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An Analysis of The Competitive Position of Oregon Pork Producers

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An Analysis of the Competitive Position of Oregon Pork Producers

VIRGIL NORTON AND EMERY CASTLE

Summary and Conclusions

Feed grain production in Oregon has increased considerably during the past decade. Likewise, during the same period, increasing population has created a growing market for virtually all commodities, including pork. This has resulted in a substantial deficit of pork in this area and appears to represent a large potential market for Oregon-produced pork. Further, the geographical location of Oregon with respect to the large deficit area in California and the surplus states in the Midwest seems to put Oregon in an advantageous position for increased hog production. The purpose of this study was to examine the economic feasibility of increasing hog production in Oregon.

The data used come from a variety of sources. The exact source of all data is indicated at the appropriate point in the text. Some of the data are secondary and are taken from reports of the United States Department of Agriculture. Primary data are from a survey of Oregon hog producers and generally average performance rates are used. Performance rates reported could be exceeded either by (1) the more efficient producers currently in business, or (2) a pork-producing plant that might be designed based on recommended or "optimum" conditions.

The following conclusions were reached on the basis of the analysis:

1. Production response of Oregon swine producers is conditioned by both hog-feed price relationships and hog-cattle price relationships.
2. Pork consumption is a function of the price of pork, beef, and chicken and of the level of income.
3. Northwest corn-belt states are the principal competitors for the Oregon pork deficit.
4. Physical requirements for pork production in Oregon are quite similar to those in the Midwest. Historically, feed prices have been higher in Oregon than in the competing states of the Corn Belt. This feed cost disadvantage has been partially, but not completely, offset by transportation costs on pork from the Midwest to Oregon.

Few people are interested in the past as such. What are the prospects for a reversal of Oregon's historical disadvantage in the future? To understand this question it is necessary to keep the following facts in mind:

1. Some Oregon producers have made profits through much of the period analyzed. Some are excellent managers, others had particular advantages relating to the availability and cost of feed, labor, or housing. Such producers, undoubtedly, will fare well in the future.
2. Feed costs, transportation rates, and hog prices are such that currently (1964) the average Oregon producer has very little advantage or disadvantage relative to the average Minnesota producer in competing for the Oregon deficit in pork consumption.

We must now judge whether the situation is likely to become more or less favorable to the Oregon producer. In this connection, the following factors seem important:

1. Government policies and programs.
2. Per acre production of feed grains in the Pacific Northwest and other parts of the nation.
3. Transportation rates both on products coming into the Northwest and on "back-hauls."

It appears unlikely that the above factors will change in such a way as to make the relative position of Oregon producers worse in the future than it has been during the past 17 years. It also appears doubtful that the situation will change enough to make hog production in Oregon highly profitable to large numbers of producers. If Oregon is to expand hog production, it must do so in the face of stiff competition. It is dangerous to assume that competing areas will remain static in their hog-production techniques and erroneous to believe they have been static in this respect in the past.

Introduction

In an effort to improve the income situation of Oregon farmers, some individuals are looking toward increased production of meat animals. In the past 20 years, feed-grain production has approximately doubled in this state. At the same time that this increase in feed grain production has been taking place, rapid growth of population in the West has occurred. Demand for meat created by increased population

has outstripped production of meat animals in the West because high-grade, slaughter-livestock production has not moved extensively into western feed-grain producing areas.

Thus, increased feed-grain production, together with rapidly increasing population, indicates that the Pacific Northwest may be an area of considerable potential in the development of slaughter livestock. Livestock may represent a method by which grain can be marketed with an economic advantage and a means by which farm resources can be more efficiently employed.

The rapidity with which hog production can be increased, the relatively low investment required to undertake the enterprise, and the variety of conditions under which hogs can be produced suggest that this enterprise may be a profitable livestock alternative for western farmers. At the present time the corn-belt region is the only major surplus pork-producing area in the United States. The fact that the Corn Belt is located a great distance from the Pacific coast states, along with the feed and population situation, seems to indicate that Oregon is in an excellent location for increasing pork production. Not only does California represent a potential market for Oregon-produced pork, but it would take approximately twice the present pork production in Oregon simply to fill the present Oregon pork deficit.

Trends in Oregon Hog Production

Hog numbers in Oregon have fluctuated greatly over the past 30 years, reaching a peak of 360,000 hogs in 1944. The low came only 10 years later, when hog numbers dropped to less than 100,000 hogs. At present, hog numbers are considerably below the past 30-year average (Figure 1).

Not only has income from hogs declined in absolute terms but it has also declined relative to total income from livestock in Oregon. In 1940, hogs accounted for about 8% of total income from livestock. Since that time, however, this has been cut approximately by one-half. During the past 20 years, only three counties had an increase in hog numbers: Clackamas increased from 19,200 to 19,500 head; Marion from 25,000 to 25,500 head; and Josephine from 3,100 to 3,700 head. On the other hand, certain eastern counties such as Wallowa and Malheur have experienced considerable decreases.

The purpose of this study was to examine the long-run economic feasibility of increasing hog production in Oregon; that is, to analyze the desirability of reversing the present trend of the decline of hog production.

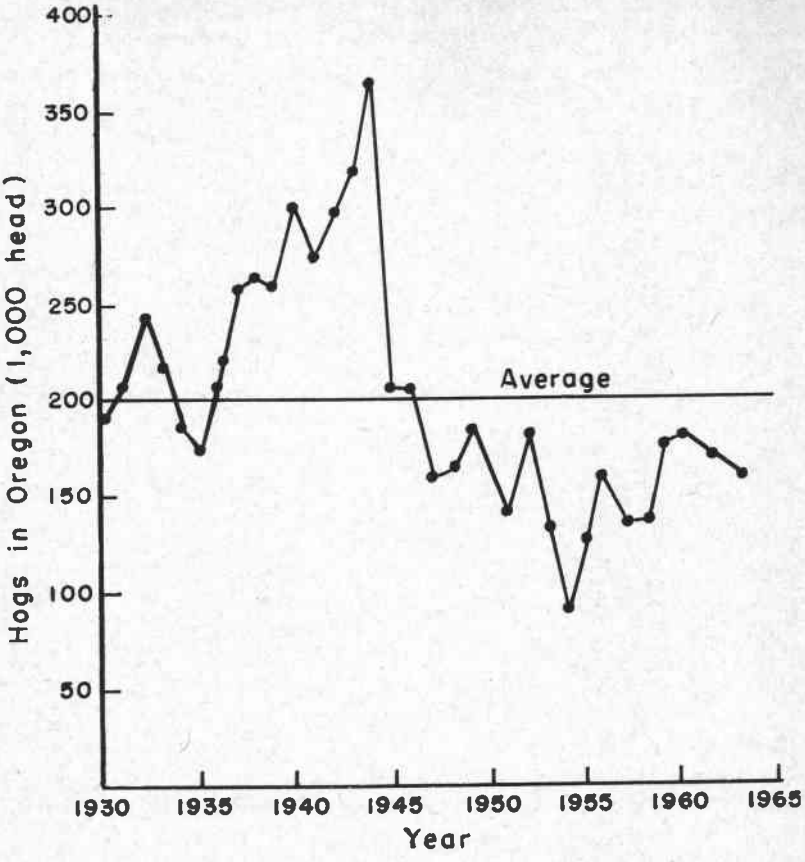

Figure 1. Number of hogs on Oregon farms, 1930 to 1963.

Source: U. S. Dept. of Commerce, Bureau of Census, United States Census Report of Agriculture, Washington, D. C., 1962.

Consumption Analysis

In order to analyze the profitability of increasing hog production on a long-run basis, it is necessary to arrive at some conclusions concerning present and future pork consumption. A least-squares, time-series regression equation was used to predict 1961 and 1970 per capita consumption by states. The function was derived from United States price, income, and consumption data.

The derived equation was as follows:

$$\hat{Y} = 67.88903 - .67930X_1 + .29577X_2 + .29698X_3 - .00046X_4$$
$$(.07846) \quad (.04105) \quad (.07420) \quad (.00420)$$

where

$\hat{Y}$ is predicted per capita pork consumption per year in pounds,
X_1 the average United States retail price per pound for pork,
X_2 the average United States retail price per pound for beef,
X_3 the retail price per pound for chicken, and
X_4 partially deflated per capita personal income.[1]

Parameter estimates for the three price variables were significant at the .05 level. However, the income coefficient was not significantly different from zero. Although the income coefficient was not significant, it is important to note that the sign on the coefficient is negative. This is consistent with results obtained in a Kansas State University study.[2]

Elasticity coefficients were derived from the equation. Average elasticities for the 14-year period were obtained as well as average elasticities for the years 1948-50 and 1959-61, inclusive. These data are given in Table 1.

Table 1. Elasticity Coefficients Derived From United States Demand Equation

Year	Price E_D	Cross $E_{D\frac{P}{B}}$	Cross $E_{D\frac{P}{C}}$	Income E_D
1948-61 av.	–.6053	.3395	.2380	–.0138
1948-50 av.	–.5727	.3166	.2629	–.0119
1959-61 av.	–.6024	.3682	.1868	–.0152

It is not surprising that pork price is an important factor in determining pork consumption. Also important, however, are prices of two competing meats—beef and chicken. If the price of either or both of these commodities declines relative to the price of pork, pork

[1] The coefficient of determination, R^2, was .95. Despite the encouraging statistical results obtained, it is obvious that all factors influencing the consumption of pork are not represented by the equation. For example, the kind or quality of the pork consumed undoubtedly varies regionally. Figures in parentheses on the line below the coefficients in this and in other equations are standard errors.

[2] Paul L. Kelley, John H. McCoy, and Milton Manuel, *The competitive position of Kansas in marketing hogs,* Kans. Agric. Exp. Sta. Tech. Bull. 118, 1961.

consumption also declines. Finally, even though the coefficient was not statistically significant, it is worth noting that there is some evidence that pork consumption tends to decline as income increases. Future developments in this connection will be of considerable importance to hog producers.

In order to make individual state predictions, state commodity prices and personal income were substituted into the demand equation. It was necessary to use the equation for the United States because data on per capita pork consumption by states are not available. Predicted pork-consumption data are given in Appendix Table 1.

Production Response

In order to analyze the economic position of Oregon hog producers, it is necessary to understand the factors that affect the production response of these producers as well as the potential demand for their product. While it is relatively simple to determine the major factors that affect pork production on the national level, evaluation of important factors on an individual-state basis may be quite difficult. This is because factors influencing farmers as a whole may be quite different from factors influencing farmers in a particular state. This is especially true for a state such as Oregon which is of minor importance in the industry.

Time-series regression analysis was used to aid in understanding the production response of Oregon hog producers. Both direct and opportunity costs were considered in the analysis.

The derived function was:

$$\hat{Y} = -.1606 - \underset{(3.518)}{10.2113}\ X_1 + \underset{(.5081)}{1.3254}\ X_2 + \underset{(.0611)}{.1555}\ X_3$$

where

$\hat{Y}$ = first difference in predicted hog production in Oregon in million pounds,

X_1 = first difference in ratio of price of beef steers to price of hogs in Oregon with a two-year lag,

X_2 = first difference in ratio of price of hogs to barley price in Oregon with a one-year lag,

X_3 = first difference in average October, November, and December hog-corn price ratio for the United States with a one-year lag.

Data for the equation included the years 1949-1961. All coefficients are significant at the 5% level. The coefficient of determination, R^2, for the function is .73.

The equation suggests that beef feeding is competitive with hog production for Oregon feed grain. That is, as the price of beef goes up relative to the price of hogs, some resources tend to move from the production of hogs to the production of beef. The equation emphasizes that barley is an important feed grain for Oregon hog production. The positive sign of the hog-corn price ratio means that the profitability of Oregon hog production is positively associated with the profitability of national hog production.

The equation was used to predict 1962 and 1963 hog production in Oregon. Predicted 1962 production was 59.0 million pounds. Actual 1962 production was 55.5 million pounds. This represents an error of about 6%. Predicted 1963 production was 57.0 million pounds, while preliminary estimates by the United States Department of Agriculture put Oregon 1963 production at 57.1 million pounds.

Transportation Problem Analysis

The primary purpose of using the transportation model was to determine which states would tend to offer the greatest degree of competition with Oregon hog producers. Hence, it was necessary to analyze a number of different assumed situations. Each situation will be discussed in detail.

The initial step was to divide the United States into various regions.[3] Vermont, Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut were combined for one region; and New Jersey, Delaware, and Maryland made up another. All other states were considered individually. Thus, the analysis was based on 41 separate regions.

This method requires that a single shipping or receiving point be selected for each region. Cities representing these points were selected so as to be centrally located with respect to population concentration in each area. It is recognized that the selected cities do not necessarily reflect points of greatest volume shipping. However, it was deemed more important to select points centralized with respect to population than it was to determine actual cities from which the greatest volume was shipped. Regions and points representing these regions are shown in Figure 2.

State pork-consumption predictions for 1961 were compared with 1961 hog-production data from each state in order to ascertain which regions were surplus producers of pork and which states were

[3] Only the continental United States was included.

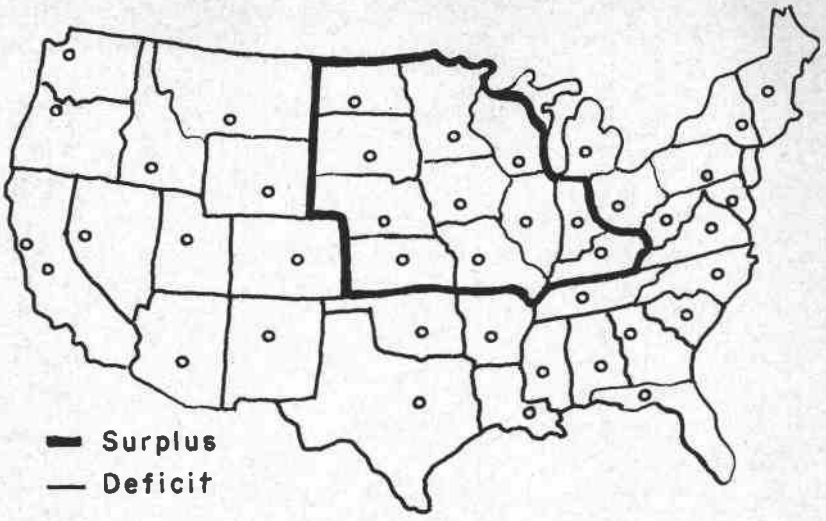

Figure 2. Pork surplus and deficit regions for 1961 and points representing these regions for interregional analysis.

deficit. Eleven regions were surplus and 30 were deficit (Appendix Table 2). The surplus states are contiguous and are located in or around the Corn Belt (Figure 2).

Transportation rates for pork among these cities were obtained for both live hogs and dressed meat. Transportation costs were based on rail freight rates among the various regions.

For the latter part of this analysis, it was necessary to estimate certain transportation charges where published rates did not exist. Simple linear regressions of reported transportation costs with respect to mileage between points were calculated. The derived equations were then used to predict the unknown transport costs.[4]

Situation I. Dressed pork, Oregon deficit

The first transportation model was designed to determine equilibrium flows under 1961 production and consumption conditions. It was assumed that all pork was processed in the producing areas and shipped as dressed pork. The problem consisted of 11 surplus areas and 30 deficit areas. Minimum total transportation cost flows are

[4] For live hogs: $Y_1 = 44.2715 + .1026\ X$, $r = .88$. For dressed meat: $Y_2 = 97.8247 + .1065\ X$, $r = .61$, where Y is predicted shipping cost per hundredweight and X is mileage between points.

given in Table 2. The shipment pattern illustrated in Figure 3 shows that Minnesota would be the primary supplier of pork to the Pacific Northwest. It is evident that North Dakota and South Dakota hold an absolute freight-rate advantage over Minnesota in shipping to Oregon. However, the solution is based on the principle of comparative rather than absolute rate advantage, and, in this case, Minnesota apparently holds the comparative advantage. The tremendous market potential of California is pointed out by the fact that California received pork from five different regions. It can be seen that Iowa, furnishing pork to 13 deficit areas, is in fact the center of the pork industry. Iowa shipped pork in every direction except to the Pacific Northwest.

Total transportation costs for shipping the 6 billion pounds of pork was 106.8 million dollars.

Situation II. Live hogs, Oregon deficit

It was assumed here that all hogs needed to supply deficit regions in 1961 were shipped live and slaughtered in the consuming regions. It should be noted that no inference is made that all pork is shipped by either of the two methods alone. It is known that some hogs are

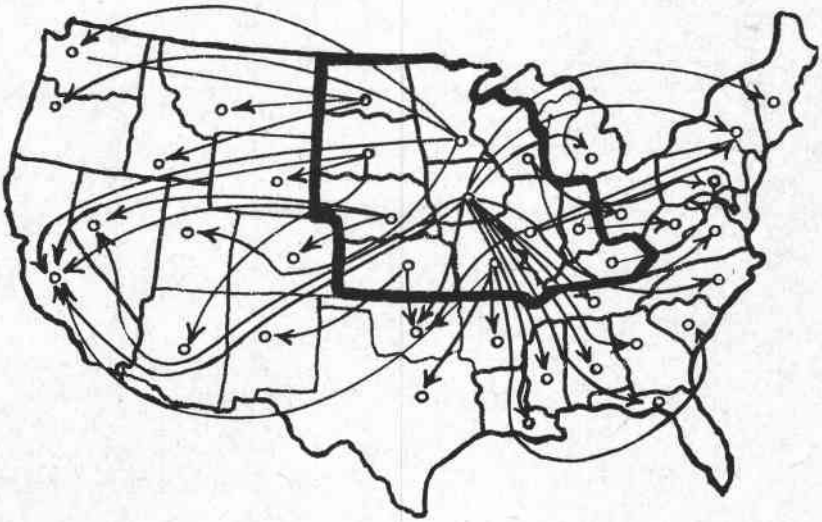

Figure 3. Equilibrium minimum transportation flow for dressed pork, 1961.

Table 2. Equilibrium Minimum Transportation Cost Flows for Dressed Meat, 1961 (10,000 lbs.)

FROM \ TO	Salina, Kansas	Grand Isl., Nebr.	Pierre, S. Dak.	Bismarck, N. Dak.	St. Paul, Minn.	Madison, Wisconsin	Des Moines, Iowa	Jeffn. City, Mo.	Frankfort, Ky.	Springfield, Ill.	Indianapolis, Ind.	TOTALS
Seattle				340	1,223							1,563
Portland					805							805
Fresno		3,192	3,107		1,990		1,336					9,625
Reno					14		150					164
Twin Falls							197					197
Billings				129								129
Casper			152									152
Salt Lake City					442							442
Denver	417	338										755
Albuquerque	548											548
Phoenix		825										825
Fort Worth								4,245				4,245

Oklahoma City							605					605
Little Rock								421				421
Baton Rouge							1,673					1,673
Jackson							479					479
Montgomery							422					422
Nashville							20					20
Lansing							3,420					3,420
Columbus								19			1,094	1,113
Charleston									611		357	968
Richmond						780	605					1,385
Harrisburg										6,185		6,185
Albany							10,498					10,498
Concord							1,244				5,289	6,533
Baltimore					1,544	975				3,231		5,750
Raleigh							448					448
Columbia								684				684
Atlanta							28					28
Tallahassee							2,678					2,678
TOTALS	965	4,355	3,259	469	6,018	1,755	23,803	5,369	611	9,416	6,740	62,760

shipped live and some as dressed pork. Flows derived for the equilibrium solution are given in Table 3 and illustrated in Figure 4. A comparison of Figures 3 and 4 shows some significant changes in the shipment pattern. When live hog rates are used, Iowa gains considerable advantage in shipping west. In general, its gain to western markets results in a loss of southeastern shipments. If hogs are transported live, Minnesota no longer has the western advantage it had for dressed meat. Hence North Dakota and South Dakota filled the Pacific Northwest deficit. Minnesota sent its surplus directly east to New York.

Transportation cost for the live-hog shipment pattern is 151.2 million dollars. An important implication arises when total transportation costs from live-hog flows are compared to transportation costs for dressed pork. This shows that if all the pork that was shipped from the surplus areas to the deficit areas in 1961 had been shipped as dressed pork, total cost would have been 44 million dollars less than if it were all shipped as live hogs. The existence of this situation over an extended period of time would tend to encourage development of slaughter facilities within the producing areas rather than in the deficit areas.

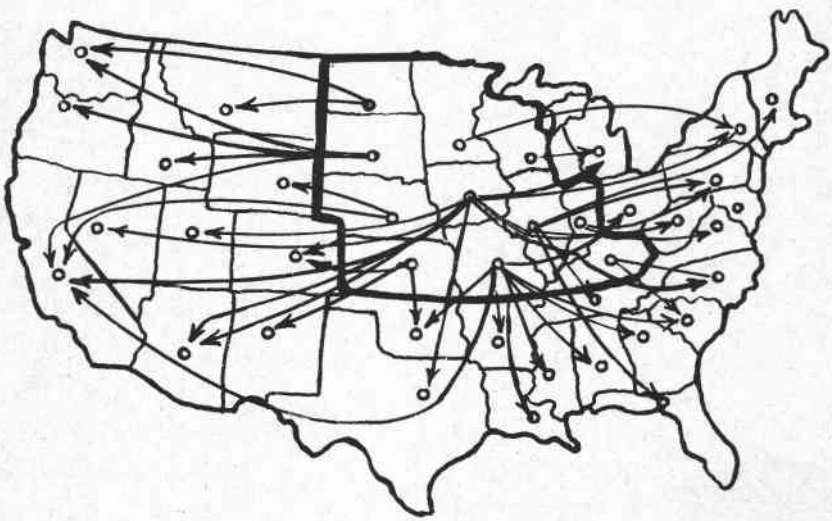

Figure 4. Equilibrium minimum transportation flow for live hogs, 1961.

Situation III. Projection to 1970

In order to take into account the effects of future changes in population and income on the competitive position of Oregon hog producers, several transportation problems were run under assumed 1970 conditions. This made it necessary to predict 1970 consumption in each region. Under the assumption that factors influencing pork consumption at the present would continue to be important in the future, the demand equation derived for estimating 1961 individual-state consumption was used for the predictions. As the primary purpose of using 1970 projections was to consider relative future changes in population and income among the regions, pork, beef, and chicken prices were assumed to be unchanged from 1961. Personal per capita income by states for 1970 was estimated in the following manner: The 1956 per capita personal income in each state was deflated through the use of the 1956 consumer price index of all items less food. The same was done with 1960 income. The average percent change for each state during this period was found. It was then assumed that the same percent change would occur from 1961 to 1965, and then again from 1966 to 1970.

Projected 1970 per capita pork-consumption data were derived from the demand equation using 1961 prices and 1970 estimated income. The 1970 state population estimates were based on United States Census Bureau projections. The projected population was multiplied by predicted per capita consumption in order to obtain total consumption for each state and for the United States.

For Situation III, it was assumed that each state produced the same relative share of pork that it did in 1961. Thus, percent of total pork production in each state in 1961 was multiplied by the predicted total consumption in 1970 of 13,933,431,000 pounds. The 1970 production obtained was automatically equal to total consumption. Then, consumption was subtracted from production in each area. The resulting deficits and surpluses are shown in Appendix Table 3. It is interesting to note that Georgia and Tennessee which were deficit in 1961 became surplus in this situation. This was a result of relatively slow projected population growth. Thus, even though production in these states was the same relative to other states, consumption was relatively less.

Transportation rates used for the problem were 1961 dressed-pork charges. Dressed meat rather than live-hog costs were used because of the relative total transportation cost of the two methods.

The minimum cost-flow pattern for Situation III is given in Table 4. A comparison of these flows with the results from Situation I indicates no basic change in the pattern of movement except that arising from the addition of two surplus regions in the Southeast.

Table 3. Equilibrium Minimum Transportation Cost Flows for Live Hogs, 1961 (10,000 lbs.)

FROM \ TO	Salina, Kansas	Grand Isl., Nebr.	Pierre, S. Dak.	Bismarck, N. Dak.	St. Paul, Minn.	Madison, Wisc.	Des Moines, Iowa	Jeffn. City, Mo.	Frankfort, Ky.	Springfield, Ill.	Indianapolis, Ind.	TOTALS
Seattle			2,147	596								2,743
Portland			1,411									1,411
Fresno		6,741	1,813				8,106	226				16,886
Reno							288					288
Twin Falls			346									346
Billings				226								226
Casper		267										267
Salt Lake City							775					775
Denver	693	632										1,325
Albuquerque	961											961
Phoenix							14,487					14,487
Fort Worth							446					446

Oklahoma City	39							1,022				1,061
Little Rock								739				739
Baton Rouge								2,935				2,935
Jackson								840				840
Montgomery								741				741
Nashville										35		35
Lansing						3,079	2,921					6,000
Columbus								1,952				1,952
Charleston							1,699					1,699
Richmond											2,430	2,430
Harrisburg							1,130			326	9,395	10,851
Albany					10,557		7,860					18,417
Concord										11,461		11,461
Baltimore							10,088					10,088
Raleigh									786			786
Columbia								914	286			1,200
Atlanta								50				50
Tallahassee										4,698		4,698
TOTALS	1,693	7,640	5,717	822	10,557	3,079	47,800	9,419	1,072	16,520	11,825	116,144

Table 4. Equilibrium Minimum Transportation Flow of Dressed Pork, 1970 Projected Situation III (10,000 lbs.)

FROM \ TO	Salina, Kans.	Grand Isl., Nebr.	Pierre, S. Dak.	Bismarck, N. Dak.	St. Paul, Minn.	Madison, Wisc.	Des Moines, Iowa	Jeffn. City, Mo.	Nashville, Tenn.	Frankfort, Ky.	Springfield, Ill.	Indianapolis, Ind.	Atlanta, Ga.	TOTALS
Seattle				270	1,629									1,899
Portland					978									978
Fresno		4,808	2,054		4,254		3,496							14,612
Reno							339							339
Twin Falls				218										218
Billings				159										159
Casper			171											171
Salt Lake City					620									620
Denver	516	611												1,127
Albuquerque	740													740
Phoenix			1,466											1,466

Fort Worth								5,656						5,656
Oklahoma City	42		366					16						424
Little Rock								112						112
Baton Rogue							1,655	382						2,037
Jackson							247							247
Montgomery													165	165
Lansing							4,692							4,692
Columbus												1,456		1,456
Charleston												868		868
Richmond						1,780								1,780
Harrisburg										1,088	4,074	1,280		6,442
Albany							6,472				5,242			11,714
Concord							7,079							7,079
Baltimore						429					2,496	4,660		7,585
Raleigh							364							364
Columbia								754					16	770
Tallahassee							5,030		344					5,374
TOTALS	1,298	5,419	4,057	647	7,481	2,209	29,374	6,920	344	1,088	11,812	8,264	181	79,094

Iowa was directly affected by the new surplus areas and shifted some of its shipments from the South to the far West. As before, Minnesota and North Dakota were the primary sources of pork for Oregon and Washington.

Situation IV. Oregon surplus

The 1970 projected consumption was used to test the effect on the industry of a disproportionate increase in hog production in Oregon. The purpose of this test was to determine if Oregon would compete with the southern corn-belt states for the California market or with the northern corn-belt states for the pork market in Washington. For this situation, an arbitrary production of 150 million pounds of pork was assumed for Oregon. This resulted in a 1970 estimated surplus of 10 million pounds (Appendix Table 3).

Results showed that the least-cost solution would exist when Oregon shipped its surplus pork to Washington (Table 5). This put Oregon hog producers in direct competition with North Dakota and Minnesota producers. It resulted in increased North Dakota movements to Idaho and Montana and a significant increase in California shipments for Minnesota.

Situation V. Increased production in Nebraska, Montana, and Texas

It is not logical to assume that in the future Oregon might be the only area to increase production significantly. There are no artificial barriers to entry into the hog industry. Thus, economic theory indicates that if there is in fact a profitable potential, all areas would attempt to obtain part of the profit. Hence, on the basis of present feedgrain production, Texas and Montana were chosen as deficit areas with the potential of becoming surplus. Also, Nebraska which is now surplus was considered as an area with the potential of greatly increasing production. It was assumed that Nebraska pork production increased to 700 million pounds, Texas to 800 million, and Montana to 65 million. Oregon's pork production remained at 150 million. The remaining production was divided among the other areas in the same manner as was used in Situation IV. The resulting surpluses and deficits are given in Appendix Table 3.

Thus, Situation V consisted of 16 surplus and 25 deficit areas. The minimum-cost solution given in Table 6 shows that Texas shipped its assumed surplus to New Mexico and Montana sent its pork to Wyoming. For the first time Nebraska entered the Northwest market, taking over the Seattle market from North Dakota and Minnesota. These two states were forced to go to the more distant market in California. This change put Oregon in direct competition with Ne-

braska. The new pattern shows that Iowa's share of the California market also declined. Therefore, in Situation V, Iowa began moving more of its pork to the East and Southeast.

Implications of this series of transportation models are that the northwest corn-belt states probably will be the main future competitors with Oregon in swine production. This is true whether Oregon farmers are competing for the deficit market in Oregon or for markets in other states. It is obvious that Oregon holds a freight-rate advantage over these corn-belt states for the Oregon deficit. This amounts to about $2.25 per hundred pounds for dressed pork and approximately $1.85 per hundred for live hogs. The basic question that must be answered is whether the midwestern states hold a cost-of-production advantage large enough to offset their freight-rate disadvantage.

Production Function and Cost of Production Analysis

In order to answer the question concerning relative cost of production among the regions, certain production and cost analyses were made. Data for the derivation of the production function and the cost of production analysis were obtained from a sample survey of Oregon hog producers. The survey included approximately one-third of the hog producers in 12 counties which are considered to be the most important potential hog-producing areas of the state. These 12 counties were chosen on the basis of past production, trends, availability of feed, and alternative enterprises. The counties were concentrated in two general areas, the Willamette Valley and the northeastern Blue Mountain area. The Willamette Valley included Clackamas, Marion, Linn, Lane, Benton, Polk, Yamhill, Washington, and Wasco counties. The Blue Mountain area consisted of Umatilla, Union, and Wallowa counties. The Cobb-Douglas production function derived from the data was:[5]

$$\log \hat{Y} = -1.4745 + \underset{(.0108)}{.0117} \log X_1 + \underset{(.0151)}{.01882} \log X_2 + \underset{(.1969)}{1.0281} \log X_3.$$

Where: $\hat{Y}$ = predicted production in number of 200 pound market hog equivalents,

X_1 = total investment in buildings and equipment in dollars,

X_2 = weekly labor input in hours,

X_3 = feed cost in dollars.

[5] Only b_3 was significantly different from zero at the 5 percent level. The coefficient of determination, R^2, was .991.

Table 5. Equilibrium Mimimum Transportation Cost Flow of Dressed Pork, 1970 Projected Situation IV (10,000 lbs.)

FROM \ TO	Portland, Ore.	Salina, Kans.	Grand Isl., Nebr.	Pierre, S. Dak.	Bismarck, N. Dak.	St. Paul, Minn.	Madison, Wisc.	Des Moines, Iowa	Jeffn. City, Mo.	Nashville, Tenn.	Frankfort, Ky.	Springfield, Ill.	Indianapolis, Ind.	Atlanta, Ga.	TOTALS
Seattle	104				251	1,548									1,903
Fresno			4,585	1,761		5,852		2,421							14,619
Reno			21					318							339
Twin Falls					221										221
Billings					163										163
Casper				172											172
Salt Lake City				622											622
Denver		374	758												1,132
Albuquerque		742													742
Phoenix				1,467											1,467
Fort Worth									5,666						5,666

Oklahoma City		164							271						435
Little Rock									122						122
Baton Rouge								2,041							2,041
Jackson								259							259
Montgomery										11				162	173
Lansing								4,697							4,697
Columbus													1,510		1,510
Charleston													870		870
Richmond							1,795								1,795
Harrisburg											1,068	3,879	1,507		6,454
Albany								6,869				4,848			11,717
Concord								7,083							7,083
Baltimore							372					2,931	4,289		7,592
Raleigh								382							382
Columbia									781						781
Tallahassee								5,064		317					5,381
TOTALS	104	1,280	5,364	4,022	635	7,400	2,167	29,134	6,840	328	1,068	11,658	8,176	162	78,338

Table 6. Equilibrium Minimum Transportation Cost Flow of Dressed Pork, 1970 Projected Situation V (10,000 lbs.)

FROM \ TO	Portland, Ore.	Billings, Mont.	Fort Worth, Tex.	Salina, Kans.	Grand Isl., Nebr.	Pierre, S. Dak.	Bismarck, N. Dak.	St. Paul, Minn.	Madison, Wisc.	Des Moines, Iowa	Jeffn. City, Mo.	Nashville, Tenn.	Frankfort, Ky.	Springfield, Ill.	Indianapolis, Ind.	Atlanta, Ga.	TOTALS
Seattle	104				1,813												1,917
Fresno					2,607	3,728	588	5,920		816	997						14,656
Reno								342									342
Twin Falls										230							230
Casper		115				65											180
Salt Lake City								625									625
Denver				500	89						570						1,159
Albuquerque			114	626													740
Phoenix					1,473												1,473
Oklahoma City										370	114						484

Little Rock											159						159
Baton Rouge										2,065							2,065
Jackson										314							314
Montgomery										95		186				1	282
Lansing										4,803							4,803
Columbus											1,831						1,831
Charleston															887		887
Richmond									1,868								1,868
Harrisburg										1,196			901	2,583	1,831		6,511
Albany										4,570				7,156			11,726
Concord										7,106							7,106
Baltimore									34		1,822			930	4,841		7,627
Raleigh										544							544
Columbia											835						835
Tallahassee										5,419							5,419
TOTALS	104	115	114	1,126	5,982	3,793	588	6,887	1,902	27,528	6,328	186	901	10,669	7,559	1	73,783

Regression coefficients of the Cobb-Douglas function directly give elasticity of production of the respective factors of production. Also, the sum of the coefficients expresses returns to scale. In this case, the sum of the coefficients was not significantly different from one. This indicates constant returns to scale in the Oregon hog-producing industry. The important implication of this analysis is that if there are constant returns to scale in the industry, it is possible to expand hog production either by increasing the number of relatively small plants that exist in Oregon today or by increasing the size of existing plants. Although per-unit profit could not be improved by plant expansion, total profit, as a result of more units being sold, would increase. However, this conclusion must be accepted with considerable reservation for the reasons outlined below.

Although the production function analysis indicated constant returns to scale, an analysis of cost-of-production data indicates that there was some decrease in per-unit costs as the size of the hog enterprise increased. Investment in buildings and equipment declined rapidly and then tended to level off as sow herd size increased. Investment per sow and two litters was almost $100 less for the enterprises consisting of more than 60 sows than it was for sow herds of 10 or less (Table 7). The table indicates that investment for given size herds tended to be lower in the Blue Mountain area than in the Willamette Valley area.

Hours of labor per unit of output also tended to decline with larger plants. It is important to note that the higher capital requirements in the Willamette Valley were not offset by lower labor requirements (Table 7). This indicates that, excluding feed costs, cost of production tended to be higher in the Valley than in the Blue Mountain area.

An overall average of about 430 pounds of corn equivalent was required to produce 100 pounds of pork (this includes feed for the breeding herd). The principal difference in feed costs per hundred pounds of output did not come from differences in feeding efficiency but rather from the differentials in the cost of feed bought by the farmers. Based on October 1962 prices, the range in feed cost per hundred pounds of pork was from $10.44 to $14.81. The above data, as mentioned earlier, are based on survey conditions and are average results. A carefully developed, efficiently managed operation would obviously achieve much more satisfactory results.

There is an apparent inconsistency between the production function analysis, which indicates constant returns to size, and the data in

Table 7. Capital and Labor Inputs as Related to Size of Sow Herd in Three Oregon Areas[1]

Input		Size of sow herd					Average (all sizes)
		Under 10	10-19	20-39	40-59	60 or more	
Area 1[2]	Labor—Hours per 100 lbs. pork	1.83	1.33	1.20	.80	.70	1.10
	Labor—Hours per sow & two litters	55	40	36	28	21	33
	Capital ($)[5]	385	369	295	283	297	312
Area 2[3]	Labor—Hours per 100 lbs. pork	1.43	.97	1.07	.83	.60	.97
	Labor—Hours per sow & two litters	43	29	32	25	18	29
	Capital ($)[5]	394	324	306	324	311	323
Area 3[4]	Labor—Hours per 100 lbs. pork	1.58	.93	.90	.93	.67	1.00
	Labor—Hours per sow & two litters	47	28	27	28	20	30
	Capital ($)[5]	309	253	288	248	227	267
State average	Labor—Hours per 100 lbs. pork	1.63	1.00	1.03	.87	.67	1.00
	Labor—Hours per sow & two litters	49	30	31	26	20	30
	Capital ($)[5]	367	317	294	286	273	298

[1] Source: Sample survey of approximately one-third of hog producers in 12 counties listed below.
[2] Benton, Linn, Lane, Polk, Washington, and Yamhill counties. Average sow herd size, 12.
[3] Clackamas, Marion, and Wasco counties. Average sow herd size, 25.
[4] Umatilla, Union, and Wallowa counties. Average sow herd size, 31.
[5] Capital—Includes all buildings and equipment associated with the hog enterprise, but does not include investment in feed, animals, or land.

Table 7 which show resource requirements declining as size of enterprise increases. The explanation appears to be as follows:

1. There is increased efficiency in the use of labor and equipment as size of enterprise increases.
2. There is little difference in feed conversion efficiency as size of enterprise is varied.
3. Feed is by far the most important input in hog production. As a consequence, its influence dominated that of labor and capital in the production function analysis.

An attempt was made to compare cost of production in Oregon with midwest costs. It was found that reliable cost information is difficult or, in many cases, impossible to obtain. However, a study by Purdue University did shed light on this question.[6] Results of the Purdue study were compared with data derived from the Oregon survey described in the previous section. Assuming that the Purdue study is representative of the Midwest, the analysis indicated that the average capital requirements, labor inputs, and feed inputs for hog production are slightly higher in Oregon than in the Midwest (Table 8). When the larger, more efficient producers in Oregon were compared with farmers in the Midwest, it was apparent that physical input requirements of feed, labor, and capital were almost identical.[7]

Although physical requirements are similar, there is a significant variation in feed costs per unit of feed between areas. These feed cost differentials vary considerably from year to year. The average difference and range in differences for two periods between Portland and certain midwestern points are given in Table 9. These differentials are expressed in terms of per ton cost in corn-equivalent feeding value for hog production.

Table 10 gives freight rates per hundredweight on fresh dressed pork and live hogs from certain midwest points to Portland. Also listed are cost-of-production differentials per hundredweight arising from the average feed-cost difference during the years 1954-1961.

These data show that, using 1954-1961 average feed-cost differentials (which are lower than 1946-1961 averages), Oregon would have been at a disadvantage if dressed meat had been shipped. Fur-

[6] Ronald H. Bauman, et. al., *Economies of size and economic efficiency in the hog enterprise,* Ind. Agric. Exp. Sta. Res. Bull. 699, 1961.

[7] The reader may wish to compare the input requirements for Oregon and Indiana with those reported from an earlier study in Oregon. See Grant E. Blanch, *Economics of hog production in Oregon,* Oreg. Agric. Exp. Sta. Bull. 561, 1957. Although the Blanch study was conducted approximately a decade earlier than the one being reported on here and the method of analysis is somewhat different, there is considerable similarity both in the data developed and in the conclusions reached.

Table 8. Inputs per Hundredweight of Hogs Produced in Oregon and Indiana,[3] by Different Sized Enterprises

Input	Size of sow herd					Average (all sizes)
	Under 10	10-19	20-39	40-59	60 or more	
Indiana						
Feed (pounds)[1]	426	417	406	392	396	408
Labor (hours)	1.3	1.1	.95	.75	.60	1.0
Capital ($)[2]	11.70	9.07	9.00	8.57	9.03	9.23
Oregon						
Feed (pounds)[1]	437	439	414	426	434	430
Labor (hours)	1.63	1.00	1.03	.87	.67	1.0
Capital ($)[2]	12.23	10.57	9.80	9.53	9.10	9.93

[1] Corn equivalent.
[2] Excluding investments in feed, hogs, and land.
[3] Source of Indiana data:
"Economies of size and economic efficiency in the hog enterprise," Purdue University Research Bulletin No. 699, September 1961.
Source of Oregon data:
Sample survey of hog producers in 12 Oregon counties.

Table 9. Feed Costs Differentials Between Portland and Four Midwest Points (Per ton in corn equivalent)

	Kansas City	Minneapolis	Chicago	Omaha
Average 1946-1953	10.66	10.84	13.58	13.47
Average 1954-1961	9.49	10.18	10.32	10.81
Range 1946-1953	7.32–14.30	3.21–19.69	8.08–20.19	8.08–20.19
Range 1954-1961	5.04–13.05	6.37–13.74	3.99–17.65	3.99–20.55
Highest three-year average	1949–51	1951–53	1950–52	1950–52
Lowest three-year average	1954–56	1946–48	1954–56	1954–56

ther, Oregon is at a disadvantage with Nebraska if Nebraska ships either live hogs or dressed meat. Even more important, in only two years (1955 and 1956) during the 17-year period (1945-1961) could Oregon compete favorably with Nebraska. That is, considering the feed-cost differentials that existed during each year and the present freight-rate structure, Nebraska farmers could put pork into Portland at less cost than Oregon farmers in 15 of the last 17 years.

Data of Table 10 are made more significant in view of the results of the transportation analysis. Based on freight rates, Minnesota and Nebraska were shown to be major competitors with Oregon. Historically, these same two states have held feed cost advantages over Oregon.

Table 10. Freight Rates for 1961 per Hundredweight and per Hundredweight Cost of Production Differential Based Upon 1954-61 Feed Costs in Portland and Selected Areas

	Kansas City	Minneapolis	Chicago	Omaha
Freight rate (live)	$2.17	$2.21	$2.63	$2.03
Cost-of-production differential (live)[1]	2.03	2.20	2.25	2.33
Net Oregon advantage[2]	+.14	+.01	+.38	–.30
Freight rate (dressed)	2.40	2.31	2.70	2.31
Cost of production differential (dressed)[1]	3.56	3.85	3.95	4.09
Net Oregon advantage[2]	–1.16	–1.54	–1.25	–1.78

[1] Production costs in Oregon minus production costs in each of the three midwest regions.

[2] Oregon freight rate advantage minus Oregon cost-of-production disadvantage.

Policy Implications

When the implications of the analysis presented in this bulletin up to this point are examined, the wisdom of greatly increasing hog production in Oregon must be questioned. That is, care must be taken that long-run as well as present or short-run considerations are taken into account. If historical feed-grain cost relationships continue into the future, Oregon farmers must exercise superior management or realize some other efficiency to offset the historical disadvantage which has existed.

Many suggestions have been made concerning the improvement of the competitive position of Oregon producers. One proposal is that large amounts of government surplus grain be released in the Northwest. This would supposedly bring the price of feed grain in Oregon down to a point where Oregon farmers could compete. Another suggestion has been that the government impose a two-price plan for wheat in Oregon that would allow wheat to compete with feed grain in price. In order to compete with $45 barley, wheat would have to be in the neighborhood of $1.50 per bushel.

Oregon's competitive position would also improve if there should be a marked improvement in the per acre yield of feed grains in the Pacific Northwest (wheat and/or barley) relative to feed-grain yields in competing areas. Information is not presently available to permit such a prediction, although some believe it may be a possibility.

Appendix Table 1. PORK CONSUMPTION BY STATES, 1961
(Predicted and adjusted consumption)

State	Pork price per pound	Chicken price per pound	Beef price per pound	Adjusted average personal income	Predicted consumption per capita	Adjusted consumption per capita[1]	Population	Total consumption
	Cents	*Cents*	*Cents*	*Dollars*	*Pounds*	*Pounds*	*1,000*	*Pounds*
Maine	58.7	41.7	86.9	1,787	65.98	61.98	992	61,484,160
N.H.	56.8	40.8	91.1	2,003	68.24	64.24	621	39,893,040
Vt.	55.6	38.5	88.0	1,787	67.57	63.57	395	25,110,150
Mass.	56.4	39.6	91.5	2,471	68.24	64.24	5,234	336,232,160
R.I.	60.2	39.7	94.6	2,170	66.62	62.62	867	54,291,540
Conn.	59.0	39.8	92.1	2,766	66.69	62.69	2,614	163,871,660
N.Y.	55.3	39.2	85.3	2,683	67.02	63.02	17,033	1,073,419,660
N.J.	56.8	39.3	91.0	2,567	67.72	63.72	6,244	397,867,680
Pa.	55.0	37.9	82.8	2,155	66.13	62.13	11,468	712,506,840
Ohio	51.5	37.2	80.4	2,209	67.59	63.59	9,876	628,014,840
Ind.	48.5	36.3	77.8	2,091	68.60	64.60	4,711	304,330,600
Ill.	52.5	36.8	80.3	2,517	66.74	62.74	10,258	643,586,920
Mich.	53.2	36.3	77.8	2,153	65.40	61.40	7,954	488,375,600
Wis.	51.3	35.5	74.5	2,095	65.48	61.48	4,022	247,272,560
Minn.	50.2	38.1	77.6	2,010	67.92	63.92	3,470	221,802,400
Iowa	53.5	39.5	79.6	2,044	66.69	62.69	2,779	174,215,510
Mo.	49.9	35.9	77.9	2,136	67.55	63.55	4,378	278,221,900
N.D.	52.7	39.2	79.4	1,403	67.12	63.12	640	40,396,800
S.D.	52.8	39.6	78.6	1,705	66.92	62.92	690	43,414,800
Nebr.	49.5	36.3	75.0	2,038	67.09	63.09	1,431	90,281,790
Kans.	51.2	37.2	78.6	2,038	67.27	63.27	2,194	138,814,380
Del.	54.6	37.0	85.2	2,860	66.80	62.80	458	28,762,400

Md.	53.4	37.3	83.2	2,342	67.15	63.15	3,188	201,322,200
Va.	52.0	35.9	79.3	1,806	66.56	62.56	4,059	253,931,040
W.Va	52.2	36.2	81.9	1,596	67.30	63.30	1,830	117,105,000
N.C.	51.6	33.3	79.2	1,550	66.05	62.05	4,614	286,298,700
S.C.	52.3	35.3	81.3	1,362	66.80	62.80	2,407	151,159,600
Ga.	51.2	34.5	80.7	1,554	67.12	63.12	3,987	251,659,440
Fla.	53.1	37.0	78.3	1,884	65.84	61.84	5,222	322,928,480
Ky.	51.0	34.8	77.8	1,537	66.49	62.49	3,076	192,219,240
Tenn.	50.1	36.5	76.8	1,507	67.31	63.31	3,615	228,865,650
Ala.	48.4	34.7	75.6	1,403	67.59	63.59	3,302	209,974,180
Miss.	49.2	34.5	77.5	1,165	67.56	63.56	2,215	140,785,400
Ark.	50.2	35.2	78.0	1,342	67.22	63.22	1,797	113,606,340
La.	52.9	34.6	77.5	1,535	65.05	61.05	3,321	202,747,050
Okla.	49.8	35.6	76.3	1,776	67.08	63.08	2,360	148,868,800
Tex.	51.0	35.6	75.2	1,864	65.94	61.94	9,788	606,268,720
Mont.	52.3	43.1	78.5	1,897	68.26	64.26	682	43,825,320
Idaho	51.6	44.2	75.7	1,752	68.24	64.24	684	43,940,160
Wyo.	53.1	40.5	79.6	2,234	67.24	63.24	338	21,375,120
Colo.	51.5	38.3	76.1	2,315	66.64	62.64	1,781	111,561,840
N.Mex.	52.4	40.4	81.5	1,721	68.29	64.29	983	63,197,070
Ariz.	55.0	42.1	80.0	1,924	66.57	62.57	1,391	87,034,870
Utah	56.2	41.4	78.6	1,871	65.13	61.13	916	55,995,080
Nev.	58.4	44.0	85.8	2,798	66.48	62.48	299	18,681,520
Wash.	59.0	50.9	83.8	2,250	67.57	63.57	2,902	184,480,140
Oreg.	56.1	47.8	80.0	2,155	67.50	63.50	1,799	144,236,500
Calif.	56.0	43.1	79.4	2,631	65.96	61.96	16,397	1,015,958,120

[1] Predicted consumption per capita was multiplied by population in each state and then all total state consumption figures were added together. It was found that total consumption predicted from the equation exceeded actual total United States consumption by 4 pounds per person. Thus, a constant of 4 subtracted from each predicted per capita consumption in order to get the adjusted consumption per capita given in this column.

Appendix Table 2. Production and Predicted Consumption of Pork and the Resulting Surplus or Deficit by State, 1961

State	Total consumption	Total production	Net deficit (–) or surplus (+)
Maine	61,484,160	3,377,580	–58,106,580
N.H.	39,893,040	2,251,720	–37,641,320
Vt.	25,110,150	1,688,790	–23,421,360
Mass.	336,232,160	15,762,040	–320,470,120
R.I.	54,291,540	1,688,790	–52,602,750
Conn.	163,871,660	2,814,650	–161,057,010
N.Y.	1,073,419,660	23,643,060	–1,049,776,600
N.J.	397,867,680	15,762,040	–382,105,640
Pa.	712,506,840	94,009,310	–618,497,529
Ohio	628,014,840	516,769,744	–111,245,096
Ind.	304,330,600	978,372,347	+674,041,748
Ill.	643,586,920	1,585,210,893	+941,623,973
Mich.	488,375,600	146,361,801	–342,013,799
Wis.	247,272,560	422,760,433	+175,487,873
Minn.	221,802,400	823,566,597	+601,764,197
Iowa	174,215,510	2,554,576,360	+2,380,360,850
Mo.	278,221,900	815,122,646	+536,900,746
N.D.	40,396,800	87,254,150	+46,857,351
S.D.	43,414,800	369,282,082	+325,867,283
Nebr.	90,281,790	525,776,624	+435,494,834
Kans.	138,814,380	235,304,741	+96,490,362
Del.	28,762,400	6,192,230	–22,570,170
Md.	201,322,200	30,961,150	–170,361,050
Va.	253,931,040	115,400,650	–138,530,389
W.V.	117,105,000	20,265,480	–96,839,520
N.C.	286,298,700	241,496,971	–44,801,728
S.C.	151,159,600	82,750,710	–68,408,889
Ga.	251,659,440	248,815,061	–2,844,378
Fla.	322,928,480	55,167,141	–267,761,339
Ky.	192,219,240	253,318,501	+61,099,262
Tenn.	228,865,650	226,860,791	–2,004,858
Ala.	209,974,180	167,753,141	–42,221,039
Miss.	140,785,400	92,883,450	–47,901,949
Ark.	113,606,340	71,492,110	–42,114,229
La.	202,747,050	35,464,590	–167,282,460
Okla.	148,868,800	88,380,010	–60,488,789
Tex.	606,268,720	181,826,392	–424,442,328
Mont.	43,825,320	30,961,150	–12,864,170
Idaho	43,940,160	24,205,990	–19,734,170
Wyo.	21,375,120	6,192,230	–15,182,890
Colo.	111,561,840	36,027,520	–75,534,320
N.Mex.	63,197,070	8,443,950	–54,753,120
Ariz.	87,034,870	4,503,440	–82,531,430
Utah	55,995,080	11,821,530	–44,173,550
Nev.	18,681,520	2,251,720	–16,429,800
Wash.	184,480,140	28,146,500	–156,333,640
Ore.	114,236,500	33,775,800	–80,460,700
Calif.	1,015,958,120	53,478,350	–926,479,770
Total	11,380,193,090	11,380,193,090	00,000,000,000

Appendix Table 3. Projected Pork Production, Surpluses, and Deficits Under Different Assumed 1970 Situations

State	Situation III		Situation IV		Situation V	
	Production	Surplus or deficit	Production	Surplus or deficit	Production	Surplus or deficit
Maine	4,180	-59,879	4,135	-59,924	3,666	-60,393
N.H.	2,787	-41,895	2,757	-41,925	2,444	-42,238
Vt.	1,393	-22,727	1,378	-22,742	1,222	-22,898
Mass.	19,507	-327,968	19,297	-328,297	18,328	-329,147
R.I.	1,393	-60,372	1,378	-60,387	1,222	-60,543
Conn.	2,787	-195,085	2,757	-195,115	2,444	-195,428
N.Y.	29,260	-1,171,398	28,945	-1,171,713	28,102	-1,172,556
N.J.	19,507	-481,541	19,297	-481,751	18,328	-482,720
Pa.	115,647	-644,173	114,402	-645,418	108,744	-651,076
Ohio	632,578	-145,581	627,146	-151,013	595,038	-183,121
Ind.	1,198,275	+826,380	1,189,510	+817,615	1,127,761	+755,866
Ill.	1,940,927	+1,181,195	1,925,545	+1,165,813	1,826,655	+1,066,923
Mich.	179,741	-469,154	179,185	-469,710	168,614	-480,281
Wis.	516,930	+220,855	512,744	+216,669	486,294	+190,219
Minn.	1,008,780	+748,095	1,000,677	+739,992	949,372	+688,687
Iowa	3,128,056	+2,937,400	3,104,030	+2,913,374	2,943,420	+2,752,764
Mo.	997,634	+691,994	989,650	+684,010	938,376	+632,736
N.D.	107,287	+64,666	106,132	+63,511	101,413	+58,792
S.D.	452,837	+405,689	449,340	+402,192	426,423	+379,275
Nebr.	643,725	+541,941	638,173	+536,389	700,000	+598,216
Kans.	288,422	+129,772	286,695	+128,045	271,249	+112,599
Del.	6,967	-39,380	6,892	-39,455	6,109	-40,238
Md.	37,620	-237,584	37,215	-237,989	35,433	-239,771
Va.	140,728	-178,006	139,213	-179,521	131,959	-186,775

(*Continued on page 36.*)

APPENDIX TABLE 3—Continued

State	Situation III		Situation IV		Situation V	
	Production	Surplus or deficit	Production	Surplus or deficit	Production	Surplus or deficit
W. Va.	25,080	-86,777	24,810	-87,047	23,215	-88,642
N.C.	295,389	-36,416	293,587	-38,218	277,358	-54,447
S.C.	101,714	-77,035	100,619	-78,130	95,304	-83,445
Ga.	305,142	+18,065	303,235	+16,158	287,133	56
Flo.	66,880	-537,351	66,160	-538,071	62,314	-541,917
Ky.	310,716	+108,780	308,749	+106,813	292,021	+90,085
Tenn.	277,275	+34,361	275,669	+32,755	261,474	+18,560
Ala.	204,821	-16,469	203,995	-17,295	193,051	-28,239
Miss.	114,254	-24,648	113,024	-25,878	107,522	-31,380
Ark.	87,781	-11,217	86,836	-12,162	83,085	-15,913
La.	43,194	-203,643	42,729	-204,108	40,321	-206,516
Okla.	108,681	-42,368	107,511	-43,538	102,635	-48,414
Tex.	222,935	-565,620	221,913	-566,642	800,000	+11,445
Mont.	37,620	-15,863	37,215	-16,268	65,000	+11,517
Idaho	29,260	-21,786	28,945	-22,101	28,102	-22,944
Wyo.	6,967	-17,112	6,892	-17,187	6,109	-17,970
Colo.	44,587	-112,704	44,107	-113,184	41,543	-115,748
N.Mex.	9,753	-74,048	9,648	-74,153	9,775	-74,026
Ariz.	5,573	-146,589	5,513	-146,649	4,887	-147,275
Utah	13,933	-62,037	13,783	-62,187	13,440	-62,530
Nev.	2,787	-33,853	2,757	-33,883	2,444	-34,196
Wash.	34,834	-189,883	34,459	-190,258	32,990	-191,727
Oreg.	41,800	-97,820	150,000	+10,380	150,000	+10,380
Calif.	65,487	-1,461,211	64,782	-1,461,916	61,092	-1,465,606
Total	13,933,431	00,000,000	13,933,431	00,000,000	13,933,431	00,000,000