Where Have All the Packing Plants Gone? The New Meat Geography in Rural America

By Mark Drabenstott, Mark Henry, and Kristin Mitchell

The meat industry is an economic powerhouse for rural America—accounting for roughly one of every 16 rural manufacturing jobs. Moreover, this rural powerhouse is adding jobs at a fast clip, with recent growth of 8.5 percent a year versus just 1.2 percent a year for all rural manufacturing industries. Finally, rural America has captured a commanding 52 percent of all meat industry jobs, far above the level of a decade ago.

While all these figures are welcome news to rural areas eager to expand employment, geographic shifts under way in the industry raise fresh doubts over which rural communities will land new meat plants. Once concentrated in midwestern urban centers like Chicago, the meat industry is now most often found in rural towns and hamlets—and often far from the Midwest. Poultry processing has moved to the Southeast. Beef packing plants have moved to the Great Plains. And pork packing plants have begun moving out of the Corn Belt to the Southeast and Great Plains, but where they go next is highly uncertain, with the future location of hog production itself very much in question (Drabenstott).

What geographic shifts lie ahead for the meat processing industry? And what do the shifts in this powerhouse industry mean for the future of the rural economy? This article reviews some critical trends in the meat industry by examining for the first time a special database on the industry—the Longitudinal Research Database (LRD) maintained by the Bureau of the Census. The first section shows that the meat industry has moved to new regions over the past three decades, has concentrated to a considerable degree within those regions, and has consolidated in bigger plants. The second section considers what the trends mean for rural America. The article concludes that the meat industry is likely to concentrate geographically even more in the future, promising a new source of economic growth for some rural communities while leaving many others behind. Yet even in areas where the industry does locate, a sharp drop in industry wages raises new questions about its local economic impact.

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I. THE MEAT INDUSTRY ON THE MOVE

The meat industry rarely attracts the attention that high-tech industries often command. Among the most basic of basic industries, meat processing lacks the technological wonder of Silicon Valley. Yet few industries are more important for rural America. In general, the service sector is growing more slowly in rural America than in metropolitan areas. That means rural communities put a premium on an expanding the rural manufacturing sector to provide new jobs and income. The meat industry is often a prime target in rural community development plans.

Food processing (SIC 20) is the biggest manufacturing industry in rural America, and meat processing is the single biggest food industry segment. As shown in Table 1, the meat industry accounts for approximately 50 percent of all rural food processing jobs. The meat industry has three separate components. *Meat packing* (SIC 2011) includes both beef and pork packing plants, and unfortunately the two cannot be disaggregated. However, examining where cattle and hog production has shifted does allow some inferences to be drawn. *Processed meats* (SIC 2013) includes plants that process sausage, "luncheon meats," frankfurters, and other processed meat items. *Poultry processing* (SIC 2015) includes plants that process chicken and turkey.

In terms of local economic impact, the meat industry does stand out as a key industry for rural America. Taken together, all categories of meat processing account for fully half of all food processing jobs in rural America. Meat processing plants buy more material input per plant (about $32.5 million in 1995) from local sources (defined as being within a one-hour drive of the plant) than any of the other eight sectors in the food processing group. Meat plants are also a big source of jobs. Poultry processing plants, for instance, employ more people at each plant (an average of 467 in 1995) than any other kind of food plant. While wages tend to be lower than in many other kinds of manufacturing, annual payrolls still average $7.0 million for poultry processing plants and $7.6 million for meat processing plants. When local purchases and payroll are taken together, therefore, meat and poultry plants together rank among the top four "high local economic impact" food industries (ERS).

Table 1

SHARE OF NONMETRO FOOD PROCESSING JOBS

Food processing sectors	
Meat products	49.8
Dairy products	8.5
Preserved fruits and vegetables	13.9
Grain mill products	8.4
Bakery product	6.4
Sugar and confectionery products	4.2
Fats and oils	2.0
Beverages	3.7
Selected miscellaneous food preparations	3.1
	100.0

Source: Economic Research Service, 1998.

For all its old-fashioned image, much is changing in the meat processing industry, and nowhere are these changes more evident than in the rural communities that increasingly are home to the industry. The industry is literally on the move—opening new plants near huge livestock production facilities and shutting down plants in more traditional locations. Even within regions, the industry is concentrating geographically, tracking a similar pattern in livestock production. Finally, the industry appears to be shifting to

LONGITUDINAL RESEARCH DATABASE (LRD)

The principal data source in this article is the Census Bureau's Longitudinal Research Database (LRD). The LRD, which is maintained at the Bureau's Center for Economic Studies, consists of a time series of economic variables collected in the Census of Manufactures, which is published by the Census Bureau every five years. In addition to the 1963 Economic Census, there has been a Census of Manufactures every five years beginning in 1967. The Census years included in this analysis are 1963, 1972, 1982, and 1992. The most recent year available at the time of this study was 1992. Although the data are not included in this analysis, the LRD also contains Annual Survey of Manufactures data from noncensus years.

The LRD is unique because it is the only data source that contains detailed establishment, or plant-level, data. It provides researchers with a rich source of information on such factors as production, output, and various other basic economic variables related to manufacturing plant operations. Economic variables used in our analysis include total employment, value-added, and wage data. Another useful aspect of the LRD is that it also tracks the geographic location of all plants, enabling a tracking of geographic shifts. Census regions and county-level markers (FIPS codes) are used to monitor plant location. In addition, Beale codes—which essentially define a spectrum of proximity to a metropolitan area—were merged with the Census data to permit a more careful analysis of rural/metropolitan trends.

Each establishment in the LRD is assigned a unique permanent plant number (PPN) which remains the same throughout all of the Economic Censuses. The PPN thus enables researchers to track individual plants and changes that occur within the plants over time, including changes in employment levels and plant openings and closings.

While plant-level data make the LRD an especially useful dataset, it also creates many disclosure implications. The Center for Economic Studies reviews all tabulations to ensure that individual plants cannot be identified. Cross tabulations must be aggregated in a way that meets all disclosure requirements. In some situations, individual cells in a table may be suppressed to prevent the disclosure of sensitive information. There are also criteria for analysis implementing regression or other mathematical analysis techniques. All of these measures ensure the confidentiality of each reporting establishment.

bigger plants, much like many other segments of the manufacturing sector.

To take a closer look at where the meat-processing industry appears headed, a new analysis was undertaken using the Census Bureau's LRD. The LRD is a particularly useful source for tracking these trends (see the accompanying box). This unique dataset tracks individual manufacturing plants, including meat plants, from 1963 to 1992, noting which plants expanded, contracted, closed, or opened. The results presented here are aggregated for meat packing (SIC 2011), processed meats (SIC 2013), and poultry processing (SIC 2015).[1]

Figure 1
U.S. CENSUS REGIONS

Source: U.S. Census Bureau.

Where is the meat industry moving?

A good starting point in thinking about where the meat industry is headed is to review where it has moved in recent decades. The LRD helps to isolate the major geographic shifts. For disclosure reasons, regional aggregations were limited to the four major Census regions (Figure 1). Rural/metropolitan comparisons were possible in all four regions.

Poultry processing (SIC 2015) was the first meat industry to undergo a big regional shift in the location of its plants. It was also the first meat segment where vertically coordinated production, processing, and marketing became the dominant industry structure. These vertical industry structures are now often called supply chains. [2] In fact, supply chains already dominated the poultry business by 1963, the starting year for the LRD. Nevertheless, there has still been a marked move among processing plants as production and processing consolidated and concentrated in the South.

The rural South has become the dominant home of the poultry processing industry. Half of all poultry plant jobs are now in the rural South, up from about a third in 1963 (Table 2). That jump in employment share has come mainly from plants closing in rural and metropolitan sites in the Midwest, although the Northeast—a poultry stronghold earlier this century—also lost jobs (Chart 1).

The geographic shifts in the *meat packing industry* (SIC 2011) have been much less pronounced across regions, but jobs have clearly moved from cities to the countryside. The Midwest remains the dominant home of meat packing, capturing about 58 percent of all meat plant jobs (Table 2). Over the past three decades, however, there has been a huge shift to rural plants. Midwestern metropolitan areas lost fully 20 percentage points of their employment share in this industry, and all those jobs shifted to rural places in the Midwest (Chart 1). Livestock production patterns (for both cattle and hogs) suggest these jobs generally shifted from the eastern Corn Belt states of Ohio, Indiana, Michigan, and Illinois to western Corn Belt states like Iowa, Kansas, and

Table 2

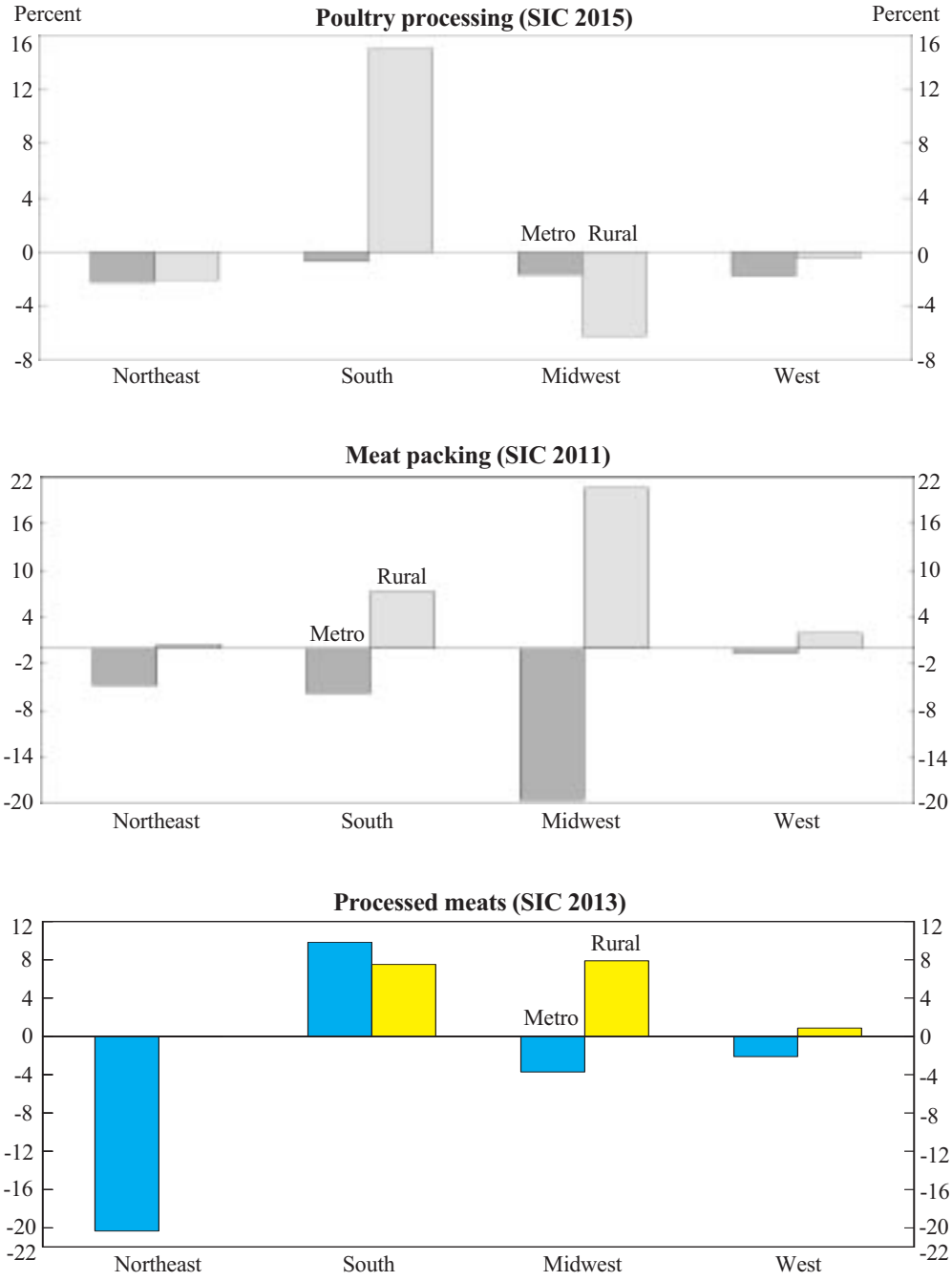
EMPLOYMENT SHARES ACROSS CENSUS REGIONS

1963 - 92

Region	Employment shares			
	1963	1972	1982	1992
Poultry processing (SIC 2015)				
Metro counties				
Northeast	5.6	5.7	5.1	3.3
South	24.1	23.1	20.7	23.4
Midwest	6.2	3.6	4.1	4.6
West	7.8	6.3	9.0	6.1
Nonmetro counties				
Northeast	3.3	3.5	2.0	1.3
South	34.5	41.7	46.8	49.5
Midwest	17.6	15.6	11.9	11.4
West	.8	.5	.5	.4
Meat packing (SIC 2011)				
Metro counties				
Northeast	8.0	6.0	4.3	3.3
South	17.3	18.7	17.9	11.5
Midwest	44.4	35.8	29.3	24.9
West	9.2	9.7	8.5	8.6
Nonmetro counties				
Northeast	.5	.6	.7	1.1
South	5.7	8.1	12.6	13.0
Midwest	13.7	19.2	24.4	34.3
West	1.3	2.0	2.5	3.3
Processed meats (SIC 2013)				
Metro counties				
Northeast	33.7	30.2	22.7	13.3
South	14.2	15.8	18.2	24.1
Midwest	32.9	31.7	29.7	29.2
West	13.4	12.4	12.1	11.3
Nonmetro counties				
Northeast	.6	.6	.7	.6
South	1.2	2.6	6.5	8.7
Midwest	3.8	5.8	9.6	11.7
West	.3	.8	.5	1.2

Source: Longitudinal Research Database.

Chart 1
CHANGE IN EMPLOYMENT SHARE
1963-92



Source: Longitudinal Research Database.

Nebraska. The same shift from city to countryside took place in the South, although somewhat fewer jobs were at stake.

Finally, the *processed meats industry* (SIC 2013) has stayed mainly in the Midwest, although a sizable portion of the industry has moved from the Northeast to the South (Table 2). The Northeast lost nearly 20 percentage points of its employment share in the processed meats industry, with virtually all that loss coming from the region's cities (Chart 1). Nearly all those jobs moved to the South, mainly to metro areas but also to some southern rural communities. In total, rural areas have claimed a much smaller portion of processed meat jobs than in either poultry or meat processing.

In sum, much of the meat industry has moved to the Midwest and South over the past three decades, and rural areas in these regions have captured a big portion of the new plants. Often viewed as a stodgy business, the meat industry has in fact been on the move, with a new geography emerging that appears to benefit rural America.

Are the meat industry shifts benefiting all of rural America?

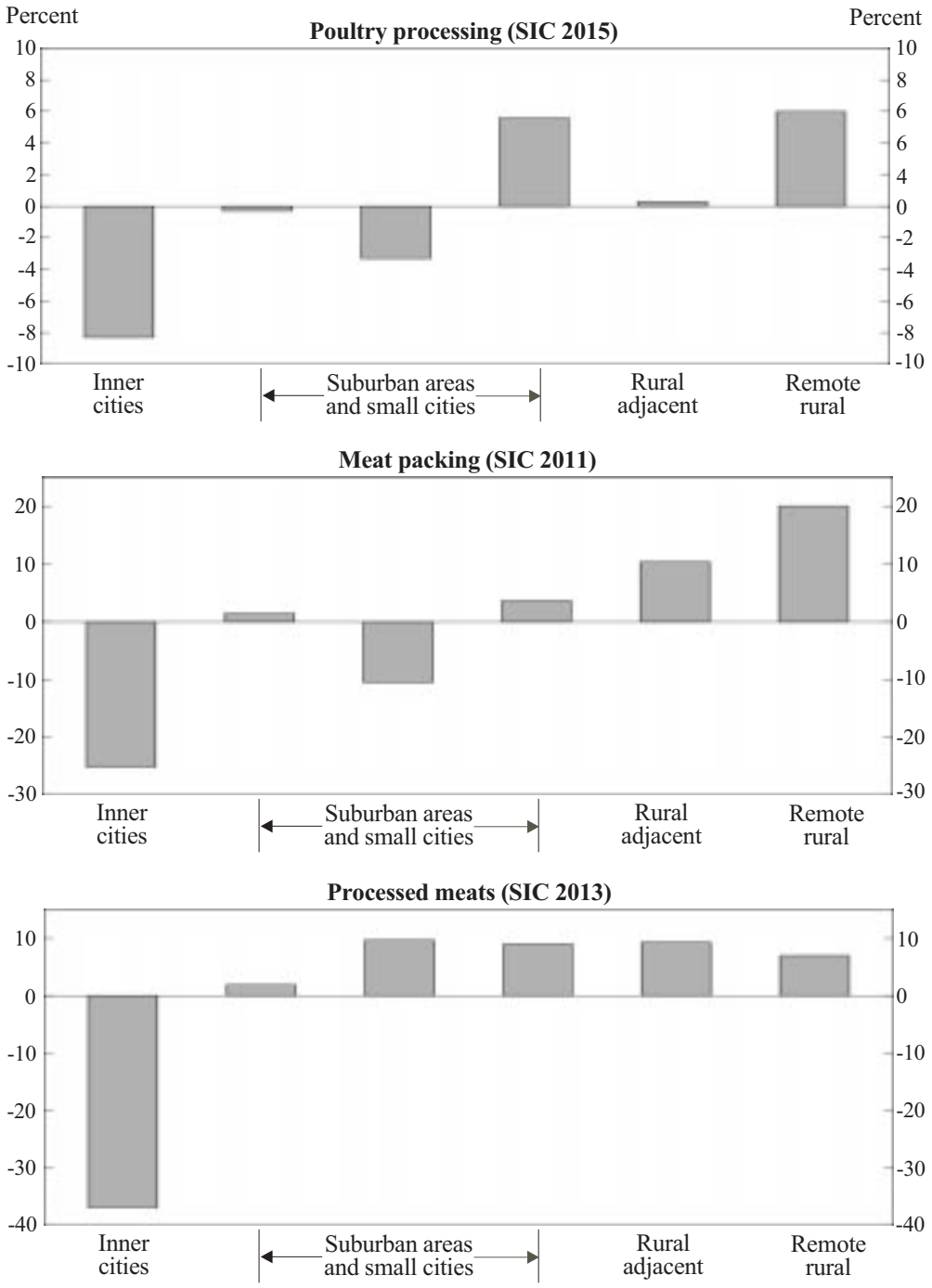
While rural America is clearly benefiting from the meat industry's new geography, are all rural communities sharing alike? The answer is no. More remote rural places appear to be doing best, while rural areas closer to metropolitan areas have captured fewer plants and jobs. To assess which rural areas have garnered meat plants, the LRD data were grouped into four categories: urban core counties, suburban and small city counties, rural counties adjacent to metropolitan areas, and remote rural counties.[3]

An analysis of these data shows that remote rural places have generally gained meat industry jobs at the expense of inner cities. As shown in the three panels of Chart 2, inner cities have lost a substantial share of meat industry jobs, in all three meat industry categories. These losses probably reflect the high cost of operating the older plants often found in cities and the relatively higher wages of urban labor markets. On the other hand, remote rural counties have been the biggest gainers, although not in the processed meats category. Rural areas adjacent to metropolitan areas have gained employment shares in all three meat industries, although the gains have not been as great as in more remote rural counties. (Rural areas adjacent to metro areas did relatively better in attracting jobs in the processed meat category.) Finally, suburban areas and smaller cities have managed modest gains on net.

The finding that the most remote rural places are the biggest gainers is somewhat surprising. Many analysts believe that rural areas next to metropolitan areas have a much bigger pool of workers, a seeming advantage since meat plants are still relatively labor-intensive in spite of significant capital investments in recent decades. The explanation to this puzzle may lie in two economic considerations. First, the meat industry appears to be constantly searching for lower labor costs, and wages in most cases are lower in remote areas. Some researchers attribute the meat industry's shift to rural areas almost entirely to a search for lower wages (Melton and Huffman). Other researchers have found that there is little difference in the productivity of remote rural meat plants and those located in urban areas (Martin and others).[4] Thus, if wages are lower in rural areas, companies have a strong incentive to move.

Second, meat plants have followed livestock herds to more remote areas. Livestock production—including cattle, hogs, and poultry—has undergone a major shift from more populated parts of rural America, such as the eastern Corn Belt, to areas with much more open space, such as the Great Plains. The livestock migration has been driven largely by ever bigger operations

Chart 2
CHANGE IN EMPLOYMENT SHARE
1963-92



Source: Longitudinal Research Database.

Table 3
GEOGRAPHIC CONCENTRATION IN THE MEAT INDUSTRY
Ellison-Glaser Index, 1963-92

	1963	1967	1972	1977	1982	1987	1992
Poultry processing (2015)	.059	.054	.050	.045	.040	.059	.061
Meat packing (2011)	.006	.012	.012	.007	.010	.043	.057
Processed meats (2013)	.004	.003	.007	.006	.006	.010	.010
All manufacturing*			.039	.039	.038	.036	.034

* Dumais, Ellison and Glaeser 1997.
Source: Longintudinal Research Database.

that generally require more open space to accommodate their corresponding environmental impact. What is more, many states with relatively high population density in their rural areas have openly resisted livestock and meat expansion. Indiana is a good example. The state still ranks among the top corn producing states. Yet whereas Indiana ranked among the top three states in hog production in 1960, it had dropped to sixth by 1996. By contrast, pork production has risen rapidly in states like Oklahoma with lots of open space.

In short, the migration of livestock herds to remote rural places has driven meat plants out of many traditional locations, such as the eastern Corn Belt. Trucks that once could deliver animals to plants in a one-hour drive found themselves facing a full day's drive, or more. Rather than ship the animals, the plants moved.

Are meat processing plants concentrating geographically?

A final consideration for rural areas looking to the meat industry as a source of economic development is whether the industry is spreading evenly as it moves to rural areas or concentrating in a relative handful of locations. The evidence points to a significant degree of geographic concentration, much higher than for other types of manufacturing.

Geographic concentration is somewhat difficult to measure, especially because the LRD has many disclosure restrictions. One comprehensive measure of geographic concentration that has gained favor among economists is the Ellison-Glaeser (EG) index. Put simply, this index measures the extent to which manufacturing activity concentrates within a given state compared with a uniform distribution throughout the nation. Table 3 presents EG index values for the three meat industries, and for all U.S. manufacturing.

Two key findings flow from a comparison of index values. First, the meat industry is considerably more concentrated geographically than manufacturing in total. Specifically, the index values for meat packing and poultry processing suggest these two industries are in the range of being one and a half to two times as geographically concentrated as manufacturing in total. The processed meats industry, on the

other hand, is spread out more uniformly across the nation.

Second, the meat industry has generally become much more concentrated over time. The meat packing industry in the 1990s is roughly ten times more concentrated geographically than in the early 1960s, while the processed meats industry is nearly three times as concentrated. Poultry processing is little changed over the period, but it was already heavily concentrated when the period began.

In short, aggregate measures point to a significant degree of geographic concentration of the meat industry. While rural America takes solace from its ability to capture a bigger share of the meat industry, the gains are increasingly concentrated in relatively few places.

Is the industry moving into bigger plants?

Like many other industries, the industry appears to be consolidating into ever bigger plants, a pattern often linked with geographic concentration. Two sources of information confirm the move to big plants—employment patterns derived from the LRD and a mapping of large meat plants derived from an industry directory, the Harris national manufacturers database.

It is possible to track meat-industry employment trends across three broadly defined plant size categories: 0-99 employees, 100-449 employees, and 450 or more employees. The LRD reveals both jobs lost and gained across firms of these various sizes. That is, the database reveals the rate of job destruction, job creation, and a net figure. Disclosure restrictions limit the analysis to combined data for all three meat industries.

The data show that the meat industry is moving into bigger plants at a very rapid rate (Table 4). The smallest plants have been losing a lot of jobs, with negative job growth rates throughout the past 30 years—in both urban and rural places. The new jobs, meanwhile, are heavily concentrated in the biggest rural plants, those with 450 or more employees. In the 1982-92 period, these big rural plants added jobs at a torrid pace—nearly 12 percent a year. While the biggest metropolitan plants returned to a solid rate of growth during the same period, job gains in the urban locations were less than half as fast. Underscoring the dynamic pace of change in the industry, the data reveal a lot of "churning" of jobs, with relatively high rates of both job creation and destruction over all three decades shown in the table. This probably reflects a relatively rapid rate of closure in old plants and, conversely, and brisk pace of plant openings.

The LRD does not permit a mapping of firms to show the consolidation at work in the meat industry, but another industry source does. The Harris national manufacturing database provides a comprehensive directory of firms grouped by the size of work force. A simple mapping of where firms of different size are located provides a helpful summary picture of the geographic consolidation in the meat industry.

Geographic concentration is most evident in the poultry industry, where the South dominates with clusters of large plants. As the map shows, poultry processing is not only concentrated in the South, it is concentrated in relatively few locations in the South (Figure 2). The only other regions of the nation that show up notably on the poultry processing map are the Mid-Atlantic states, where there is a significant cluster of large broiler firms, and in Minnesota and Iowa, where there is sizable concentration of turkey production.

Maps for meat packing and processed meats reveal somewhat less geographic concentration, although the western Corn Belt and central and southern Great Plains states clearly dominate. There are some medium-sized plants along the West Coast to serve those markets. And there is a cluster of medium and large plants in North

Table 4

EMPLOYMENT TRENDS IN THE MEAT INDUSTRY BY SIZE OF FIRM*

Annual percentage change

	1963-72		1972-82		1982-92	
	Metro	Nonmetro	Metro	Nonmetro	Metro	Nonmetro
1-99 Employees						
Creation	17.2	6.9	15.2	7.2	14.9	6.1
Destruction	-21.0	-8.4	-19.6	-7.7	-19.4	-7.8
Net change	-3.8	-1.5	-4.4	-.5	-4.5	-1.7
100-449 Employees						
Creation	12.9	10.6	11.9	7.3	12.5	9.6
Destruction	-11.4	-4.4	-10.7	-4.7	-12.4	-5.9
Net change	1.5	6.2	1.2	2.6	.1	3.7
450+ Employees						
Creation	4.9	6.2	8.3	11.8	8.9	13.9
Destruction	-18.3	-2.8	-8.2	-2.8	-4.0	-2.1
Net change	-13.4	3.4	.1	9.0	4.8	11.8

*Combined data for SIC 2011, SIC 2013, and SIC 2015.
Source: Longitudinal Research Database.

Carolina and Virginia, where the pork industry has expanded rapidly over the past 15 years. Finally, there are still remnants of the processed meat industry in the Great Lakes states. In the main, however, meat packing and processed meats have concentrated in the Heartland, and mainly in very large plants.

II. THE NEW MEAT GEOGRAPHY: IMPLICATIONS FOR THE RURAL ECONOMY

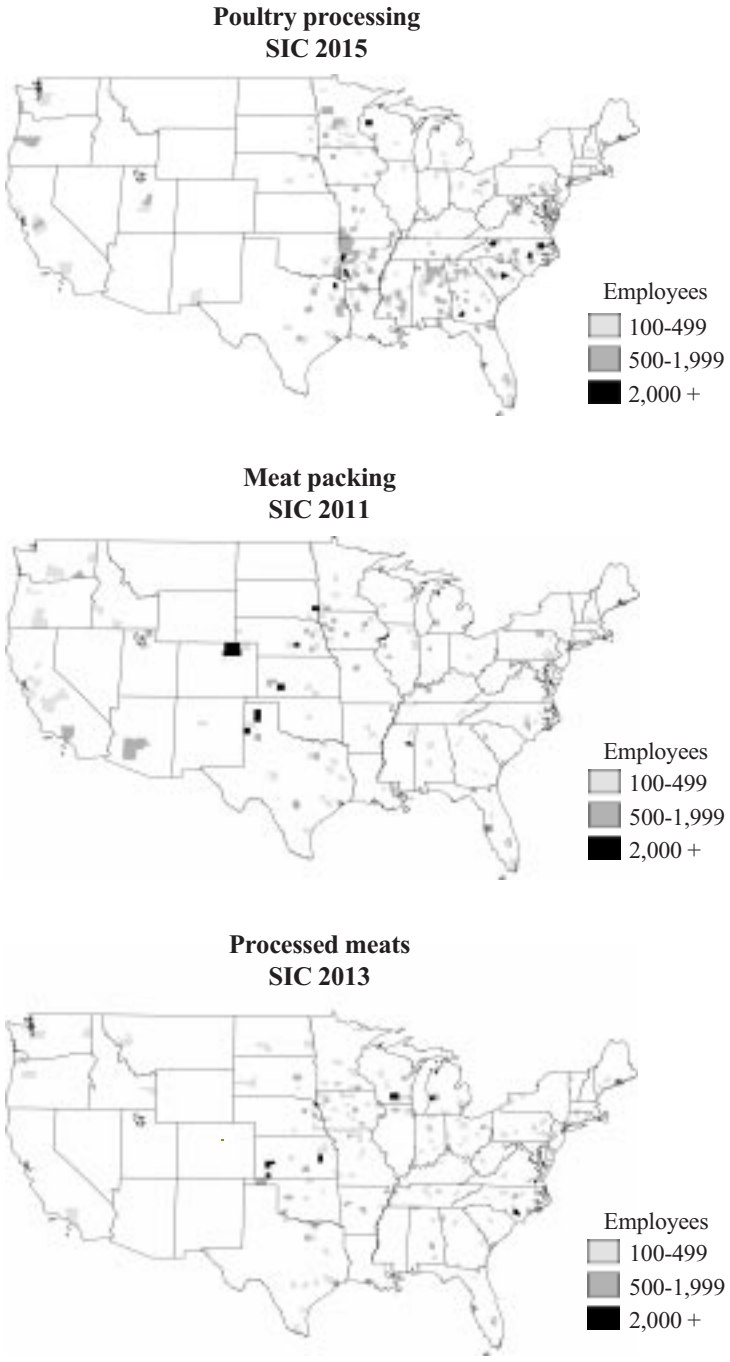
The meat industry's new geography carries big implications for the rural economy of the 21st century. The implications carry forward not only because the geographic shifts are substantial, but also because many parts of rural America eye the meat industry as a prime source of economic development. The first implication is *where* in rural America the meat industry offers the greatest promise for economic gain. And the second is *how much* economic spark the industry will provide.

Where to next?

With a major exodus over the past three decades, the meat industry poses an economic development puzzle to rural communities. While it is a natural source of economic growth in rural America, many communities wonder if the industry will migrate still further. They also ponder the odds of landing one of the industry's ever fewer but bigger plants. Put simply, are recent trends in the meat industry a shadow of things to come? And if so, which rural communities can capitalize on that future?

There are many reasons to conclude that the meat industry's recent past *is* prelude to the future. A supply chain structure now defines the poultry industry. That structure has now stood the test of time for more than 30 years, and it shows no sign of evolving into something else anytime soon. Meanwhile, supply chains seem to be on the verge of capturing the vast majority of the nation's

Figure 2
FIRMS WITH MORE THAN 100 EMPLOYEES
1998



Source: Harris 1998.

pork production (Drabenstott). Finally, some analysts see the semblance of supply chains emerging in the beef industry, where a substantial amount of coordination already exists in the feeding and packing segments of the industry (Lamb and Beshear).

More vertical coordination in the pork and beef industries will almost certainly lead to even bigger production facilities and a corresponding geographic concentration in processing plants. Substantial economies of scale both in production and in processing will continue to be key driving forces. What is more, supply chains usually try to bring different stages of production and processing under closer management with the goal of producing a final product closely suited to consumer preferences. Thus, the management systems in a vertically coordinated meat industry tend to bring livestock production and meat processing closer together—geographically and in a host of other ways.

U.S. livestock production is already quite concentrated geographically. Two-thirds of the nation's chickens are grown in just five states (Figure 3). Nearly 60 percent of the nation's fed cattle that go to slaughter are located in just three states. Hog production is also concentrated, though recent shifts in production leave the future more open to question.

There may be more uncertainty surrounding the future geography of pork than the other two main meat sources. Due to the huge scale of hog production now, many states and rural communities are unsure whether they want gigantic hog farms in "their backyard." Thus, a patchwork of environmental regulations is now emerging, and this uneven regulatory pattern will likely play a significant role in influencing where big hog farms and the associated processing plants go next.

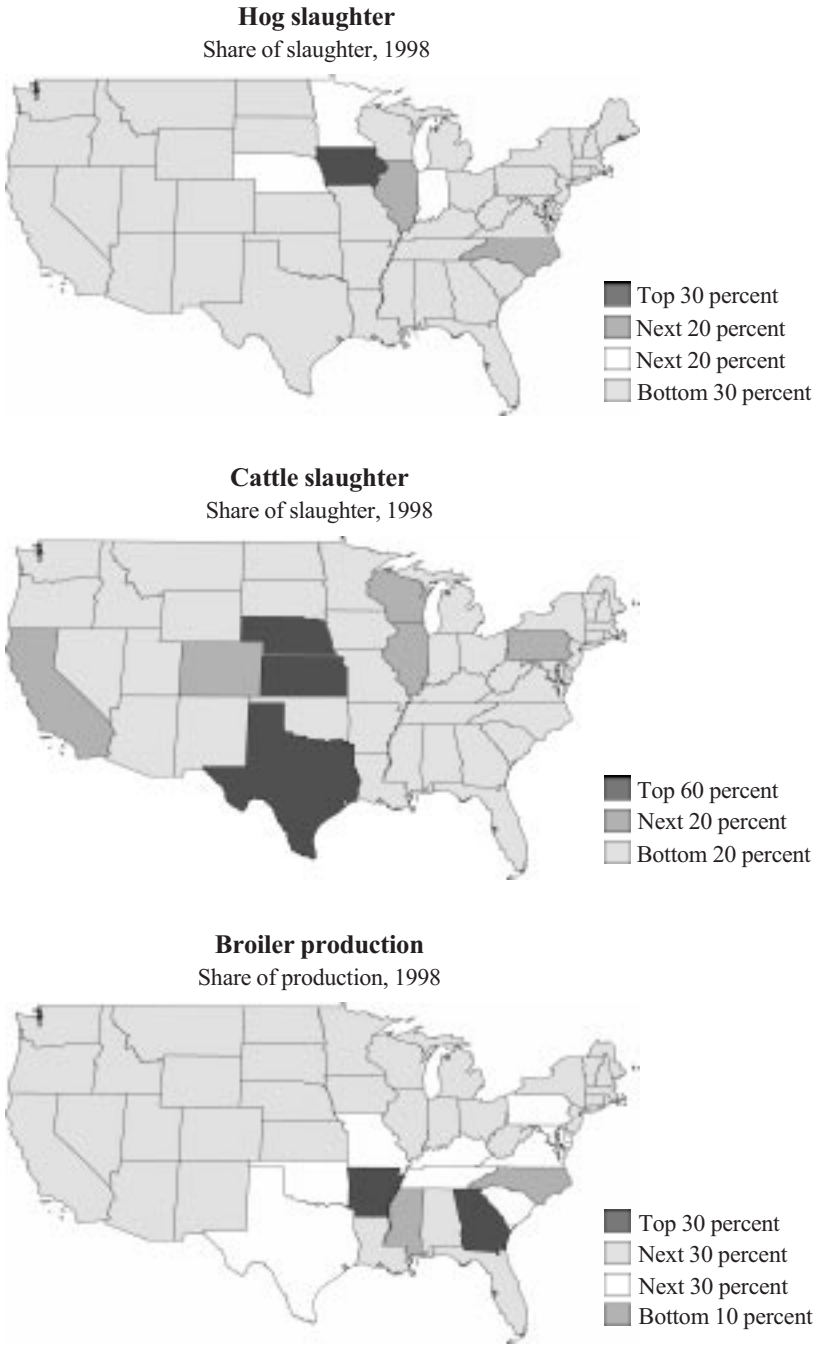
What the new meat geography means for rural America is simple but far-reaching. Relatively few communities will benefit from the new meat industry. A host of rural communities and farm states now espouse a "value-added" development mantra. That mantra will increasingly collide with the new geography of the meat industry. Those communities that do host the industry must be in a position to accommodate a big plant and all that comes with it. To be sure, some rural communities may hang on to a small meat plant, but they will increasingly prove to be industry exceptions and not the rule, as they once were. One industry factor likely to mitigate specially against small meat plants in the future is the adoption of new federal food safety regulations known as Hazard Analysis and Critical Control Points (HAACCP), which industry observers believe will be more costly to implement in small plants.

The big meat plants of the future will inevitably lead to rural debates over environmental and social impacts. While meat plants create a lot of jobs, many communities are concerned about the strains on local water supplies and the possibility for water pollution. Communities also are concerned about the social costs, such as increased school spending, that stem from the wave of migrant labor that often attends the opening of a meat plant.[5] While environmental and social issues can be managed, they will fit the resource base and the local tolerances of some communities better than others.

Environmental concerns will also create new strains of uncertainty over the longevity of some rural meat plants. With public officials paying more attention to the environmental impact of livestock production and meat processing plants, some communities may wonder how committed the shrinking number of major players in the livestock and meat industry are to specific plant locations.

The pork industry provides a good example. Many in the industry now believe that within a few years 40 or fewer firms may dominate the pork industry. Some of these firms will have

Figure 3
CONCENTRATION OF U.S. MEAT PRODUCTION



Source: U.S. Department of Agriculture.

close contractual relationships with processors, and many will own their own packing plants. With growing environmental scrutiny in many states, several pork firms are looking seriously at moving production and processing plants to other countries. The most likely prospective locations appear to be the prairie provinces of Canada, but Mexico and Brazil also are mentioned. Similar global shifts are not out of the question in poultry production and processing.

Put simply, the U.S. meat industry may start thinking much more globally. Indeed, export markets are a much more important source of demand than they once were. In the case of pork, 6 percent of U.S. production is now exported compared with just 1 percent a decade ago. While exports can be a new driving force for expanded production of livestock and meat in rural America, they may also lead some meat companies to consider sourcing production abroad, especially when confronted with a growing thicket of environmental regulations in the United States.

In sum, relatively few areas of rural America will capture the meat plants of the future. Livestock production seems likely to concentrate further in bigger facilities, and probably in more remote regions with greater space to accommodate them. While fewer and bigger locations raise the prospect of a bigger economic development prize, the global reach of the new meat industry raises some questions about the longevity of at least some U.S. rural plants.

How much local economic impact?

In addition to which communities will benefit, an equally important consideration is how much economic impact the new meat industry brings to rural communities. The answer appears to be less than it used to due to a sharp drop in industry wages. The drop in wages leaves many rural communities in a development quandary as they consider the meat industry and their own future.

A sharp drop in meat industry wages. LRD data reveal a striking drop in meat industry wages over the past decade or so. From 1982 to 1992, the last year for which data were available, real wages in the meat industry dropped in a pervasive pattern—falling in both rural and metropolitan plants, falling in all regions, and falling in nearly all types of plants (Table 5). The only exception to this pattern was poultry processing, where wages were already low in the 1960s and stayed low throughout the decades that followed. By 1992, wages in the meat packing segment of the industry were not much higher than in poultry processing.

Real wages fell sharply in many cases, generally between 20 and 30 percent. But the drop was even steeper in some regions. In the Midwest, for instance, meat packing wages dropped 44 percent in both rural and metropolitan plants. This drop came after two decades of generally steady to rising wages. Wages also fell sharply at processed meats plants, especially in the Midwest. Conversely, the only areas that experienced any wage gains in the 1982-92 period were poultry processing jobs in metropolitan areas of the Midwest and West, and poultry jobs in rural areas of the Northeast.

These data portray a bleak picture to rural economic development officials bent on adding more value to local agricultural production. Many rural communities view livestock production and meat processing as essential building blocks in moving away from a commodity-based local economy. In Iowa, for instance, it is estimated that the state's substantial pork industry adds $700 million to farmers' income directly and another $1.4 billion indirectly, much of that to rural residents working at the state's many meat plants (Otto and others).

Yet meat industry jobs simply do not offer wages that are attractive to many rural communities hoping to boost incomes. Supporting evidence of this lies in the fact that throughout

Table 5

HOURLY REAL WAGES* ACROSS REGIONS 1963-92

	1963			1972			1982			1992		
	2015	2011	2013	2015	2011	2013	2015	2011	2013	2015	2011	2013
Metro counties												
Northeast	6.30	11.29	10.84	8.30	13.15	13.87	8.48	12.42	12.91	8.50	10.62	10.50
South	5.60	8.98	8.45	7.25	11.22	10.46	7.05	10.62	10.04	7.07	7.72	9.01
Midwest	5.77	13.76	11.04	7.52	16.32	13.84	8.18	15.44	14.56	9.05	8.68	10.79
West	6.94	13.43	12.51	8.95	14.55	15.63	8.58	13.14	14.47	8.86	8.60	9.25
Nonmetro counties												
Northeast	6.52	8.77	8.63	8.41	9.97	9.99	7.32	11.18	10.32	8.44	9.28	9.84
South	5.64	7.27	6.14	7.17	9.63	8.40	7.20	10.07	8.83	7.07	7.85	7.69
Midwest	5.91	13.84	8.78	7.67	15.67	11.72	7.94	15.43	13.80	7.74	8.79	9.78
West	7.57	10.06	8.87	d	11.53	10.67	d	10.61	10.81	d	d	7.26

d denotes cells deleted due to disclosure requirements.
* 1992 dollars.
Source: Longitudinal Research Database.

the Great Plains, a significant portion of meat industry jobs is filled by migrant labor, not from the local labor pool.

Why have meat industry wages fallen so sharply? Regional shifts over the period explain part of the decline. The meat industry moved out of urban centers in the Midwest and Northeast to rural places in the Great Plains and South. This allowed the industry to trade high-wage jobs for lower paying ones. A lower cost of living in rural areas generally leads to lower rural wages, as does a more limited union presence. In addition, many states in the South and Great Plains are right-to-work states, which are typically associated with lower wage scales. The industry's regional shift, therefore, can explain a decline in the average wage paid in the industry. But regional shifts alone cannot explain why *rural* wages have fallen.

The puzzle is compounded by the fact that productivity in the meat industry generally held steady or edged up even as wages fell. The LRD contains data on value-added per worker, a broad proxy for the productivity of workers. In Midwest metropolitan meat packing plants, for example, value-added per worker *climbed* from roughly $60,000 to $66,000 from 1982 to 1992, even as wages *dropped* 44 percent. One exception to the pattern of steady productivity was rural meat packing plants in the Midwest. There, value added *fell* from $81,000 in 1982 to $61,000 in 1992.

No matter the reason, sharply lower wages in the meat industry give rural communities pause in making it a target for economic development. On the one hand, meat plants provide a "double" bonus. Livestock production significantly enhances the income of local farmers, and the meat plant boosts local payrolls. On the other

hand, meat plant wages are so low that few local residents may find the jobs attractive and the plant may not lift per capita incomes in the community (even though *total* income may rise).

In short, rural communities appear to face a development quandary. For agricultural communities with few selections on their economic development menu, the meat industry appears to be a strong alternative, especially in places where the livestock industry is already well established. But the economic gains are smaller than hoped due to the low wages in the industry.

What's a rural community to do? Three considerations merit close scrutiny. First, environmental impacts of livestock production *and* meat processing need to be understood and embraced. It is increasingly apparent that livestock production and related meat plants will migrate to places where they are welcomed. Some regions of rural America, especially the Great Plains, are well suited to livestock production and have the natural resources to sustain the new meat industry. For such communities, there will be clear opportunities for meat industry expansion since many states and communities will choose otherwise.

Second, new partnerships between industry and communities may benefit both. Rural communities may want to consider investments in the local work force, such as more rigorous community college training, that would result in a better trained local work force. This approach is consistent with research findings that the local labor force is the most important factor influencing regional shifts in the manufacturing sector (Dumais and others). Turnover rates are high at many meat plants, substantially raising production costs. Communities that take an active role in raising skill levels could hold out the prospect of a more stable work force. In exchange, meat companies might be willing to offer higher wage rates, addressing one of the most vexing development aspects of the new meat industry.

Third, communities may want to target the processed meat category since wages are generally highest in this industry segment. As in most forms of manufacturing, the more value that is added and the more capital that is invested, the higher the wages tend to be. The meat industry is no exception. In 1992, wages in processed meat plants were substantially higher than in poultry plants and modestly higher than in packing plants.

In the end, rural communities must weigh the costs and benefits of tying their economic future to the meat industry. A more mobile industry with lower wages clearly makes the development calculus more difficult. Yet for some communities, the bottom line is probably still positive, especially when compared with other economic development alternatives.

III. CONCLUSIONS

After three decades of closing old urban plants and opening big, new rural plants, the meat industry now calls rural America home. Following a move to geographically concentrated livestock production facilities, the meat industry has moved into large plants more often than not located next to the huge herds. As a result, meat packing and poultry processing are now roughly twice as concentrated geographically as manufacturing in total.

The meat industry's rural migration clearly holds out benefits for the rural economy. The meat industry is the single biggest segment of the biggest manufacturing industry in rural America—food processing. Meat plants tend to be a steady economic engine, being more immune to business cycles than many other types of manufacturing. Meat plants also provide a substantial impact by sourcing a large portion of purchased inputs in the local area and by employing a relatively large number of workers. Finally, meat plants help farm-dependent communities in their quest to add value to local commodities—both

through the plant payroll *and* by lifting prices for locally grown crops and livestock.

But the meat industry comes with some associated challenges. Relatively few rural communities will land an industry that is moving to ever larger plants. The environmental impacts of livestock production and meat plants will exceed the capacity of local resources in some communities. Moreover, new environmental regulations are leading some segments of the meat industry, most notably pork, to consider moving some plants to other countries, raising questions about how long some plants may stay in rural America. Most challenging of all, meat industry wages are low, and unlikely to lift per capita incomes in many parts of rural America.

In sum, the meat industry's new geography offers some significant opportunities for rural America, but the opportunities will not come to all, or come easily to many.

ENDNOTES

[1] The analysis of the LRD data for the meat industry was made possible by special arrangement with the Census Bureau's Pittsburgh office.

[2] In a supply chain structure, one firm typically coordinates everything from genetic selection to production systems to final packaging of the finished meat product. While the firm typically does not own all stages of production and processing (a structure called vertical integration), contracts bind the stages together.

[3] All U.S. counties were divided into Beale codes—a spectrum of counties essentially arranged according to distance from a metropolitan area and the size of population. Beale codes are based on metro and nonmetro categories as defined by the Office of Management and Budget in 1993. The codes range from zero to nine, with zero being the urban core and nine being the smallest and most remote rural counties.

[4] Over the 1972-82 period, Martin and others found that meat plants in metropolitan counties (Beale codes 0,1,2,3), all else the same, produced 5 percent more output than plants in small rural counties (codes 4,5) or completely rural counties (codes 6,7,8,9). However, after adjusting for the size of plant, the location advantage for metropolitan counties disappears except for the smallest plants.

[5] Migrant workers often speak another language than English, requiring local schools to invest in additional teachers and curricula to teach English as a second language. These and other social issues are discussed in Stull, Broadway, and Griffith.

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