Introduction

The increasing size and specialization of hog operations reflect significant structural change in U.S. swine production during the past two decades. Once dominated by small operations that practiced crop and hog farming, the industry has become increasingly concentrated among large operations that produce hogs on several different sites. Further, large operations that specialize in a single phase of production (see glossary) have replaced farrow-to-finish operations that traditionally performed all phases of production. Organizational change in hog production, particularly the widespread use of contracts with growers, has played a key role in the structural shift within the industry by allowing individual producers to grow by specializing in a single phase of production. Technological innovation has also been a driving force behind the structural shift and has contributed to substantial increases in farm productivity.

Changes in the industry have pressured hog producers to adjust the size, organizational structure, and technological base of their operations to remain competitive. The effects of the changes have extended beyond the industry, as restructuring has heightened environmental risks and problems associated with odor, raised concerns about the integrity of rural communities in farming-dependent areas, precipitated controversies over animal welfare, and lowered consumer prices for pork.

This report analyzes changes in the characteristics, production practices, and production costs of U.S. hog operations over the past 15 years. The objective is to emphasize economic relationships that have affected the size and ownership structure of hog production and the impact of these changes on industry productivity.

Data

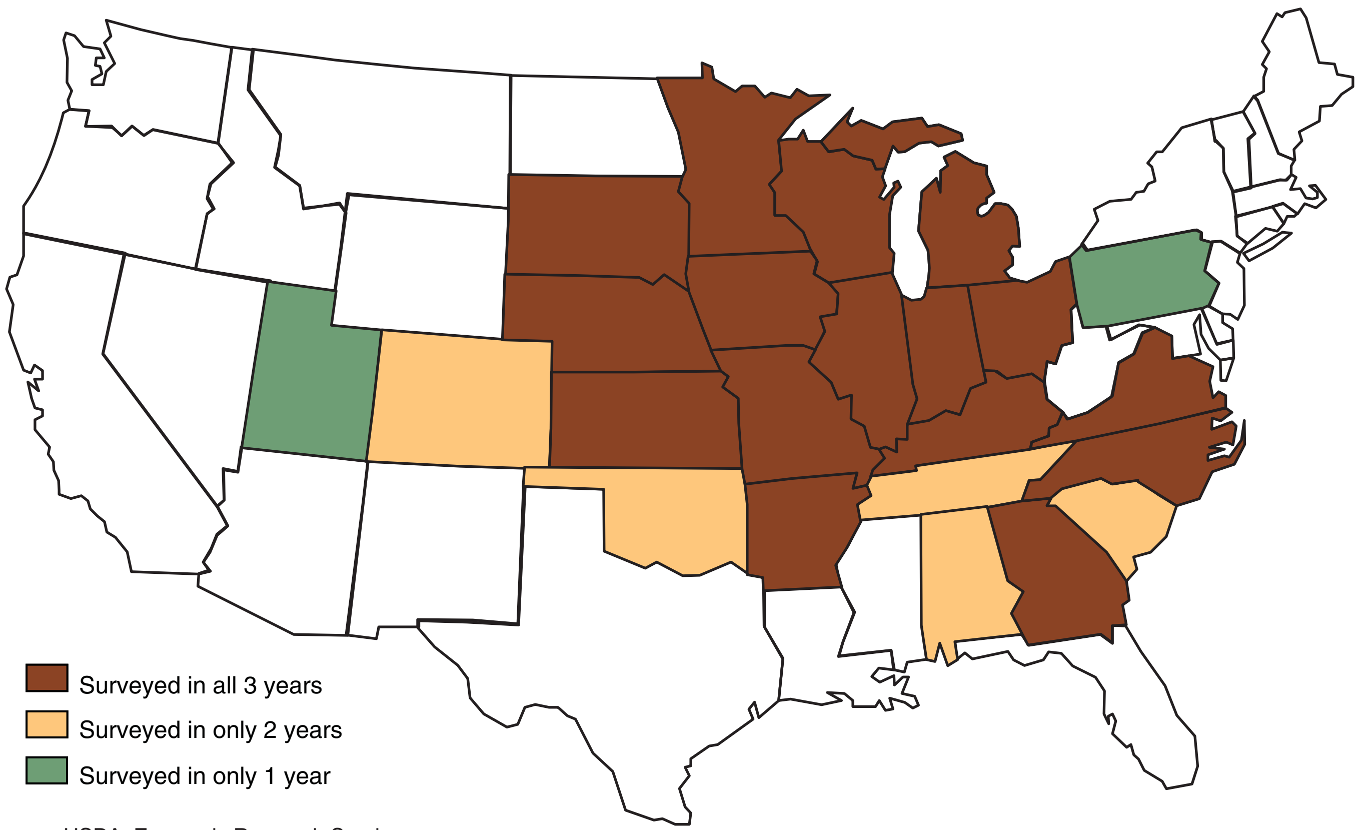
This report relies on data from detailed surveys of U.S. hog producers for 1992, 1998, and 2004. Data for 1998 and 2004 come from USDA's annual Agricultural Resource Management Survey (ARMS), and data for 1992 come from the ARMS predecessor, USDA's Farm Costs and Returns Survey (FCRS). The surveys cover a cross-section of U.S. hog operations and collect information on size, production costs, business arrangements, production facilities and practices, and farm operator and financial characteristics. The sampling resulted in 1,221 responses from 20 States in 1992, 1,633 responses from 22 States in 1998, and 1,198 responses from 19 States in 2004. Producers in 16 States, including all major hog-producing States, were part of all three surveys in each year (fig. 1). These 16 States represented nearly 90 percent of U.S. hog production in each survey year.

Hog farms were chosen from a list of farm operations maintained by USDA's National Agricultural Statistics Service (NASS). The target population of each survey was farms with 25 or more hogs on the operation at any time during the year. The hog producer surveys collect the information necessary to estimate the average cost of production for hog operations. Screening out farms with hog inventories below 25 head excludes farms raising hogs primarily for onfarm consumption and other noncommercial

Figure 1

States as part of the 1992, 1998, and 2004 surveys of hog producers

Producers in the 16 States surveyed in 1992, 1998, and 2004 accounted for nearly 90 percent of the hog and pig inventory on U.S. farms in each year



Source: USDA, Economic Research Service.

activities, such as youth projects. Each sample included operations with hogs regardless of who owned the hogs, and thus included producers who raised hogs under contract with the hogs' owner. Therefore, results differ from those of surveys of hog owners, such as described by Boessen et al. (2004) (see box, "Hog Producers Versus Hog Owners"). The sample population of hog owners includes very large operations with hogs produced under contractual arrangements on multiple sites.

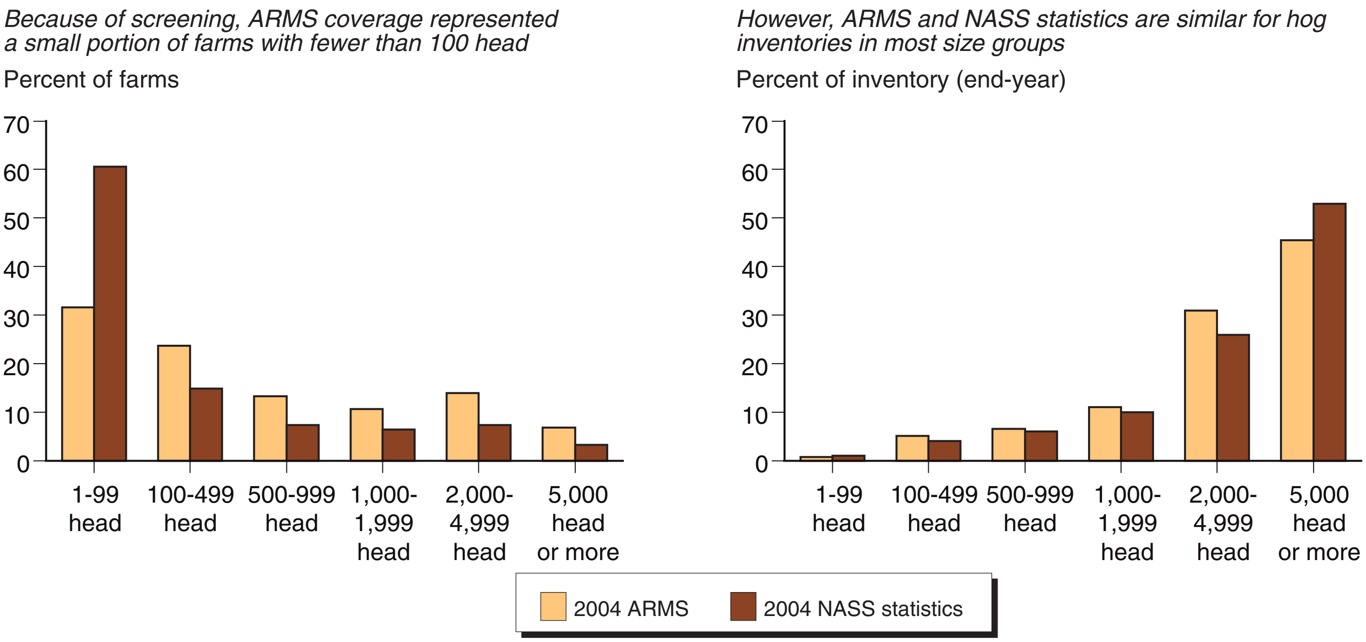
Each surveyed farm represents a number of similar farms in the population as indicated by the surveyed farm's expansion factor. The expansion factor, or survey weight, was determined from the farm's selection probability and thereby expands the sample to represent the target population. The expanded samples in each survey represent more than 90 percent of the hog and pig inventory on U.S. farms in each survey year (USDA, NASS, July 2005). However, the hog samples expand to cover just over half of the farm operations that had any hogs or pigs (USDA, NASS, January 2005; 1995-99), due to the 25-head threshold.

Figure 2 compares hog farms and inventory by size category from the 2004 ARMS and 2004 NASS hog and pig statistics. Both surveys define hog producers as sites where hogs are located (see box, "Hog Producers Versus Hog Owners"), but the NASS data include all locations with any hogs, and ARMS screens out those with fewer than 25 head. Because of the minimum-size threshold, the share of farms and the share of hog inventory on farms with fewer than 100 head are significantly lower in ARMS than in the NASS statistics. While these small hog operations represent about 60 percent of U.S. hog farms, they include only 1 percent of the hog inventory. The distribution of hog inventory by farm size in the ARMS sample is much like that in the NASS statistics. This pattern of coverage among the different sizes of hog operations in 2004 is nearly identical to that in 1992 (McBride, 1995) and 1998 (McBride and Key, 2003).

Estimates from the surveys in 1992, 1998, and 2004 are comparable because of the consistent way in which the surveys were conducted and processed. Each survey had broad national coverage, represented the same target population (operations with 25 head or more), involved a complex sampling scheme designed to represent the target population, was conducted the same way (hand enumerated) by the same organization (NASS), and collected much the same information in a similar format. Also, the definitions of different types of hog producers used to summarize the data were identical in all years.

Figure 2

Survey coverage of U.S. hog farms and inventory by size of operation, 2004



Note: Both the ARMS and NASS estimates are based on surveys of farms with hogs on the operation and thus differences between the estimates are primarily due to the screening out of farms with less than 25 head of hogs in ARMS, and the sampling and nonsampling error in each survey.

Sources: USDA, ERS using data from USDA, NASS, January 2005 and USDA's 2004 Agricultural Resource Management Survey.

Hog Producers Versus Hog Owners

The rapid growth of contract production increasingly has separated hog production from hog ownership. Contract production is an arrangement in which a hog owner (a contractor) engages a producer (a grower) to take custody of the pigs and care for them in the producer's facilities. The producer is paid a fee for the service provided. Contractors typically furnish inputs for growers, provide technical assistance, and assemble the commodity to pass on for final processing or marketing. Contractors often market hogs through marketing contracts or other arrangements with packers or processors. Packers or processors also act as contractors and have production contracts directly with producers.

The 1992, 1998, and 2004 surveys summarized in this report targeted farms with 25 or more hogs located on the operation at any time during the year regardless of who owned the hogs. Therefore, the survey samples included operations where hog producers own their hogs and contract grower operations that are producing hogs owned by a contractor. Contractors are often large conglomerate or corporate organizations that contract with many growers to produce hogs. For example, Smithfield Foods, a packing company, was by far the largest contractor in 2004 with about 800,000 sows (Successful Farming, 2005). ARMS collects information about the hogs owned by contractors such as Smithfield Foods by contacting their contract growers.

The table below shows a comparison of the number of U.S. hog producers versus hog owners and the share of hog inventories of each by size group as reported by USDA's National Agricultural Statistics Service (USDA, NASS, January 2005) for 2004.

The NASS data show about 8,600 fewer hog owners than hog producers (locations with hogs) in 2004, indicating that several hog owners had hogs on multiple operations. The hog inventory was also heavily concentrated among the largest owners, as those with 5,000 head or more owned 75 percent of the inventory. Of these, the largest 110 hog owners, those with 50,000 or more head, owned 54 percent of the inventory. Data reported by Boessen et al. (2004) for 2003 suggest that the very largest hog owners, those with 500,000 or more head, accounted for 40 percent of U.S. hog slaughter, and 23 percent of these hogs were wholly or partially owned by a packer or processor. Study findings by USDA's Grain Inspection, Packers, and Stockyard Administration (USDA, GIPSA, 2007) show that 20 to 30 percent of hogs were owned by packers during 2002-05. The GIPSA study also reports that 89 percent of the total finished-hog volume was marketed through alternatives to the traditional cash or spot market, such as forward contracts, marketing agreements, and packer ownership.

In evaluating the results of these different studies, it is important to recognize that hog industry surveys have different target populations and, hence, provide complementary, rather than duplicate information. GIPSA data are drawn from reports filed by packing plants and are based on the flow of market hogs to slaughter plants. Data reported by Boessen et al. (as well as earlier surveys administered by Lawrence and Grimes) are based on surveys of packers and other hog owners. Owners may be integrators who have their hogs raised on many different contract farms. The ARMS data used here are derived from surveys of sites with hog production facilities, which include farms where hogs are grown under contract for contractors, farms owned by contractors, and independent operations that grow their own hogs and sell them locally or directly to packers.

	Hog producers		Hog owners	
Head	Operations	Share of inventory	Operations	Share of inventory
	Number	*Percent*	*Number*	*Percent*
1-99	42,095	1.0	41,980	1.0
100-499	10,358	4.0	9,800	4.0
500-999	5,155	6.0	3,830	4.5
1,000-1,999	4,449	10.0	2,300	6.0
2,000-4,999	5,137	26.0	1,850	9.5
5,000 or more	2,306	53.0	1,150	75.0
U.S. total	69,500	100.0	60,910	100.0

Source: USDA, ERS using data from USDA, NASS, January 2005.