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Agricultural ECONOMICS

Economic Impacts of Indiana Beef Cattle Production

Kevin T. McNamara, Kenneth A. Foster, and Chris A. Hurt

Introduction

The importance of beef cattle production in the Indiana economy has been overlooked in recent years. Advancement of nonagricultural industries has captured the attention of the news media as well as of policymakers trying to enhance total economic growth. Beef cattle production is an important source of farm household income and stimulates local economic activity as a result of producers’ input purchases and as a result of increased household spending.

Beef Cattle Production

Indiana Beef Cattle Production

The value of cattle and calf production in Indiana exceeded $250 million in 1991. Cattle and calves sales accounted for 6.8 percent of total Indiana agricultural cash receipts in 1991, ranking fourth among sales of all agricultural commodities in Indiana. Corn, soybean, and hog products are Indiana agricultural enterprises that generated more total receipts.

Indiana cattle inventories peaked in the mid-1970s at 2.2 million head. By 1992 cattle inventories had declined to 1.3 million head (Figure 1). The number of cattle and calves marketed in Indiana declined an average of 1.5 percent per year between 1977 and 1991, from 920,000 head to 450,000 head (Figure 2). While

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the value of production fell from about $370 million in 1981 to $260 million in 1991, the impact of declining production has been alleviated by a slight increase in the total value of cattle and calf production in the state during the past five years (Figure 3).

Beef cattle production in Indiana has exceeded the slaughter capacity of meat packing facilities in the state since the mid 1970s (Figure 4). The loss of the largest cattle slaughtering firm in the state in 1991 increased the share of Indiana cattle shipped out of state for slaughter and processing. In-state slaughter dropped from about 350 million pounds in 1982 to less than 100 million pounds in 1991 (Figure 4). About 350,000 head, or 77 percent of the total 450,000 head of beef cattle marketed in Indiana, were shipped out of the state for slaughter and further processing in 1991. Declining cattle production in Indiana is associated with a decline in the number of farms with cattle. In 1975, 58,000 Indiana farm operations produced beef cattle. The number of farms with cattle had declined 43 percent to 33,000 farms by 1991. Over 90 percent of Indiana cattle operations had fewer than 100 head of cattle. Indiana cow-calf enterprises tend to be small and/or part-time producers, utilizing scattered small parcels of rough land not well suited for other agricultural enterprises. Feedlot operations in Indiana also tend to be small and generally utilize low-cost facilities rather than invest in newer technology and buildings. The average size of Indiana cattle operations is small compared to the size of the farms in other regions. The average cattle inventory per Indiana operation in 1991 was 39, compared to 80 nationally.

**Distribution of Cattle Production Across Indiana**

Cattle and calf inventories are relatively evenly distributed across Indiana (Figure 5). State level data are not available to distinguish between cattle on feed versus cattle kept for breeding. The relative percentage within the three regions of Indiana has not changed dramatically since the mid-1970s. There has been a slight decline in the share of cattle inventories in the central region from 34 percent to 29 percent. Inventories in the southern part of the state as a share of the state’s total cattle and calf inventory have been the most stable, perhaps because the region has abundant land suited only for cattle grazing.

The north central and south central crop reporting districts lead the state in the number of cattle and calves in inventory. The type of production in these two regions, however, is quite different. Cattle production in the north central region is characterized by cattle feedlots and veal production. Feeder calf production is the dominant type of operation in the south central region, and most of the animals are beef cows. In general, this distinction is true of northern versus southern Indiana. Southern Indiana contains more land suitable for grazing. Northern Indiana has abundant lower priced grain for feed as well as closer proximity to the higher priced western markets for finished cattle. There are, however, some cow-calf operations in the north as well as some feedlot operations in the south.

The distribution of cattle across the state is an important factor in analyzing the economic impacts of beef cattle production in Indiana. The type of production expansion is also important. While cattle are widely distributed around the state, increases in cattle feeding would probably be concentrated in the northern two-thirds of Indiana, while expansion of calf production would most likely occur in the southern region of Indiana. Economic impacts associated with either type of beef cattle production would result from both direct on-farm activities and from linkages to allied sectors of the economy. In general, however, increased beef cattle production would benefit county income throughout the state as producers at the farm level increase production in response to increased demand for beef cattle.

**Eastern Corn Belt Cattle Production**

Indiana is in the eastern corn belt (ECB) region. Illinois, Michigan, Ohio, and Wisconsin are also in the ECB. ECB beef cattle production has declined in number faster than that of the rest of the nation over the past several decades. The ECB cattle inventory fell from 14 million head to 10 million head between 1977 and 1992 (Figure 6). The value of production in the ECB fell from 10 percent of total U.S. production in 1975 to about 7.5 percent in 1991. Total value of
production declined through the early 1980s to a low of $1.8 billion in 1985 (Figure 7). Value of production increased through the second half of the 1980s to a level of $2.2 billion in 1991, equal to the value production in 1979.

Over the same period the more traditional cattle feeding areas of the Great Plains have expanded production, resulting in a shift in the geographic distribution of production as well as a change in enterprise size. For example, Texas increased its share of the nation's cattle on feed between 1978 and 1990 from 13.7 percent to 18.0 percent. Feedlots in the Great Plains states tend to be extremely large (50,000 or more head annual production). This restructuring reflects large operations’ tendencies to locate in the plains states and Texas because of fewer environmental constraints, lower facility and labor costs, and closer proximity to major slaughter plants.

Limited slaughter capacity in the ECB appears to have had a detrimental effect on Indiana and ECB cattle prices. The average price of finished cattle in Indiana is two dollars or more per hundredweight below prices on the plains. This is a result of limited regional demand for cattle for processing and the impact of costs associated with selling to processing facilities in the Plains states.

Indiana’s share of ECB production declined even more precipitously during the 1980s. In 1977 the Indiana cattle inventory accounted for 16 percent of total beef cattle inventory in the region, but had fallen to 12 percent by 1992 (Figure 8). The value of Indiana’s production as a share of ECB production declined from 19 percent in 1977 to 11 percent in 1991 (Figure 9).

**National Cattle Production**

The beef cattle inventory in the United States peaked at 132 million head in 1975 (Figure 10). Since then the number of cattle has declined to a level of 100 million head in 1992. The nominal value of total U. S. production, however, increased from $26 billion to $30 billion over the period (Figure 11). Total marketings declined from 56 million head in 1977 to 46 million head in 1991 (Figure 12). Annual U. S. cattle slaughter in 1991 was 38 billion pounds (Figure 13).

Total Indiana production accounts for a small share of industry production nationally. Indiana’s beef cattle breeding herd comprises just over 1 percent of the national herd. This is down from a peak of 1.5 percent in 1978. The dollar value of Indiana production was 1.8 percent of total U.S. value in 1975 (Figure 14). Indiana beef cattle numbers declined from 1.7 percent of the national beef cattle inventories in 1970 to about 1.3 percent in 1992 (Figure 15).

**Economic Impacts of Indiana Beef Cattle Production**

**Total Impacts of Indiana Beef Cattle Production**

Measuring the income and employment associated with the beef cattle production industry is difficult because a large share of the income and employment generated by the industry is not reported by standard data sources (such as the Bureau of Economic Analysis Income and Employment series, the County Business Patterns series, or the Bureau of Labor Statistics series). This is because a large share of the people working in beef cattle production are not covered by state unemployment insurance. Information about their employment and income, therefore, is not filed with their respective state’s department of labor. Published income and employment statistics for the beef cattle production industry, therefore, are often underreported. Consequently, data on the share of employment and income from the beef cattle sector are not available in most series of data on local income and employment.

The income and employment impacts of the beef cattle production sector can be estimated with multipliers obtained from an input-output model. Input-output multipliers, used with current beef cattle production levels, provided estimates of the income, employment, and total output impacts associated with the beef cattle industry. An Indiana input-output model was constructed using IMPLAN, an input-output model developed by the U.S. Forest Service, to obtain multipliers for the beef cattle sector. The multipliers were used to estimate the income, employment, and total output impacts that 1991 Indiana beef cattle production had on the state’s economy.

The value of total beef cattle and calf marketings in Indiana during 1991 was $255,850,000 (Indiana Agricultural Statistics,
An estimated 651,000 head of cattle and calves were marketed. The almost $256 million paid to cattle and calf producers during 1991 generated an estimate of $415,014,280 in economic activity in the Indiana economy. This activity resulted in income of $103,951,850 and employment of 3,488 jobs.

**Sectors Impacted by Beef Cattle Production**

Two general types of impacts result from the cattle and calf production. One type is the economic activity associated with cattle producers' purchase of goods and services to use in managing and operating their production facilities. These purchases range from purchases of gloves and nails to purchases of livestock and feed, to purchases of financial and business services, to purchases of labor, and so forth. Each unit increase in cattle production is associated with an incremental increase in purchases for each input that cattlemen use in their production facilities.

The $256 million of beef cattle marketed in Indiana during 1991 stimulated an estimated $415,015,280 of economic activity throughout the Indiana economy. Major sectors of the Indiana economy affected were those that are input suppliers to beef cattle operators. Agricultural enterprises were key suppliers of inputs to the beef cattle industry. The beef and dairy industries provided $35,000,000 in cattle and calves for feeding. Farmers supplied an estimated $17,932,527 in grains and $1,271,575 in hay and pasture.

Nonagriculture sectors also benefited from purchases made by cattlemen to support beef production. Beef cattle producers purchased $12,820,644 in services from the finance, real estate, and insurance sectors. An estimated $1,419,986 of construction activity was associated with 1991 beef cattle production. There was an estimated $2,653,165 in machinery production associated with the beef cattle production, as well as $6,780,025 in transportation services. An estimated $6,227,389 of whole/retail business resulted from 1991 beef cattle production.

The other type of impact associated with beef cattle production is from economic activity of persons (households) spending income earned from cattle production and allied industries. Farm families, families of farm workers, and families of people employed in firms that supply inputs to the beef cattle producers purchase household goods and services with the income that they earn. These expenditures generate additional economic activity that is a direct result of wages paid to workers associated with the beef cattle industry.

Income and employment multipliers can be used to translate the economic activity associated with beef cattle production into state level income and employment impacts. The $255,850,000 of cattle marketings in 1991 stimulated an estimated $103,951,850 of total income in the Indiana economy. This income includes wages and salary paid to on-farm workers, workers in allied industries, and workers in businesses providing goods and services to the households of individuals involved in beef cattle sectors.

The total employment impact of beef cattle production was 3,488 full time job equivalents. This includes on-farm employment, employment in industries supplying inputs to beef cattle operations, and employment in businesses providing goods and services to households.

**Expansion of Indiana Beef Cattle Production**

**Potential Impacts of Expanded Beef Cattle Production**

Beef cattle production is an important source of income for farm households throughout Indiana. Expansion of Indiana beef cattle production could stimulate income and employment growth that would affect counties throughout the state. Increased economic activity associated with beef cattle production would affect a large number of economic sectors as cattlemen increase input purchases and households increase spending.

Marginal increases in cattle production could stimulate income and employment growth for Indiana communities. Multipliers generated with an input-output model of the Indiana economy suggest that marginal growth in cattle production can have important economic impacts on the state's economy. For every dollar increase in production, there is additional output growth of 62 cents in the economy. This means that for every
dollar of cattle production all other sectors must increase their output a total of 62 cents (an output multiplier of 1.62). The total income impact of the dollar increase in cattle production would be 42 cents. This means that for every dollar of cattle production there would be 42 cents in wages (income) paid in all sectors of the economy. Every dollar of income earned by cattlemen stimulates another $1.50 in income for the economy (an income multiplier of 2.5). Cattle production has an employment multiplier of about 17 jobs per million dollars of output. Each additional on-farm job in cattle production adds .985 jobs to the economy (an employment multiplier of 1.985). Relatively small increases in cattle production can have important economic consequences.

The output, income, and employment multipliers for cattle production compare very favorably to those for the sectors. Beef cattle production multipliers are larger than multipliers of most other economic sectors. For instance, aggregate multipliers for manufacturing excluding food and kindred products industries are lower than multipliers associated with beef cattle production. The output multiplier for general manufacturing is 1.49. The income and employment multipliers are 1.60 and 1.76, respectively. Beef cattle multipliers of 1.62, 2.5 and 1.99 suggest beef cattle production has higher impacts than general manufacturing per dollar of output. While the size and structure of cattle production and manufacturing operations are quite different, output growth in both sectors stimulates income and employment growth beneficial to Indiana's economy.

Increases in beef cattle production on Indiana farms would have significant growth impacts for the Indiana economy. The economic activity is especially important for communities in need of income and employment growth.

An aggregate increase in total Indiana beef cattle production of 5 percent over the 1991 production level, a production increase of about 30,000 cattle and calves, would stimulate $13 million in cattle sales and about $21 million in total receipts throughout all economic sectors of the economy. The increased production would stimulate $5 million in new income and a total of 175 full time job equivalents. Production growth of 60,000 cattle and calves (10 percent) would create 350 jobs and add over $10 million of new income to the Indiana economy. Production growth of 20 percent above 1991 marketings, about 130,000 head, would increase the value of production by $51 million. This increased production would stimulate economy wide growth of about $83 million. The total income impact would be $21 million. About 700 full time job equivalents would be created throughout the economy.

Potential for Growth in Indiana Beef Cattle Production

Beef Cattle Production Cost

USDA cost of production estimates suggest that there are significant cost reductions associated with large beef cattle operations. The opportunity costs of resources utilized by Indiana's beef producers, however, is small because there is sufficient land that is ill suited for crop production. Cash costs for Indiana beef producers tend to be low, regardless of operation size. In addition, beef cattle are well suited to part-time and/or low labor farming operations. Beef production, therefore, will remain an important agricultural enterprise in Indiana. The challenge for the beef cattle industry and state economic development officials is to identify and develop new markets for Indiana beef cattle. Improved demand for Indiana beef cattle would increase profitability of the industry and encourage expanded production on farming operations throughout the state.

Slaughter Capacity

Limited slaughter capacity affects the growth potential of the cattle feeding industry in Indiana. Costs associated with shipping cattle out of state for slaughter as opposed to in-state slaughtering and processing reduces income earned by farmers. Advances in technology have affected cattle slaughtering and processing facilities. Modern, competitively sized packing plants generally have a slaughter capacity over 500,000 head per year. This capacity was 10 percent over total marketings for Indiana in 1991.

While Indiana's beef cattle industry does not appear large enough to attract a large processing facility, Indiana beef cattle producers should focus on identifying opportunities that enhance
profitability of the industry, given its resource base. There may be potential for a mid-sized specialized packing facility that could utilize some of the state’s out-shipped cattle production as well as cattle from surrounding states. Any expansion of Indiana slaughter capacity would have a positive impact on producer income, as cattle producers would face more favorable terms. The state economy would benefit from income and employment associated with the processing and distribution of beef products.

**Cattle Marketing**

Cooperative marketing of cattle and calves is another possibility for enhancing profitability. Feeder calf auctions in southern Indiana, for instance, demonstrate how producer cooperation can improve market access. Cooperative efforts that increase the lot size of cattle offered for sale could improve price and expand selling opportunities. Buyers for large feedlots or large packers are unlikely to bid top prices for cattle and calves in lots under a semi-truck load. Producers who cooperate in cattle feeding enterprises and market activities could coordinate production and marketing efforts so that they could sell in semi-truck loads and, thereby, gain access to higher valued markets.

Indiana producers could benefit from efforts to identify and serve consumers with specific tastes and preferences in cooperation with specialized processors. While the beef slaughter industry is highly concentrated, 31 percent of total slaughter is controlled by small and moderate sized firms that primarily supply specialized markets. If producers identify new niche markets and work with specialized processors to supply these markets, cattle production in the state could expand.

**Summary and Conclusions**

Beef cattle production is a major source of agricultural income in Indiana, accounting for more than $255 million in marketings in 1991. Indiana’s cattle production has declined over the past twenty years, as has the state’s share of eastern corn belt and total U.S. production.

The beef cattle industry is a critical source of income and employment throughout Indiana, and is of particular importance to rural areas faced with limited income and employment opportunities. Beef cattle marketings in 1991 stimulated an estimated $415,015,280 in total economic activity throughout the Indiana economy. Cattle production and associated activities generated $103,951,850 of personal income in the state’s economy. Because cattle production facilities are distributed throughout all of Indiana, any growth in the beef cattle industry would stimulate economic activity in every county.

Maintaining and expanding beef cattle production in Indiana is important to fully utilize Indiana’s land resources and to maintain farm incomes through the state. Increasing the demand for cattle for packing is a key to expanded beef cattle production in Indiana. The state’s limited production relative to major processing states suggests it is unlikely that a major packer would come to the state. The potential for expanded production is linked to coordination of production and marketing activities so that Indiana producers are not at a disadvantage when they market beef cattle outside of the ECB and to identifying specialty markets that could utilize Indiana cattle in processing.

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2. An operation with cattle is defined as any place having one or more head of cattle on hand at any time during the year.
Figure 1. Indiana Beef Cattle Inventory

Figure 2. Indiana Beef Cattle Marketing
Figure 3. Value of Indiana Cattle Production

Figure 4. Indiana Beef Cattle Slaughter (1,000,000 Pounds)
Figure 5. Regional Distribution of Beef Cattle Inventories in Indiana, 1975 to 1991

Figure 6. Eastern Corn Belt Beef Cattle Inventory
Figure 7. Value of ECB Cattle Production

Figure 8. Indiana Beef Cattle Inventory As a Share of ECB Beef Cattle Inventory
Figure 9. Value of Indiana Cattle Production As a Share of ECB Production

Figure 10. U.S. Beef Cattle Inventory
Figure 11. Value of U.S. Cattle Production

Figure 12. U.S. Cattle Marketings
Figure 13. U.S. Cattle Slaughter (1,000,000,000 Pounds)

Figure 14. Value of Indiana Cattle Production As a Share of U.S. Production
Figure 15. Indiana Beef Cattle Inventory As a Share of U.S. Inventory