Dennis Brown

Poultry Processing Created More Rural Jobs than Red-Meat Packing During the 1980's

Red-meat packing and poultry processing were among very few food-processing industries to experience employment growth in rural counties during the 1980's. Red-meat packing expanded mainly in the Plains and Corn Belt, and poultry processing expanded in the Delmarva Peninsula and other pockets of the South. Input-output analysis shows that an increase in consumer demand for poultry adds more processing jobs than an equivalent increase in demand for red meat because poultry processing is more labor intensive.

Most food-processing industries lost jobs in rural areas during the 1980's. Among the few that gained were red-meat packing and poultry processing. However, the changes in consumer preferences and industrial organization that led to rural job growth in those two industries differed significantly.

Changes in the Red-Meat-Packing Industry

Since the mid-1970's, the red-meat-packing industry has contracted in terms of both employment and establishments. The industry had some 160,000 employees in 1975 but only about 120,000 by 1989, a 25-percent decrease. The number of establishments fell from 2,299 in 1975 to 1,290 in 1989, a 44-percent decline.

At the same time, the red-meat-packing industry became increasingly concentrated in nonmetro counties, both in terms of employment and number of establishments. Metro counties lost nearly 50,200 red-meat-packing jobs during 1975-89, while nonmetro counties gained about 10,500 jobs. The share of red-meat-packing jobs in nonmetro counties rose from one-third to more than one-half between 1975 and 1989. The number of meatpacking establishments declined in both areas, but by 1989, a larger number of establishments were in nonmetro counties because more were lost in metro counties.

Red-meat-packing activity shifted away from metro counties in the Corn Belt (mostly from Iowa and Illinois) and Lake States (southern Minnesota and Wisconsin) to nonmetro counties in the Northern Plains (Nebraska and Kansas) and Southern Plains (the Texas Panhandle) (fig. 1). Within the Northern and Southern Plains, industry employment also moved from metro to nonmetro counties. Declining numbers of small, family-operated feedlot farms and cattle feeding operations in Iowa and Illinois led to a shift in this activity from the western Corn Belt and Lake States to the Northern and Southern Plains. Changes in Federal income tax laws also favored construction of large, corporate-owned feedlots that have located primarily in the Plains.

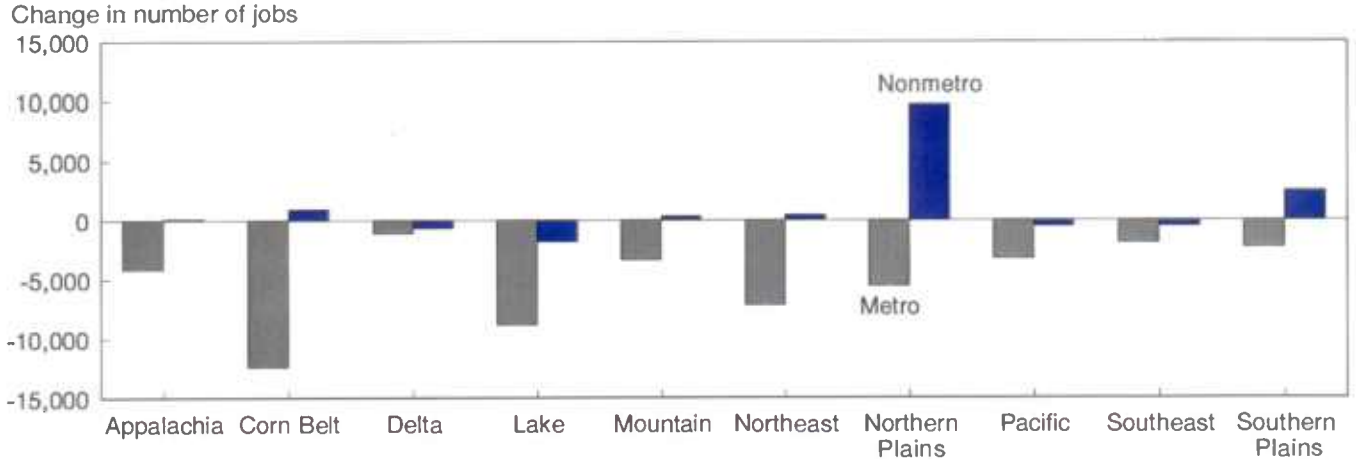
These regional shifts resulted largely from restructuring in the industry. As the beef and pork industries became more cost-conscious, inefficient plants were closed, labor was replaced with capital, and operations were consolidated through mergers and acquisitions. For example, the share of marketed cattle slaughtered by the four largest firms rose from 24 to 53 percent between 1975 and 1991. Moreover, improvements and innovations in the red-meat-packing industry resulted in significant savings in transportation costs. For example, boxed beef (beef that is packaged and shipped in smaller, more easily transportable, compact boxes) and improved refrigeration technologies have allowed the industry to move closer to the source of the raw inputs, the grain-fattened cattle in the Plains States. Firms wishing to reduce costs have been drawn to nonmetro counties largely because both land and labor are cheaper there.

Dennis Brown is an agricultural economist with the Rural Economy Division, ERS.

Figure 1

Employment change in red-meat packing by farm production region, 1975-89

Red-meat-packing jobs shifted from metro to nonmetro areas and from other regions into the Corn Belt and Plains



Source: Calculated by ERS using data from County Business Patterns, Bureau of the Census.

Real wages for red-meat-packing production workers declined 34 percent between 1975 and 1990, contrasting with a 4.6-percent decline in real wages for all U.S. manufacturing workers. Declining red-meat-packing earnings reflect lower wages in newer plants and less unionization in rural areas. By improving technology, red-meat-packing firms have been able to simplify the production process, replace highly skilled workers with employees having fewer skills, and lower wages.

Falling per capita demand for red-meat products contributed to industry cost-consciousness and moves toward greater efficiency. Total consumption of red-meat products increased 6 percent between 1975 and 1991, much more slowly than the 17-percent growth in the U.S. population (fig. 2). Consequently, the per capita consumption of red-meat products decreased from 126 pounds in 1975 to 114 pounds in 1991. Red-meat products' market share also fell, from 74 percent of all meat consumed in 1975 to 61 percent in 1991.

Changes in the Poultry-Processing Industry

In contrast to overall employment declines in red-meat packing, substantial job growth in poultry processing has taken place. But like red-meat packing, increasing industry concentration accompanied the growth in poultry processing. Between 1975 and 1989, while poultry-processing employment nearly doubled, increasing from 81,000 to 159,000 jobs, the number of processing establishments declined 18 percent, falling from 562 plants to 460. The industry continues to be largely concentrated in rural areas, with nonmetro counties accounting for about two out of every three jobs and more than half of all establishments.

There are three major poultry-production and -processing regions (specializing primarily in broilers). The Appalachia farm production region has industry concentration in the Delmarva Peninsula (shared by Delaware, Maryland, and Virginia) and the nearby Shenandoah Valley of Virginia and West Virginia. In the Southeast, the industry is primarily concentrated in Alabama, Georgia, and North Carolina, with some activity in Mississippi, South Carolina, and northern Florida. A third area of concentration is Arkansas in the Delta region and neighboring areas of northeastern Texas and southeastern Oklahoma in the Southern Plains and southern Missouri in the Corn Belt. Arkansas is the single largest producer of broilers, accounting for 16 percent of all sales in the Nation in 1990. The rapid concentration of production and processing in these three areas accounts for the fast growth of poultry-processing jobs in nonmetro areas of the Appalachia, Delta, and Southeast regions (fig. 3).

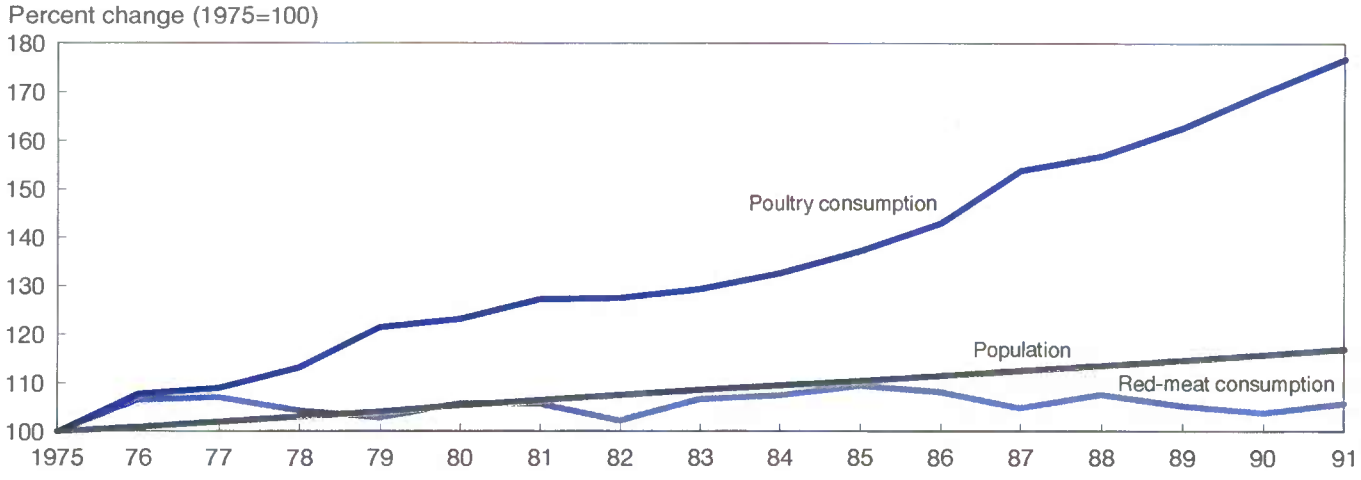
The poultry industry developed in these three areas for several reasons. First, these regions generally have mild or temperate climates, reducing the costs of heating, traditionally a big expense in the poultry industry. Second, wage rates in these areas are generally lower than elsewhere because of a less unionized workforce and an abundant supply of unskilled labor. And, third, all three areas are relatively close to large, final demand markets.

California also has a sizable broiler industry, accounting for much of the growth in poultry-processing jobs in metro areas of the Pacific region (fig. 3). Minnesota (in the Lake States) and North Carolina (in Appalachia) are important in turkey production, accounting for about one-third of total 1990 turkey sales in the Nation.

Figure 2

Change in red-meat and poultry consumption and population from 1975

Poultry consumption has grown much faster than the population since 1975, while red-meat consumption has grown more slowly

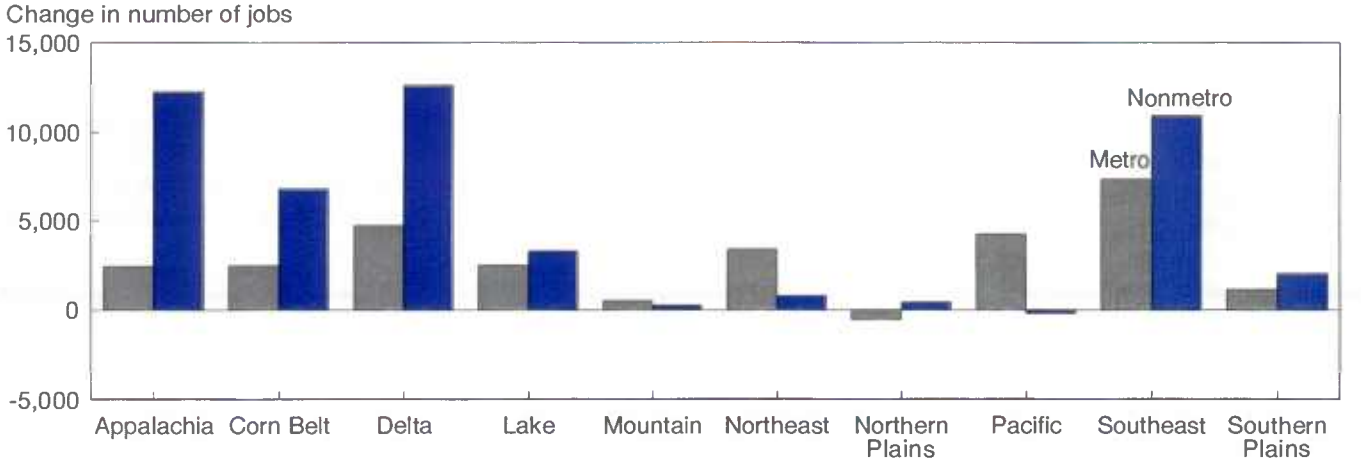


Source: Population from the Bureau of the Census and consumption from ERS.

Figure 3

Employment change in poultry processing by farm production region, 1975-89

The number of poultry-processing jobs grew in almost all areas and regions, increasing most in nonmetro areas in Appalachia, the Corn Belt, the Delta States, and the Southeast



Source: Calculated by ERS using data from County Business Patterns, Bureau of the Census.

Employment gains in poultry processing derive from an explosive growth in the consumption of poultry products (fig. 2). Annual consumption of chicken and turkey nearly doubled between 1975 and 1991, helping explain why the market share for poultry products grew from 19 percent of all meat consumed in 1975 to 31 percent in 1991. Poultry is high in protein and low in fat content, representing a popular alternative to beef and pork. Also, poultry has benefited from increased consumption of convenience foods. Fast food restaurants and the frozen food industry have expanded the use of poultry in existing and new product lines because poultry is available in a number of different forms, including precut or further processed varieties, and is cheaper than either beef or pork. The average 1991 retail price of chicken and turkey (per pound) ranged between $0.88 and $1.00, while the price of beef and pork ranged between $2.12 and $2.88.

With greater demand for poultry products and increasing industry employment, real wages for poultry production workers were much more stable than red-meat-packing workers' wages. Hourly poultry-processing wages for nonsupervisory employees declined 3.6 per-

cent in real terms between 1975 and 1990. This decline is equivalent, in percentage terms, to the wage decrease for all manufacturing workers in the Nation and contrasts with steeply declining real wages in the red-meat-packing industry. However, 1990 wages for poultry-processing workers were still considerably below the U.S. manufacturing average.

Higher Labor Intensity in Poultry Processing Creates More Jobs

To assess the regional effects of changes in the red-meat-packing and poultry-processing industries, I used an input-output model to estimate employment changes in selected red-meat and poultry areas that might result from an increase in demand for meat products. The model revealed that an increase in demand for poultry products would create more jobs in the selected poultry-processing areas than the same increase in demand for red-meat products would create in the selected red-meat-packing areas. This greater regional effect arises chiefly because of the higher degree of labor intensity in poultry processing than in red-meat packing. If poultry processing were to become considerably less labor intensive (for example, if labor-saving practices or equipment were adopted), the regional employment effect in the poultry-processing industry would be smaller. Indeed, recent trends show increasing labor productivity in the industry at the national level.

The input-output model was used to estimate what an arbitrary $10-million increase in final consumer demand for red meat in each of five areas with significant red-meat-packing industries would do to area employment compared with what a similar increase in poultry demand in each of five areas with significant poultry-processing industries would do to their employment. Because economic activity is not generally confined to the geographic boundaries of a county but tends to be linked to a broader area, multicounty Rand McNally trading areas were used to measure the employment effect. Rand McNally trading areas are widely used by regional economists in both the public and private sectors and are determined on the basis of population distribution, newspaper circulation, economic activities, transportation facilities, commuting patterns, physiography, and subjective analysis. See "Identifying Areas with Significant Red-Meat or Poultry Production and Processing," below, for the criteria used to identify and select the 10 study areas. All 10 trading areas are entirely nonmetro and have similar populations, with none greater than 220,000 (fig. 4).

The model results suggest that an increase in final demand for poultry adds more processing jobs than an equivalent increase in demand for red meat (table 1). For example, a $10-million increase in final demand for poultry adds 79 jobs to the poultry-processing industry in Harrison, AR. In Salisbury, MD, the same increase in final demand adds 91 poultry-processing jobs. In contrast, a $10-million increase in final demand for red-meat products adds only 45 meat-packing jobs in each area specializing in the red-meat industry.

Almost all the added processing jobs were generated directly by the increase in demand. Growth in the processing industry generates job growth indirectly in related industries, such as suppliers of animals for slaughter and packaging materials and wholesalers and retailers of meat products. New spending by the new processing

Identifying Areas with Significant Red-Meat or Poultry Production and Processing

To assess the regional economic impact of changes in the red-meat and poultry industries, counties with significant production and processing components were identified by four criteria. If a county met all four criteria, it was classified as having both significant production and processing activities. The criteria are

100 or more jobs in red-meat packing or poultry processing in 1989,

cattle and hogs or poultry sales of at least $10 million in 1987,

cattle and hogs or poultry sales accounting for at least 20 percent of the county's total agricultural sales in 1987, and

employment in agriculture and meat processing (either red-meat packing or poultry processing) accounting for at least 10 percent of the county's total employment in 1989.

Production data came from the 1987 *Census of Agriculture* public use file, and employment data came from the 1989 enhanced *County Business Patterns* file. Rand McNally trading areas were then defined for 10 of these counties, 5 in the red meat industry and 5 in the poultry industry. The trading ares were identified using Rand McNally's *Commercial Atlas & Marketing Guide.*

and related workers induces job growth in other industries, including in the processing and related industries themselves (see "About the Model," below). The cumulative job growth resulting from these direct, indirect, and induced effects is shown in table 1.

The service-producing sector (transportation, communication, public utilities, wholesale and retail trade, finance, insurance, real estate, and business, educational, health, recreational, and personal services) and the area economy as a whole derive more jobs from growth in

Figure 4

Significant read-meat-packing and poultry-processing areas

Five red-meat-packing and five poultry-processing areas were selected for study

Source: Study areas selected by author using data from County Business Patterns and Rand McNally trade areas.

About the Model

To assess the regional effects of changes in the red-meat-packing and poultry industries, I used the IMPLAN (IMpact analysis for PLANning) model. IMPLAN is a microcomputer-based regional input-output model developed by the USDA Forest Service. It contains information on interindustry and intersector transactions for estimating the direct, indirect, and induced employment or income effects stemming from changes in particular industries, in this case, the employment changes in 10 trading areas caused by changes in demand for red-meat or poultry products.

IMPLAN was also used to calculate employment multipliers for each of the trading areas. The employment multiplier estimates how many jobs are added to the rest of the economy for each directly created meat-processing job. The employment multiplier is comprised of three elements: a direct effect, an indirect effect, and an induced effect. The direct effect is the change in the number of production jobs in, say, the red-meat-packing industry that would be necessary to satisfy the change in consumer demand. The indirect effect is the change in the number of jobs in related industries, such as suppliers to the processing industry and wholesalers of meat products. The induced effect is the change in the number of jobs caused by the ensuing changes in household income generated from the direct and indirect effects (for example, additional workers in the red-meat-packing industry and its related industries purchase more goods and services from the rest of the economy, inducing other industries, including the directly and indirectly affected industries, to increase their employment). The employment multiplier reported in this article is calculated by dividing the indirect and induced effects by the direct effect.

Table 1

Estimated employment effects of a $10-million increase in final demand for meat products, selected red meat and poultry areas, 1989

Increased demand creates more jobs in poultry-processing areas than in red meat-packing areas because poultry processing is more labor intensive than red-meat packing

Item	Red-meat-packing areas				
	Emporia, KS	Garden City, KS	Dodge City, KS	Jacksonville, IL	Galesburg, IL
	Number of jobs created				
Total	89	104	101	106	102
Farming	21	23	18	37	31
Poultry	0	0	0	0	0
Cattle, except feedlots	5	8	8	6	5
Cattle feedlots	13	12	8	16	11
Hogs	1	1	1	11	11
Feed grains	1	1	0	2	2
All other farming	1	1	1	2	2
Manufacturing	45	46	46	46	47
Poultry processing	0	0	0	0	0
Red-meat packing	45	45	45	45	45
All other manufacturing	0	1	1	1	2
Service-producing	21	33	36	22	23
All other sectors	2	2	1	1	1
Total employment multiplier[1]	1.1	1.4	1.3	1.4	1.3
	Poultry-processing areas				
	Russellville, AR	Harrison, AR	Harrisonburg, VA	Salisbury, MD	Goldsboro-Kingston, NC
	Number of jobs created				
Total	187	209	220	253	232
Farming	50	55	56	83	76
Poultry	48	50	50	69	70
Cattle, except feedlots	0	0	0	0	0
Cattle feedlots	0	0	0	0	0
Hogs	0	0	0	0	0
Feed grains	0	0	0	0	0
All other farming	2	5	6	14	6
Manufacturing	83	84	89	94	94
Poultry processing	80	79	83	91	89
Red-meat packing	0	0	0	0	0
All other manufacturing	3	5	6	3	5
Service-producing	50	67	71	72	58
All other sectors	4	3	4	4	4
Total employment multiplier[1]	1.5	1.7	1.8	1.8	1.7

[1]Employment multiplier is the number of jobs created through indirect and induced effects divided by the number of jobs in the red-meat or poultry-processing industry directly created by the change in final demand. The multiplier cannot be calculated from the numbers shown in this table because total jobs created in the red-meat or poultry-processing industry include directly created jobs and jobs created by induced effects.

the poultry industry than from growth in the red-meat industry. For example, in Russellville, AR, where the effect on the service sector is the smallest among poultry areas, 50 service-producing jobs are added. But, in Dodge City, KS, where the effect on the service sector is largest among all red-meat areas, just 36 service-producing jobs are added. And, the increase in total employment of 187 jobs in Russellville, AR, where the overall effect is the smallest among poultry areas, is greater than the 106 jobs gained in Jacksonville, IL, where the effect among red-meat areas is largest.

While the change in poultry demand generates more jobs than the change in red-meat demand, employment multipliers for the 10 trading areas suggest that the effect of each directly created processing job differs little between red-meat-packing and poultry-processing areas. Each directly created red-meat-packing job creates between 1.1 additional jobs in the Emporia, KS, area and 1.4 additional jobs in the Garden City, KS, and Jacksonville, IL, areas. Each directly created poultry-processing job creates between 1.5 additional jobs in the Russellville, AR, area and 1.8 additional jobs in the Harrisonburg, VA, and Salisbury, MD, areas.

These results suggest that while the overall employment effect of an arbitrary increase in final consumer demand is much larger for the poultry industry than the red-meat industry, the multiplier effect of each additional job is not very different for the two industries. Poultry processing creates more jobs because it is considerably more labor intensive than red-meat packing, not because growth in poultry processing is a much better catalyst of growth in other industries. For example, the number of poultry-processing employees per $1 million of output ranges between 7.6 in Russellville, AR, and 8.9 in Salisbury, MD. In contrast, the number of meat packers per $1 million of output is only 4.3 or 4.4 in all five red-meat-packing areas.

Conclusions

The red-meat-packing industry probably has limited potential for creating a large number of jobs in nonmetro America. Although the number of red-meat-processing jobs increased in rural areas during the 1980's, the growth largely resulted from the movement of processing activity to lower cost areas nearer the source of raw inputs. The number of employees in the red-meat-packing industry declined nationally. With consumer preferences leaning toward poultry, demand for red meat products will probably not increase rapidly and create many more packing jobs.

In contrast, the poultry-processing industry, fueled by increased consumption of poultry products, will probably continue growing in rural areas. This analysis suggests that growth in poultry processing would prompt growth in related industries and the regional economy as a whole. If the industry were to become less labor intensive (for example, if labor were to become relatively more expensive, necessitating the substitution of more advanced machinery or methods for labor), the regional employment effect would decrease. Therefore, areas interested in using the poultry-processing industry as an economic development strategy should assess local potential for growth, regional production capabilities, and possible future trends in the industry's use of labor and capital.

For Further Reading...

D. Brown, *Changes in the Red Meat and Poultry Industries: Their Effect on Nonmetro Employment*, AER-665, USDA-ERS, Mar. 1993.

D. Brown, "Red Meat Packing Industry on the Move," *Farmline*, Sept. 1991.

L. Christensen and A. Perez, "Broiler Belt To Grow," *Agricultural Outlook*, July 1990.

R. Crom, *Economics of the U.S. Meat Industry*, AIB-545, USDA-ERS, Nov. 1988.

K. Krause, *Cattle Feeding, 1962-89*, AER-642, USDA-ERS, Apr. 1991.

F. Lasley, H. Jones, Jr., E. Easterling, and L. Christensen, *The U.S. Broiler Industry*, AER-591, USDA-ERS, Nov. 1988.

Rand McNally, *Commercial Atlas & Marketing Guide*, 121st edition, Chicago, 1990.

D. Stull, "Of Meat and (Wo)Men: Beefpacking's Consequences for Communities on the High Plains," paper presented at the annual meeting of the American Anthropological Association, Washington, DC, Nov. 1993.