	2.37	20.27	15.97	.10	.02	.02
Other expenses	1.00	2.96	4.23	6.15	6.09	.02	.01	.01
Total expense	20.81	67.10	88.89	138.74	127.93	.44	.24	.28
Receipts:								
Sales	15.32	63.56	87.16	130.73	85.57	.42	.21	.25
Manure credits	.95	2.69	1.28	8.89¶	9.41¶	.01	.01	.01
Inventory increase	4.40	--	--	--	--	--	--	--
Other credits	.04	--	--	--	--	--	--	--
Total receipts	20.71	66.25	88.44	139.62	94.98	.43	.22	.26
Net return per unit	-.10	-.85	-.45	.88	-32.95	-.01	-.02	-.02
Return to labor per hour	.88	.58	.71	.94	-.08	-.02	-2.00	-1.00
Return to capital invested (%)	3.6	-1.3	3.3	6.5	-14.9	-0.5	-1.1	-4.8

* Detailed budgets which are summarized here are in the author's files and copies can be obtained by requesting the same from him.

† Includes cost of feed weighing 634 lbs.

‡ Includes cost of feeder lambs weighing 74 lbs. each.

§ Included in other material expense.

¶ Includes credit for calf.

Market milk production showed a return to all capital invested in the enterprise of 6.5 percent. Hog production enterprises returned 3.6 percent and lamb fattening enterprises 3.3 percent to capital investment. Other enterprises studied showed negative return to capital; manufacturing milk had a negative return of 14.9 percent.

Production patterns in Utah's livestock enterprises using feed grains show that market milk production has comparative advantage in areas where it is suitable. However dairy production is not suited to some areas of the state and, in these areas, a suitable alternative ranking high in absolute advantage should be adopted. Many farmers and areas have specialized in market milk and some of it is exported from Utah to other areas. The market for market milk, however, is limited. Utah producers are now placing about the maximum milk on markets that can be handled. With this limitation in their area of comparative advantage, Utah producers must turn some of their resources to areas of less comparative disadvantage. As hogs ranked second in absolute advantage of the enterprises considered, it would seem that for those areas in which it is a suitable enterprise, hog production would be the best alternative for the resources in question. Further analysis of competition will be presented to explain why expansion of this industry has not taken place in Utah.

Midwest Competition

As mentioned previously, Utah's terminal markets received many hogs during the period July 1, 1957, to July 1, 1958, which were not marketed in Utah, but were shipped on to other points. The Office of Agricultural Statistician reported that 51.5 percent of these hogs came from Nebraska, 17.1 percent from Utah, 7.2 percent from Iowa, 6.4 percent from South Dakota, 4.8 percent from Idaho, 4.6 percent from Illinois, 3.0 percent from Kansas, 2.7 percent from Missouri, 1.4 percent from Colorado, and the remainder from a number of other states. By far the greatest number of hogs reaching these markets came from the Corn Belt of the Midwestern States.

The Midwest is probably the most concentrated area of hog production in the United States. Input-output data showed that Midwest producers have an absolute advantage in hog production within their own area. They export great quantities of hogs and pork and few other livestock products.

If Utah hog growers receive Midwest prices plus transportation costs, can they compete for available markets? Input data from Kansas^{3/} and Illinois^{4/} show-

^{3/} Dale A. Knight. Hog production in Anderson and Labette Counties, Kansas. Kans. Agr. Exp. Sta. Ag. Econ. Rept. 80. 1958.

4/ A. G. Mueller. Detailed cost report for northern Illinois. Ill. Agr. Exp. Sta. Res. Rep. AERR 522. 1957.

ed feed requirements of about 428 pounds of feed per 100 pounds live hog produced as compared to 405 pounds required in Utah. However, primarily due to differences in prices feed costs in Utah were approximately \$2.00 greater per hundredweight of hog produced than were Midwestern feed costs.

Labor costs in the Midwest and in Utah were comparable. However, Utah's labor requirement per 100 pounds of hog produced was 2 hours greater than Midwestern requirements. Barley needs to be chopped or rolled when fed to hogs, but this is not necessary with corn.

Total cost for raising hogs in Utah, using present requirements and average prices for the period 1949-58, was \$20.81. Total cost in the Midwest calculated on the same basis was \$16.40. Average transportation costs from Midwestern markets to Utah packers were \$1.40. The principle of comparative costs states that the area placing a product on the market at the least total cost will have comparative advantage on that market, provided that artificial or necessary costs of transfer to not destroy the advantage. With Midwestern hogs delivered here at cost plus transportation charges, they could be put on Utah's market for \$17.80. This is \$3.01 less than Utah's average production cost. Thus, the Midwest has comparative advantage over Utah in the production of hogs.

Though many of Utah's resources have been available to hog production, hogs have not been a major enterprise on many farms. Midwestern states have had an advantage in hog markets and Utah hog production has not expanded. In order for hogs to compete for resources on Utah farms, producers would have to overcome the advantage held by the Midwestern states. Costs of production would have to be reduced by at least the \$3.01 margin held by the Midwest.

Utah hog specialists have pointed out some ways

of reducing production costs.^{5/} Steffen pointed out that the climate of this state is more conducive to hog production than that of the Midwest. Utah has a dryer climate with no higher mean temperature. If production costs could be lowered enough, Utah could gain comparative advantage in local markets.

Feed and bedding comprised 58.8 percent of total costs. Selection of the most economical feeds could contribute greatly to increased efficiency in production. Barley is the most important feed grain in Utah. It produces a good quality hog carcass. However, it has only 90 to 95 percent of the feed value of corn. Selection of supplements should be made with two things in mind, cost and quality. Good quality proteins are mandatory for hog production. There is considerable variation in price of these supplements and this too must be considered. If barley is priced higher than 90 percent of the corn price, it is cheaper to buy corn.

A well balanced diet properly fed is important. Over-feeding of breeding stock can be costly to the hog enterprise. Not only is feed wasted, but the productivity of breeding stock is impaired. Overfat brood sows have a tendency to lose more pigs during the period from birth to weaning than do sows more carefully fed. Hogs should have ample feed space and free access to water at all times.

Good management is probably the most important factor in hog production. Careful attention to such programs as nutrition, parasite and disease control, and good breeding, is important if costs of production are to be reduced.

Some Utah raisers were producing hogs below average Midwest costs. Greater efficiency of management in use of feed, labor, disease control, and other programs offers opportunity for hogs to compete for Utah's farm resources.

5/ Hyrum Steffen. Profitable feeding of market hogs, Utah Ext. Serv. Cir. 260. 1957

CONCLUSIONS

Producers of hogs studied in 1957-58 made a profit. The average producer had a good return for use of his resources during this period. Hog production in the 1960 study also produced a positive net return but only about half that of 1957-58.

Applying prices for a ten year period to present physical requirements shows that, at "average" prices, some factors of production would not receive a full reward with present input-output relations. However, the fact that some enterprises showed production costs considerably below average indicates that costs of production could be reduced.

Feed costs in this study varied widely. Many growers gave no attention to changing feed-price ratios. Growers showing greater profits either raised most of their feed or purchased enough feeds when prices were lower to hold them through high price periods.

Labor expended showed inefficiency on many farms. Enterprises with labor output below 2.25 hours per 100 pounds hog produced yielded good returns. However, poor planning and high input in this area were costly to many enterprises.

Although the local and Pacific Coast market po-

tentials for hogs are favorable, the Midwest has comparative advantage over Utah in these markets. If any great expansion is to take place in Utah hog production producers will have to remove their comparative disadvantage. The disadvantage may be removed, however, through better management practices in selection and use of feeds, use of labor, sanitation programs, and in size of enterprise. Better records kept by farmers would give more knowledge of price-cost relations and furnish better decision making data.

Variations in management practices and physical requirements indicate a need for educational programs conducted on a county level. Follow through by those interested could make hog production a profitable enterprise at likely future price levels in Utah.

If Utah continues to produce as much feed grain as it is now, considerable numbers of grain-consuming animals will be required to use the production. In addition to this Utah lies enroute between the feed grain production areas and meat consuming market on the West Coast. Expansion of the hog industry under these conditions seems possible.

