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Production and Slaughter Trends in Indiana’s Hog and Cattle Industries

by Chris Hurt, Jon A. Brandt, and David C. Petritz
Extension Economists, Department of Agricultural Economics

The hog and cattle industries in Indiana are important components of the state’s agricultural economy. In 1982, gross farm income from hog production was $794 million. Cattle and calf production contributed an additional $368 million. These commodities represent over 25 percent of total cash receipts of Indiana farmers.

Hogs and cattle not only are produced in the state, but they are also consumed by the state’s population of approximately 5.5 million people. The marketing link between producer and food consumer is another vital component of the agricultural economy in Indiana. In 1982, hog slaughter in the state totaled 2.8 million head, while cattle and calf slaughter was 431,000 head. Slaughtering activities in the state add value to the farm product and help create in-state employment.

While economic size of these industries is considerable, concern arises over the small percentage of the state’s production which is slaughtered within the state. For 1982, hog slaughter in Indiana was only 46 percent of the state’s production level. For cattle and calves, 1982 slaughter was 71 percent of the production level. These percentages have both trended downward since 1960.

Livestock producers are concerned about a potential lack of slaughter demand for their livestock. Fewer slaughtering establishments in the state may lead to less competition, resulting in lower prices. Producers are also concerned that hauling live animals to distant slaughtering facilities will force them to absorb added transportation costs. Concern arises among industrial planners as Indiana foregoes the opportunity to add value to the hogs and cattle produced in the state. Adding value to live cattle and hogs increases the state’s employment and income in slaughtering, processing, packaging, and transportation. A recent study of the Indiana economy estimates the employment multiplier for the meat packing industry to be 3.9. This means for each new meat packing job, an additional 2.9 jobs are created in the remainder of the state economy (5).

Economists are concerned about the economic efficiency of the marketing sector. They question whether reduced slaughter capacity in the state leads to less competition, lower prices, or less employment. They ask: is it efficient to produce live animals in state, ship them out of state for slaughter, and then ship processed products on to demand points? Would the marketing system operate with lower cost if more animals were slaughtered in-state, where live animal transportation can be minimized, and then ship meat products to consumers? Indiana has a moderately high population, and is thus a fairly large consumer of meat products. The state exports (to other states) about 30 percent of its live cattle production but must import (from other states) over 50 percent of its beef consumption. From a transportation standpoint, this appears inefficient.

The intent of this report is to show trends of production and slaughter since 1960 for hogs as well as cattle and calves. It will analyze these trends within the framework of regional and national trends. Finally, it will provide a list of potential explanations for these trends and point to further research that can help answer some of the concerns of producers, planners, and others.

**Hogs**

Examining production and slaughter data within a given state may lead to erroneous conclusions. For example, to conclude that an Indiana hog producer in southeast Indiana is negatively affected by a lack of state slaughter capacity may not be valid since slaughter capacity exists across the state border in Ohio. In this example, viewing the data within the confines of the state border may be misleading. Therefore, a regional examination of the data is used here. This approach enables one to view the Indiana data within the context of other states in the region.

The regions used for this analysis are shown in Figure 1. The Eastern Corn Belt states are Indiana, Illinois, Michigan, Ohio,
and Wisconsin, while the Western Corn Belt states are Iowa, Minnesota, and Missouri. Other regions include the Northern Plains, Southwest, and Southeast. All remaining states are combined in a category called Other.

**National Production and Slaughter Trends**

The shifting pattern of hog production is illustrated in Figure 2. Numbers are the region’s production as a percent of national production. The first number is the national production percentage in 1960; the second number is for 1982 (10).

The major regional shift during this period has been from the Eastern Corn Belt to the Western Corn Belt and to the Northern Plains. The national share of Eastern Corn Belt production dropped 6 percentage points. Each of the growth regions gained 3 percentage points.

Regional hog slaughter as a percent of national slaughter is shown in Figure 3 (9). Again, the first number is for 1960, and the second for 1982. The Eastern Corn Belt has slightly increased its national share of hog slaughter from 25 percent in 1960 to 26 percent in 1982. The major shifting of slaughter over the period was away from Northeastern slaughter (as shown in the Other category) to the Southeast where the share of national slaughter increased from 14 to 20 percent and to the Western Corn Belt where slaughter share increased from 31 to 35 percent.

These figures illustrate how shifting national production trends have impacted the Eastern Corn Belt. It is interesting to note that while hog production was shifting away from the Eastern Corn Belt in the 1960's and 1970's, the region was able to maintain its national slaughter rank. This implies that a higher percentage of the hogs produced in the region were slaughtered there in 1982 than in 1960. Table 1 provides regional hog slaughter as a percent of production for several years from 1960 to 1982.

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<td>77</td>
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<td>91</td>
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<tr>
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<tr>
<td>Northern Plains</td>
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<tr>
<td>Other</td>
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<td>329</td>
<td>257</td>
<td>205</td>
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In 1960, Eastern Corn Belt slaughter was only 77 percent of production, indicating that about 23 percent of the hogs produced in the Eastern Corn Belt were shipped to other regions for slaughter. By 1982, the Eastern Corn Belt slaughtered about the same volume as it produced.

The Western Corn Belt, which gained national share in both slaughter and production from 1960 to 1982, saw little change in the regional slaughter as a percent of regional production. The Southeast became a net importer of hogs, as regional hog slaughter as a percent of production increased from 99 to 144 percent. The Northern Plains, however, became a net exporter of hogs as slaughter declined from 121 to 77 percent of live production.

**Indiana Within the Eastern Corn Belt**

The trend has been for production to shift out of the Eastern Corn Belt but for the region to maintain its national share of hog slaughter. If Indiana is being influenced in a manner similar to neighboring states, it should maintain approximately the same rank over time as other states in the Eastern Corn Belt. In production this has been true. Figure 4 provides individual state production as a percent of the total Eastern Corn Belt production and illustrates how uniform the relative state production shares have been from 1960 to 1982. Indiana increased its share of Eastern Corn Belt production from 27 percent in 1960 to 28 percent in 1982. No state in the region changed more than 1 percentage point over the period.

Individual state’s share of Eastern Corn Belt slaughter has had a much different pattern over the 22 years. These percentages are shown in Figure 5. Illinois and Michigan increased their percents of the region’s slaughter by 6 (28 to 34) and 16 (8 to 24) percentage points, respectively. Indiana’s 13 percent drop was the largest decline in slaughter share over the period, while Wisconsin’s share dropped 7 percent.

In 1982, Indiana raised 28 percent of the region’s production, but its slaughter share was only 13 percent. Indiana has slipped from slaughtering about 72 percent of the state’s production in 1960 to only 46 percent in 1982. Table 2 illustrates state slaughter as a percent of state production and shows that about 54 percent of Indiana’s hog production was shipped to other states for slaughter in 1982.

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<td>Indiana</td>
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<td>59</td>
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<tr>
<td>Illinois</td>
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<td>Ohio</td>
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<tr>
<td>Wisconsin</td>
<td>114</td>
<td>113</td>
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<td>103</td>
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</tbody>
</table>

Table 1. Regional Hog Slaughter as a Percent of the Regions Production

Table 2. State Hog Slaughter as a Percent of State Production
Figure 1. Hog Regions of the United States.

Figure 2. Regional Hog Production as a Percent of National Production, 1960/1982.
Figure 3. Regional Hog Slaughter as a Percent of National Slaughter, 1960/1982.

Figure 4. State Hog Production as a Percent of Eastern Corn Belt Production, 1960/1982.

Figure 5. State Hog Slaughter as a Percent of Eastern Corn Belt Slaughter, 1960/1982.
Illinois slaughter increased faster than production over the period which is reflected by the increased percentage in Table 2. Ohio, Wisconsin, and Michigan are all net importers of hogs for slaughter. Michigan, a relatively major production state, has become an important slaughtering state. In 1982, for each hog raised in Michigan, approximately 3.57 hogs were imported for slaughter.

Cattle and Calves

A similar format is used to examine trends in cattle and calf production and slaughter. Regions for cattle and calves are shown in Figure 6. All regions are the same as hogs except for the addition of the nine-state Western region. For cattle and calves, the Other region represents primarily the Northeast States. Data presented are for both cattle and calves.

National Production and Slaughter Trends

Cattle and calf production, like hogs, has shifted west since 1960. (Production is on a liveweight basis adjusted for inventory changes and in shipments.) These regional production percentages are shown in Figure 7. The Eastern Corn Belt, which produced 14 percent of the U.S. total in 1960, raised only 9 percent in 1982. Even the Western Corn Belt has experienced some decline in national production rank, dropping to 14 percent from 17 percent in 1960. The cattle and calf industry has become more highly concentrated in the Northern Plains and the Southwest. In 1960, the three most western U.S. regions produced 50 percent of the cattle and calves. By 1982, the share had increased to 60 percent.

U.S. slaughter has shifted westward more dramatically than production, as illustrated in Figure 8. National slaughter share in the Eastern Corn Belt dropped from 20 percent in 1960 to only 11 percent in 1982. Similar shifts were occurring in the Northeast as well as the Western Corn Belt. These regions each lost 6 percentage points of national slaughter share. Cattle and calf slaughtering became much more geographically concentrated during the period in the Northern Plains and Southwest (5). The national share of slaughter for these two regions increased from 22 percent to 58 percent by 1982.

From 1960 to 1982, slaughter in the Eastern Corn Belt dropped relatively faster than production. Thus, slaughter as a percent of production declined from 134 percent to 119 percent (Table 3). These percentages indicate, however, that the region is still a net importer of cattle and calves for slaughter. The Northern Plains moved from being a net exporter of cattle and calves in 1960 to a large importer in 1982. The Southwest also saw slaughter rise more quickly than production.

Indiana Within the Eastern Corn Belt

Indiana has maintained its production share within the Eastern Corn Belt, as shown in Figure 9. The major changes in the region were a reduction in production share for Illinois and gains in Wisconsin, Ohio, and Michigan. In terms of slaughter, however, Indiana experienced a reduction in its share of the region's slaughter from 12 percent to 9 percent (Figure 10). Illinois and Ohio also experienced sizable drops in their regional slaughter share. Wisconsin considerably increased slaughter share due largely to dairy livestock slaughtered for meat. The dairy industry in Wisconsin has not been influenced by the same factors that caused beef production to move west. Thus Wisconsin reflects an increase in the relative regional rank in cattle and calf production and slaughter.

Indiana's slaughter as a percent of production has dropped since 1960, indicating a larger portion of the state's production is being exported to other states for slaughter. Indiana dropped from being a net importer of cattle for slaughter in 1960 to a sizable exporter of cattle in 1982. Indiana is the only state in the Eastern Corn Belt that does not slaughter at least as many cattle and calves as it produces (Table 4).

| Table 3. Regional Cattle and Calf Slaughter as a Percent of the Regions' Production |
|-------------------------------|---|---|---|---|
| Eastern Corn Belt             | 134  | 133  | 144  | 119  |
| Western Corn Belt             | 108  | 127  | 115  | 95   |
| Northern Plains               | 80   | 101  | 117  | 140  |
| Southeast                     | 62   | 50   | 64   | 41   |
| Southwest                     | 51   | 59   | 82   | 76   |
| West                          | 101  | 96   | 103  | 90   |
| Other                         | 211  | 190  | 167  | 132  |

| Table 4. State Cattle and Calf Slaughter as a Percent of State Production |
|--------------------------------|---|---|---|---|
| Indiana                        | 105  | 95  | 79  | 71   |
| Illinois                       | 110  | 118 | 148 | 123  |
| Michigan                       | 182  | 163 | 172 | 141  |
| Ohio                           | 198  | 181 | 166 | 110  |
| Wisconsin                      | 125  | 130 | 154 | 135  |

Why the Westward Production Shifts?

Hog production and cattle feeding are both intense users of feed grains. The shift of national livestock production has been highly
Figure 6. Cattle and Calf Regions of the United States.

Figure 7. Regional Cattle and Calf Production as a Percent of National Production, 1960/1982.
Figure 8. Regional Cattle and Calf Slaughter as a Percent of National Slaughter, 1960/1982.

Figure 9. State Cattle and Calf Production as a Percent of Eastern Corn Belt Production, 1960/1982.

Figure 10. State Cattle and Calf Slaughter as a Percent of Eastern Corn Belt Slaughter, 1960/1982.
influenced by geographic differences in feed grain prices which have tended to be lower in the western portion of the Western Corn Belt, the Northern Plains, and in Northern Texas. This area is often called the Corn Belt fringe. The growth of irrigated feed grain acreage over this period also helped increase the feed grain surplus. In 1979 for Nebraska, Kansas, and Texas, irrigation was used on 70 percent of the harvested corn acreage. Yields from irrigated corn in these states were 45 percent greater than from non-irrigated corn acreage (8, pp. 14, 15). Without irrigation, these three states would have produced approximately 250 million less bushels of corn in 1979. This reduction would represent about 14 percent of all feed grains produced in the states.

The rapid increase in feed grain exports (especially corn) in the 1970's has also helped increase relative price differentials between the Corn Belt and its Western fringe. U.S. corn exports in 1960 represented about 8 percent of total use. By 1980, exports reached a peak of 32.6 percent of total corn use. While corn exports have shown steady increases from 1950, the upward trend accelerated during the 1973-1980 period. The rapid growth of the export market in the 1970's caused greater regional enterprise specialization. Corn produced in the Eastern Corn Belt had relative transportation cost advantages in accessing lake ports, gulf ports via rail and barge, and Eastern ports via rail. The Western fringe had less access to this new market which led to wider price differences. As an example, from 1960-1972 Omaha corn prices averaged 96.7 percent of Chicago prices; however, from 1973 to 1980 they dropped to 93.5 percent of Chicago prices (8, p. 79). These price differentials probably contributed to greater specialization in cash grain production in the Eastern Corn Belt, and greater livestock specialization in the Western Corn Belt and Western fringe.

Technological changes in production also help explain national production shifts in cattle feeding. The cattle feeding industry has become highly concentrated in western Iowa, eastern Nebraska, western Kansas, eastern Colorado, and northern Texas (see Figure 11). These areas have had favorable access to feeder cattle supplies and dry, favorable climates. Also, the production technology shifted to large specialized feed lots which were lower cost operations than their earlier counterparts further east (4).

Some shifting of hog production to the South was evident in the 1970's. This trend was especially influenced by the rapid escalation in energy prices in the early and middle 1970's. The South had some advantage in lower energy use and in lower building and labor cost. These advantages were weighed against the disadvantage of being a feed grain deficit area.

Why the Shifting Patterns in Slaughter?

Cattle and calf slaughter has shifted rather dramatically to the cattle feeding areas. The cattle feeding industry has had much of its new growth and development over the 1960-1982 period. For example, national cattle and calf slaughter in 1982 was 43 percent larger than it was in 1960. This reflects the strong growth of total consumption in the 1960's and early 1970's. By contrast, hog slaughter was only 7 percent larger in 1982 than 1960. The newness of the cattle feeding industry brought considerable new capital investment technology, and economies of scale to cattle slaughtering. In addition, reduced costs have resulted from more fabrication at the plant site rather than at retail. This provides economic advantages through lowered processing and transportation costs. Large capacity plants require a large volume of available cattle. It was logical then to see the slaughter shift to the cattle feedlot areas (2).

Hog slaughtering shifted much less dramatically from 1960 to 1982. The industry was not a rapid growth industry during this period. Per capita consumption of pork has remained rather constant since WWII, varying yearly around the hog production cycle. The relatively constant consumption pattern has meant the industry has grown at roughly the population growth rate. From 1960 to 1980, average annual U.S. population growth was 1.17 percent.

Slaughter followed the western and southern production shifts. The slaughter plants in the Northeast lost much of the national slaughter share. Some of these plants have been characterized as "old multi-story and multi-species plants... built a half century or more ago... they are not labor efficient, fully depreciated... and unprofitable" (7). While the Eastern Corn Belt had many plants in this category, especially near terminal markets, new larger and more efficient hog plants have replaced them.

Labor wage rates have provided another explanation for the shift in slaughter to the west and (in the case of hogs) the south. The Northeast as well as the Eastern Corn Belt has a greater heavy industry concentration. Wage rates for organized labor in such industries as steel, autos, rubber and heavy equipment have tended to be higher than general labor cost in the West and South.
Finally, the U.S. population has been shifting to the West and the South. Figure 12 illustrates these shifts by region. In 1960, the population in the Eastern Corn Belt represented 20.2 percent of U.S. population. By 1980, the region’s share of population dropped to 18.4 percent. The share of population in the Northeast also declined over the period. Population was shifting to the West, the Southwest, and the Southeast. Table 5 provides the actual population numbers for 1960 and 1980, as well as percentage changes for each region. The West and the Southwest had population increases exceeding 50 percent from 1960 to 1980. The Southeast population grew 37 percent.

Table 5. U. S. Population Changes, 1960-1980

<table>
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<tr>
<th>Region</th>
<th>Actual Population (1,000)</th>
<th>Change %</th>
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</thead>
<tbody>
<tr>
<td>Eastern Corn Belt</td>
<td>36,224</td>
<td>+15.0</td>
</tr>
<tr>
<td>Western Corn Belt</td>
<td>10,492</td>
<td>+13.4</td>
</tr>
<tr>
<td>Northern Plains</td>
<td>4,903</td>
<td>+7.6</td>
</tr>
<tr>
<td>Southeast</td>
<td>36,894</td>
<td>+37.4</td>
</tr>
<tr>
<td>Southwest</td>
<td>14,161</td>
<td>+50.2</td>
</tr>
<tr>
<td>West</td>
<td>24,941</td>
<td>+51.5</td>
</tr>
<tr>
<td>Other</td>
<td>51,708</td>
<td>+12.0</td>
</tr>
<tr>
<td>U.S.</td>
<td>179,323</td>
<td>+26.3</td>
</tr>
</tbody>
</table>

As population shifts the geographic location of demand for meat products shift. The Northeast and Eastern Corn Belt have been much lower population growth markets (12 and 15 percent, respectively, from 1960 to 1980) than the Southern and Western markets. Managers selecting locations for new slaughtering plants, which have long useful lives, must anticipate where population will be many years into the future.

Why Indiana’s Production and Slaughter Trends?

The shifting enterprise specialization which occurred nationally is evident in Indiana. In 1960, the hog industry and the cattle and calf industry comprised over 40 percent of the state’s gross farm sales. In 1982, it was near 25 percent. By contrast, crops accounted for only 36 percent of gross farm sales in 1960 but increased to 59 percent by the early 1980’s (6). Thus Indiana has trended toward a much greater grain production concentration.

This trend has taken its toll, especially in the beef cattle industry. The feedlots in Indiana and the rest of the Eastern Corn Belt tend to be small in size (83 percent of fed cattle marketings were from lots having less than 1,000 head of capacity in 1981) and of low density (1). Thus, origination volume appears to be a major obstacle in attracting the size of slaughtering capacity which can achieve the necessary scale economies.

The decline in Indiana hog slaughter in relation to production is not as easily explained. The Eastern Corn Belt has experienced a loss of national production share since 1960, but this does not explain the realignment of slaughter within the region. The entire Eastern Corn Belt has had old, antiquated slaughter facilities which have closed. However, neighboring states of Michigan and Illinois have both increased their national slaughter share. In addition, Indiana’s wage rates and location should be competitive with other states in the region.

The low slaughter as percent of production in Indiana does not create as much alarm when viewed within a regional context. By 1982 Eastern Corn Belt production and slaughter were nearly in balance. This would indicate strong potential markets for Indiana-produced hogs in neighboring states. These plants are located close to large population centers and several are close to the Indiana state border. These locations may help reduce spoilage problems in fresh pork by reducing distance from slaughtering plants to consumers.

It is likely that new hog slaughtering capacity in Indiana would have a competitive advantage in origination of hogs. However, with sufficient existing slaughter capacity in neighboring states, more capacity in Indiana would result in stronger competition for Indiana-origin hogs. New slaughter capacity in Indiana would probably mean some plants in the region would be forced to reduce slaughter.

Implications

The shifting pattern of cattle and calf production has created fewer markets for Indiana cattle. The low density of cattle and calf production in Indiana is not likely to be able to support the scale of plant needed to be competitive. Larger slaughter volumes can only be generated by expanding the origination area to the region rather than the state. The expanded buying area would result in higher origination costs. This of course raises concern among producers with fixed investment in the cattle industry.

The cattle industry is likely to survive in Indiana because of the fixed resources which are best adapted for cattle, such as pasture land. The lowered volume of production may mean that the state (and region) will need to specialize in production of certain types of cattle or meat products. This form of specialization may enable the state to overcome some of
Figure 11. Cattle Fattened on Grain and Concentrates and Sold for Slaughter, 1978. (All farms, county unit basis.)

Source: U.S. Department of Commerce
Bureau of the Census

Figure 12. Regional Population as a Percent of U.S. Population, 1960/1980.
the volume problem. Also, thin markets and low volume may lead the industry to adopt practices such as electronic marketing and market pooling. Further research can help identify how shifting production and slaughter have impacted producers and consumers in Indiana. It can also help examine alternative marketing systems.

The hog industry in Indiana does not suffer from the volume problem. However, it has been influenced by the westward shift in national production. This shift in production and slaughter may slow or even reverse in the future. More dryland farming may return to the Corn Belt fringe because of less available and more expensive irrigation water, and/or because feed grain production costs are higher than in the Corn Belt. If corn prices relative to production costs are lower in the 1980’s than in the 1970’s, the Corn Belt fringe will see more return to dryland farming and become less of a surplus grain area.

The growth of feed grain exports is not likely to be as strong in the 1980’s as the 1970’s. In fact, in the early 1980’s, exports as a percent of total corn use has declined. This would imply that the transition to greater grain specialization in the Eastern Corn Belt may not be as rapid in future years. These factors would likely lead to some shifting of hog as well as cattle and calf production eastward.

While heavy industry in the Eastern Corn Belt and the Northeast is in transition, it is likely that new technology will enable these basic industries to survive and prosper. This will help stabilize the population base of these regions and provide stronger incentives for private firms to make slaughter investments in the region. Wage rate differentials between Eastern Corn Belt and other regions may also be reduced in future years.

Research examining Indiana as a location for further live animal processing could help better identify:
1. Returns to the state in employment and income.
2. Indiana slaughter cost relative to other states.
3. Transportation cost for Indiana slaughter compared to other states.
4. Potential for reduced consumer meat prices.

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[10] (10) Meat Animals: Production, Disposition, Income. Crop Reporting Board, Statistical Reporting Service, USDA. Production data used is state liveweight production which is adjusted for inventory changes and inshipments.
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