

The Changing Structure of Livestock Production

The structure of agriculture refers to the number and size of farms, ownership and control of resources, and the managerial, technological, and capital requirements of farming (Knutson, Penn, and Boehm). During the 1969-92 period, the structure of livestock production was characterized by changes that severely altered the way in which most commodities are produced. Among the primary changes were a decline in farm numbers and an increase in farm size, technical advances that increased capital requirements but reduced labor needs, and a growing use of innovative production arrangements that more closely linked production with processor and consumer demands.

To examine change in the structure of livestock production, an attempt is made to quantify structural change according to shifts in farm numbers and size during the study period. Thus, the percentage change in per farm production between 1969 and 1992 is measured for each U.S. county (see appendix). Change in per farm production is used to measure structural change because it reflects the expansion of total production as well as the increasing concentration of production among fewer and larger producers. County estimates of per farm livestock production are developed using census of agriculture data for 1969 and 1992.

The percentage change in per farm production between 1969 and 1992 is weighted by the proportion of total production provided by each county in 1992. Estimates are weighted to account for situations in which the percentage change in per farm production in a county is substantial but total production in the county remains relatively small. For example, per farm production may have increased 400 percent in a county with 500 units of production, but only 100 percent in a county with 200,000 units of production. Structural change in the larger county obviously affected much more of the industry than did structural change in the smaller county. Thus, the weighting procedure better identifies those counties in which structural change has had the greatest impact on the industry. Production in 1992, rather than 1969, is used as weights because it indicates the level of relative production achieved by each county during the study period.

To compare the weighted index of structural change among U.S. counties, a statistical test is conducted to measure whether structural change in each county is significantly greater than that for the United States as a whole (see appendix). The trend in livestock production has been toward fewer and larger operations. Testing to see if the structural change in each county is significantly greater than the U.S. average indicates those counties with change significantly greater than the overall trend during the 1969-92 period. Counties with significantly greater structural change are mapped to examine the national distribution of change for each of the livestock industries. Among the counties with significant structural change, the highest quartile is identified as “counties of greatest change.”

Degrees of Structural Change

The degree of structural change in each county for the various livestock industries is illustrated with maps shown in figures 11-16. Structural change in counties identified with the dark and medium shades is estimated as significantly greater than the U.S. average. Counties in the dark shade (greatest change) comprise the highest quartile of these two groups. The medium shade identifies other counties of significant change. The light shade (least change) indicates counties where structural change is not significantly above average. Table 4 includes a summary of counties, sales (inventory), and change in per farm sales (inventory) for each of the groups shown in figures 11-16.

Structural change was significantly above the U.S. average during the 1969-92 period in about 9 percent of U.S. counties with hog and pig sales (table 4). These counties accounted for less than a third of total sales in 1969, but more than half in 1992. Most of the counties with significant change are in the major producing areas of Iowa, Illinois, Minnesota, and Nebraska (fig. 11). However, many counties outside of this traditional production area have the greatest structural change. Counties of greatest structural change are concentrated in Southern States, primarily in North Carolina and Arkansas, but are also located in isolated areas of Western States and Pennsylvania. Among counties with the greatest structural change, per farm sales increased more than 1,200 percent during the study period, while the portion of sales from these counties increased from 5 to 18 percent.

In the dairy industry, structural change during 1969-92 was significantly above average in about 13 per-

Table 4—Counties, production, and the percentage change in per farm production for major livestock commodities in each structural change area, 1969-92¹

Commodity ²	Counties of greatest structural change	Other counties of significant structural change	Counties of least structural change
		Percent	
Hog and pig sales:			
Counties	2	7	91
Head sold in 1969	5	27	67
Head sold in 1992	18	36	46
Change in per farm sales	1,276	341	211
Milk cow inventory:			
Counties	3	10	87
Head of inventory in 1969	16	29	53
Head of inventory in 1992	33	32	35
Change in per farm inventory	242	163	142
Fed cattle sales:			
Counties	2	6	92
Head sold in 1978	21	29	46
Head sold in 1992	31	32	30
Change in per farm sales	138	70	-6
Beef cow inventory:			
Counties	6	19	75
Head of inventory in 1969	9	18	65
Head of inventory in 1992	12	21	67
Change in per farm inventory	27	14	-9
Broiler sales:			
Counties	3	8	89
Head sold in 1969	16	32	43
Head sold in 1992	19	37	40
Change in per farm sales	322	261	172
Layer hen and pullet inventory:			
Counties	2	5	94
Head of inventory in 1969	4	16	58
Head of inventory in 1992	29	40	31
Change in per farm inventory	2,113	724	108

¹1978 for fed cattle sales.

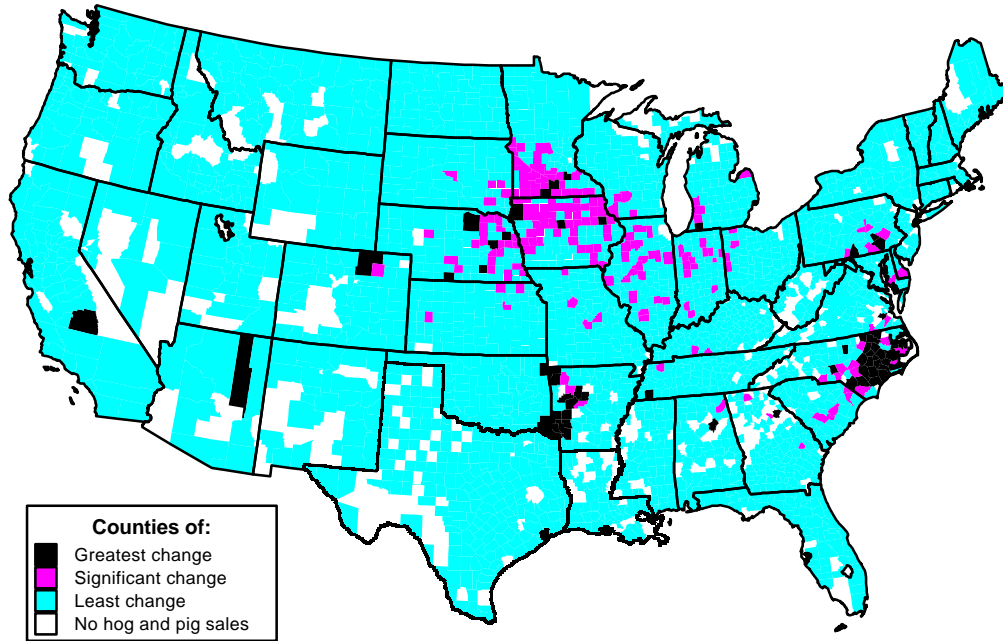
²Includes only those counties that had sales/inventory in both 1969 and 1992. Percentage of production in 1969 and 1992 may not sum to 100 because of counties that had no sales/inventory in one or the other year.
Source: Compiled by ERS using census of agriculture data.

cent of U.S. counties with a milk cow inventory (table 4). The proportion of total U.S. milk cow inventory in these counties increased from 45 to 65 percent. Counties with significant change are spread throughout the country in all regions, including several in traditional production areas of the Upper Midwest and Northeast (fig. 12). However, counties of greatest structural change are heavily concentrated in Western States, including California, Washington, Arizona, and New Mexico. The per farm milk cow inventory increased more than 200 percent over the study period in counties of greatest change, as their portion of the national cow inventory increased from 16 to 33 percent.

Structural change was significant during 1978-92 in about 8 percent of U.S. counties with fed cattle sales, while the percentage of U.S. sales from these counties increased from 50 to 63 (table 4). Nearly all counties with significant change are in the major producing areas of the Central and Southern Plains (fig. 13). Outside this traditional production area structural change is significant in only a few other counties, mainly in Western States. Counties of greatest structural change are heavily concentrated in Plains States, particularly in Nebraska and Kansas. Among counties with the greatest structural change, per farm sales increased by 138 percent during the study period compared with a decline of 6 percent in counties where structural change was least.

Figure 11

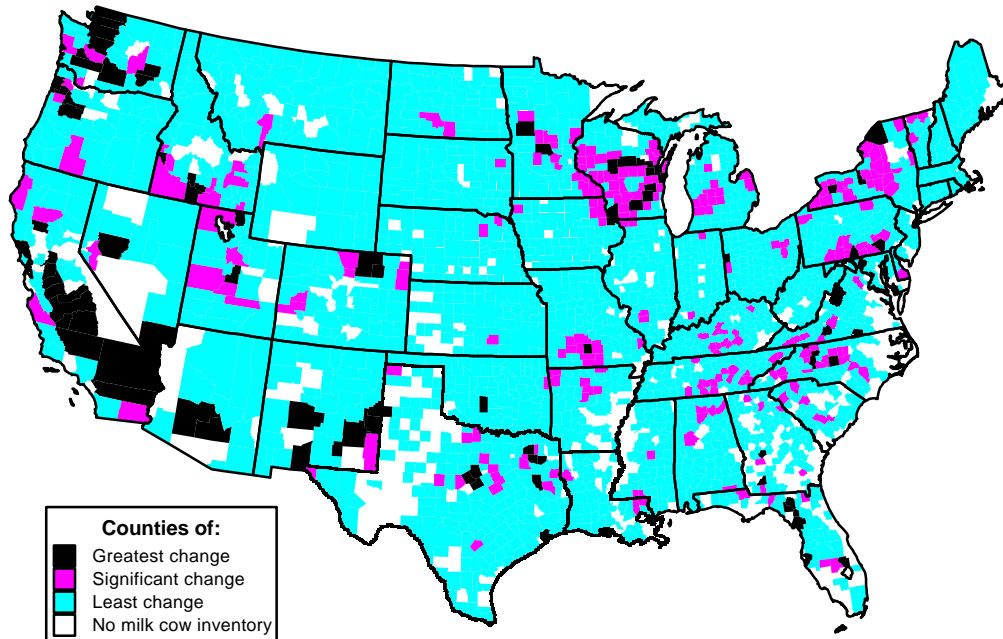
Structural change in hog and pig sales, 1969-92



Source: Compiled by ERS using census of agriculture data.

Figure 12

Structural change in the milk cow inventory, 1969-92



Source: Compiled by ERS using census of agriculture data.