

Summary and Conclusions

The U.S. swine industry has undergone significant changes in its size and structure during the past two decades that have coincided with substantial increases in hog farm productivity. In terms of structural change:

- The industry consolidated as the number of hog farms fell more than 70 percent between 1992 and 2004 while the hog inventory remained stable. Fewer and larger farms account for an increasing share of total output. The average size of U.S. hog operations grew from 945 head in 1992 to 2,589 head in 1998 and to 4,646 head in 2004. The share of the hog inventory on operations with 2,000 or more head increased from less than 30 percent to nearly 80 percent. Operations with 5,000 or more head accounted for more than 50 percent of the hog inventory in 2004.
- The organizational structure of U.S. hog farms changed considerably during the period as traditional farrow-to-finish operations gave way to large operations that specialize in a single phase of production. The share of market hogs produced by farrow-to-finish operations fell from 65 to 18 percent during 1992-2004. In contrast, the share produced by specialized hog-finishing operations increased from 22 to 77 percent.
- The expanded use of production contracts helped drive consolidation and specialization of hog production. The share of hogs delivered under production contracts grew from 5 percent of output in 1992 to 67 percent in 2004. Contracting operations are larger than independent operations and more likely to specialize in a single production phase.
- Farms with hogs became more specialized in the hog enterprise during 1992-2004 as the share of value of farm production from hog enterprises increased from 46 to 71 percent and the share of farm grain produced for hog feed fell from about half to below 20 percent. Changes have been particularly notable for specialized hog-finishing operations, where much of the production is under contract.
- The rapid growth of hog operations in the Southeast during 1992-98 slowed during subsequent years because of a moratorium on hog farm expansion in North Carolina, enacted in response to environmental concerns. In contrast, the size of hog operations increased faster in the traditional hog-producing States of the Midwest during 1998-2004.

Structural change has coincided with substantial efficiency gains for hog farms, particularly on the more specialized feeder-to-finish operations:

- Feeder-to-finish operations reduced the amount of feed used per unit of output by 4.7 percent annually between 1992 and 2004 and reduced the quantity of labor per unit by 13.8 percent annually.
- For feeder-to-finish producers, real average production costs per hundredweight of gain declined 4.7 percent annually between 1992 and 2004.

Productivity is a fundamental determinant of farm profitability and, hence, of farm growth and survival. This study used ARMS data to disaggregate changes in farm total factor productivity into changes in four constituent parts: technical change, technical efficiency, scale efficiency, and allocative efficiency. For feeder-to-finish farms:

- Total factor productivity increased annually by 6.4 percent from 1992 to 1998 and by 6.3 percent from 1998 to 2004. Most of these productivity gains were attributable to increases in the scale of production (scale efficiency) and technological change.
- The production technology displayed increasing returns to scale. Increases in farm size since 1992 explain almost half the total increase in farm productivity. Further increases in scale efficiency are likely limited for large farms, but scope for efficiency gains in the sector remains as smaller operations increase in scale or are replaced by larger operations.
- Technological advances helped drive almost half the total productivity increase since 1992.

Among findings related to a comparison of the two major hog-producing regions—the Southeast (mainly North Carolina) and the Heartland (mainly Iowa and Illinois):

- Regional trends in farm productivity mirrored trends in farm output: productivity increased more in the Southeast between 1992 and 1998 and increased more in the Heartland between 1998 and 2004.
- Average farm-size growth and the resulting improvements in scale efficiency explain most of the differences in productivity growth between the Heartland and Southeast since 1992. Farms in both regions had similar rates of technical advance over the study period. However, in the Southeast, rapid growth in average farm output during 1992-98 resulted in relatively large gains in scale efficiency. From 1998 to 2004, farms grew faster in the Heartland, leading to greater productivity growth in that region.

Recent ERS research associated use of production contracts with substantial increases in farm productivity. The estimates of productivity gains attributable to contracting suggest that these productivity advantages contributed to recent growth in contracting in the hog industry. The apparent continuing link between contracts and productivity, along with other benefits from contracts, suggests that the use of production contracts is likely to continue expanding. Because contract operations are generally larger operations, contracting may disproportionately benefit larger farms.

Cheaper food is one of the main potential benefits to society of greater hog farm productivity. The study found that productivity gains contributed to about a 30-percent reduction in the price of hogs at the farm gate, compared with prices estimated without the productivity gains. ERS did not estimate the extent to which the reduction in hog prices lowered retail pork prices.

While productivity gains can benefit consumers in terms of lower food prices, structural changes that enable efficiency gains may also generate environmental concerns. Increases in the scale of production resulting in greater animal density may require operations to store manure in larger lagoons/pits—creating concentrated levels of odor, ammonia emissions, and the potential for larger manure spills. The concentration of hog manure makes it more costly to use as fertilizer as more land is needed and transportation costs to fields are greater. On the other hand, concentrating manure sources in fewer locations potentially affects fewer people. Additionally, greater concentration may make some manure treatment technologies feasible (e.g., energy from biowaste, or processing into concentrated fertilizer).