INTERREGIONAL AND INTERNATIONAL COMPETITION IN THE PORK INDUSTRY

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Pork is an important component of the American diet -- ranking second to beef in the meat category. Both production and consumption of pork vary due to the biological nature of production and lags in response to changing demand and price signals. Pork production and consumption are also responsive to technologies availability and cost of substitutes.

PORK PRODUCTION, TRADE, AND CONSUMPTION

During the 1970-1985 period, U.S. pork production ranged from 11.8 billion pounds in 1975 to 16.6 billion pounds in 1980 (table 1). Pork production is cyclical in the United States with no apparent trend during the 15-year period 1970-85.

U.S. exports and imports of pork are of minor importance compared with the production-consumption balance (table 1). Prior to 1980, imports and exports of pork were nearly balanced -- net imports usually in the range of 200 to 300 million pounds, accounting for 1% to 2% of U.S. consumption. However, between 1980 and 1985 imports of pork trended sharply upward while exports trended downward. Based on a preliminary estimate for 1985, net imports of pork approached 1 billion pounds and accounted for about 6% of total consumption. This trend portends the U.S. becoming a major importer of pork.

During the 1970-1985 period, pork consumption in the U.S. paralleled production -- ranging from a low of 11.8 billion pounds in 1975 to a high of 16.6 billion pounds in 1980. During this same period, pork consumption per capita ranged from a low of 55.4 pounds in 1975 to a high of 78.7 pounds in 1971. Pork consumption in the U.S. exhibits a cyclical pattern with an underlying slight downward trend.

Although the United States has traditionally been near self-sufficient in pork, this is not the case with individual states and regions. Pork production (hog slaughter) is supply oriented and occurs in close proximity with hog production. However, part of the pork curing and processing -- including speciality products -- is market oriented.

Hog production is concentrated in the North Central Region of the United States and more specifically in the Central Corn Belt (figure 1). This concentration of hog production coincides with the major concentration of feed grain production -- especially corn. The major concentration of hog production centers in Iowa, Illinois and Indiana but extends westward into eastern Kansas, Nebraska, and South Dakota, northward into southern Minnesota, Wisconsin and Michigan and eastward into western Ohio.

Minor areas of hog production include the South Atlantic Coastal area extending from eastern Virginia through the eastern Carolinas into southern Georgia and Alabama; and the western parts of Kentucky and Tennessee. These areas also coincide with minor concentrations of corn production. The Northeast and Western Regions of the United States are highly deficit in pork.

U.S. REGIONAL COMPARISONS IN PORK PRODUCTION

Locational ramifications in competitiveness or profitability in hog production depend largely on locational differences in feed costs, feed conversion efficiency, housing and labor costs; and on returns or prices received for hogs.

Van Arsdall and Nelson completed an analysis of returns and costs to hog production in the United States (1). Although the study focuses on economies of size, estimates are provided on returns and costs for the North Central and Southeast regions separately. These estimates are summarized in table 2 for the base years 1982 and 1983, by region and by size group.

Hog production was relatively profitable in 1982 but highly unprofitable (losses) in 1983 due to higher feed costs and lower prices received for hogs. An upsurge in feed prices in 1983 is attributed to the supply reducing impacts of the PIK (Payment-in-Kind) program and widespread drought.

Gross Returns to Hog Production (Prices)

According to the Van Arsdall-Nelson study (1), prices received for hogs (returns per hundredweight of product sold) were nearly equal in the Southeast and North Central regions (table 1). This concurs with a study by Sullivan (2) in which he found no significant difference in prices received for hogs between Iowa and the Southeast.

Apparently, off-setting forces tend to equalize prices received for hogs in the North

Central and Southeast Regions. The concentration of hogs in the North Central Region with attendant economies of size in slaughter and lower assembly cost exert an upward pressure on hog prices. Conversely, the large surplus of pork in the North Central Region requires substantial transportation costs to move pork to ultimate consumer markets. This relatively high distribution cost exerts a downward pressure on prices received for hogs.

The Southeast Region has an advantage in proximity to consumer markets which lowers distribution costs and exerts an upward pressure on prices received for hogs. Variable and sparse supplies of slaughter hogs in the Southeast, in consort with a loose vertical infrastructure, contributes to relatively high assembly and slaughter costs. The higher costs exert a downward pressure on prices received for slaughter hogs.

A comprehensive economic analysis of the Southeast Hog-Pork Industry was completed by Rohdy (3) for the 1960 and 1970 (projected) base years. This study developed optimal location patterns of hog slaughter and obtained flow patterns for hogs and pork through slaughter to designated consuming areas. Under optimal patterns, hogs move southward for slaughter due to lower labor and energy costs. Subsequently, under optimal conditions pork flows northeastward, southeastward, and southwestward to consuming markets.

Regional Costs Incurred in Hog Production

The North Central Region holds an advantage in hog production through lower unit costs (1) -- summarized in table 2. Cost per hundredweight of output are about $2 (1982-83 prices) lower in the North Central Region compared with the Southeast Region. This cost difference is attributed largely to higher feed costs in the Southeast -- especially the energy (corn) component of feed. The Sullivan (2) study also revealed lower feed cost in the North Central Region -- especially the energy (corn) component of the diet.

Amick and Purcell (4) concluded that feed efficiency (feed/cwt gain) in hog production is optimal between 55° and 65°F, with efficiency decreasing rapidly with both lower and higher temperature. Based on data from selected swine evaluation stations in the Southeast and North Central Regions and climatological records of the United States Weather Bureau. Amick and Purcell (5) derived cost estimates for swine production by location. Although the North Central Region holds an annual average advantage in lower unit costs of hog production, their advantage was much smaller during the winter season. The Southeast Region also holds a slight advantage in lower labor, energy (excluding feed) and building costs.

Regional Net Returns to Hog Production

Estimates derived from the Van Arsdall-Nelson (1) study for the base years 1982 and 1983 indicate net returns in 1982 ranged from (-$3.14) to $12.27 by size unit and averaged $5.24/cwt of output in the Southeastern Region (table 2). In the North Central Region net returns ranged from (-$2.82) for the smallest unit to $14.59 for the largest unit and averaged $6.64.

Only the 10,000 head unit in the North Central Region realized a positive return ($1.67/cwt) in 1983. Losses in the Southeastern Region in 1983 ranged from (-$17.27) for the smallest unit to (-$1.58) for the largest unit and averaged (-$8.54). Losses in the North Central Region ranged from (-$17.98) for the smallest unit to (-$0.64) for the 3,000 head unit and averaged (-$6.65).

SUMMARY AND IMPLICATIONS

Except for cyclical variation, pork production and consumption in the United States were rather static, and near balance for the 1970-85 era. However, the sharp upward trend in net imports of pork, during 1980-85, portends a declining competitive position of the United States in world markets. Net imports of pork were relatively small in 1985 -- accounting for only 6% of the domestic market, but this was a substantial increase from the 1% to 2% for years prior to 1980. The underlying causes of this upward trend in pork imports deserves careful analysis beyond the scope of this paper. Apparently the declining value of the Canadian dollar relative to the U.S. dollar was a factor underlying the increase in pork imports from Canada.

The North Central Region dominates hog-pork production in the United States. However, areas of minor concentrations of pork production include the South Atlantic coastal area extending from Virginia southward into north Florida and southeast Alabama, and the western half of Kentucky and Tennessee.

The Southeast Region of the U.S. has some advantages in hog-pork production including: 1) proximity to growth markets, 2) a winter season advantage in feed conversion, and 3) slightly lower building and nonfeed energy costs. However, the Southeast Region has substantially higher feed costs -- especially the energy (corn) component of the diet. This disadvantage in feed costs more than off-sets other advantages, resulting in gross cost per unit of output about $2/cwt higher than the North Central Region in the mid 1980s. Prices received for slaughter hogs are near equal in the North Central and Southern areas.

Due to economies of size, hog production in the United States is expected to trend to larger and more specialized enterprises. Also, the high degree of price variability and risk portends closer vertical coordination of hog production, slaughter-processing, and merchandising in the future. Large vertically coordinated hog producing units can contribute

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to a uniform flow of high quality product at costs more competitive with the highly integrated poultry industry. Under a scenario of increasing capital costs, less capital intensive open-field production techniques may be economically viable in the Southeast. This would improve the competitive position of hog producers in the Southeast. However, additional research is needed in this area.

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NOTES AND REFERENCES

(1) Van Arsdall, Roy N. and Kenneth E. Nelson. 1985. Economics of Size in Hog Production. Econ. Res. Serv., U.S. Department of Agr. Tech. Bul. No. 1712.

(2) Sullivan, Gene D. 1981. Southeastern Pork Production: A Clue to Future Food Price Changes? Federal Reserve Bank of Atlanta, Economic Review. Dec. 1981 .pp 24-28.

(3) Rohdy, D. D. 1964. Southeast Hog-Pork Industry: A National Market Competitor. Southern Cooperative Series Bulletin No. 89.

(4) Amick, R. J. and J. C. Purcell. 1964. Temperature and Feed Conversion by Swine. Jour. of Farm. Econ. vol. 46, No. 8, pp 1227-1231.

(5) Amick, R. J. and J. C. Purcell. 1966. Costs and Returns In Finishing Swine. Ga. Agr. Exp. Sta. Bul. N.S. 162.

Table 1. Pork production, trade and consumption, carcassweight, U.S., 1970-1985

Year	Production	Imports	Exports	Consumption Total	Consumption Per capita
	- - - - - - - - - mil lb - - - - - - - - - -			- - - - - - lb - - - - - - -	
1970	14,699	491	194	14,661	72.6
1971	16,006	496	198	16,127	78.7
1972	14,422	538	236	14,712	70.9
1973	13,223	533	279	13,298	63.5
1974	14,331	488	204	14,493	68.5
1975	11,779	439	317	11,852	55.4
1976	12,688	469	316	12,667	58.6
1977	13,248	440	294	13,202	60.5
1978	13,393	495	288	13,293	60.3
1979	15,450	499	291	15,353	68.8
1980	16,616	550	252	16,574	73.5
1981	15,872	541	307	15,927	69.9
1982	14,229	612	214	14,425	62.7
1983	15,199	702	219	15,369	66.2
1984	14,812	954	164	15,396	65.7
1985	14,555	1,100	120	15,547	65.7

Source: 1970-83 - Livestock and Meat Statistics, 1983 USDA ERS Stat. Bull. No. 715.
1984-85 - Livestock and Poultry Outlook Situation Report USDA-ERS-LPS 18 Oct. 1985.
1985 - Preliminary.

Table 2. Farrow-to-finish hog production costs and returns, per cwt of sales, North Central and Southeast regions, 1982 and 1983.

Annual sales (head)	Returns	Cost	Net[c]	Returns	Cost[c]	Net[c]
			— — — — $/cwt — — — — —			
	— — — — — 1982 — — — — — —			— — — — — 1983 — — — — — —		
			Southeast Region[a]			
140	55.15	58.29	-3.14	47.21	64.48	-17.27
300	55.17	52.95	2.22	46.68	58.74	-12.06
650	55.27	50.78	4.49	46.69	56.24	-9.55
1,600	55.18	49.03	6.15	46.71	54.38	-7.67
3,000	55.19	48.73	6.46	46.71	54.38	-7.67
10,000	55.21	42.94	12.27	46.73	48.31	-1.58
All sizes	55.19	49.95	5.24	46.79	55.33	-8.54
			North Central Region[b]			
140	54.16	56.98	-2.82	46.40	64.38	-17.98
300	54.23	52.15	2.08	47.27	58.84	-11.57
650	54.45	47.94	6.51	46.89	54.29	-7.40
1,600	54.46	46.48	7.98	46.91	52.05	-5.14
3,000	54.47	41.95	12.52	46.91	47.55	-0.64
10,000	54.46	39.87	14.59	46.90	45.23	1.67
All sizes	54.38	47.74	6.64	46.92	53.57	-6.65

a. Includes KY, TN, VA, NC, SC, GA, AL.
b. Includes IA, MO IL, IN, OH, Southern _S, NJ, MN, Eastern KS, NE, SD.
c. Net returns or loss over all costs.
Source: Van Arsdall, Roy N. and Kenneth E. Nelson. Economies of size in hog production. Technical Bulletin No. 1712. Economic Research Service, U.S. Department of Agriculture.

Figure 1

Hogs and pigs sold, 1978

1 dot = 15,000 hogs and pigs   U.S. total 92,140,548   U S Department of Commerce Bureau of the Census