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The Structure of the U.S. Pork Industry

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The structure of the pork industry changed dramatically during the 1990s and promises to continue to change in the years ahead. By structural change, we refer to the number and size of operations, who owns them, and how they relate to other firms in the pork chain. Change provides both challenges and opportunities to those individuals who make their living from the industry. Trying to cope with rapid change can quickly become a test of survival. Most of the data for this fact sheet come from USDA publications and industry surveys conducted by the University of Missouri and Iowa State University.

Number of Producers

The number of U.S. farms raising hogs has been declining for a very long time (Table 1). In 1920, 4.9 million U.S. farms raised hogs. In 1950, 3 million farms raised hogs. In 1967, 1.04 million farms raised hogs. Last year, only 85,760 U.S. farms raised hogs and 8,500 of these did not own the hogs they were raising. The average inventory per hog operation has increased from 10 head in 1935 to 690 head in 2000. The number of U.S. hog operations has declined and the average inventory per hog farm has increased each year since 1980. There is no indication that either of these trends will soon end.

Year	# of Operations	Average Inventory
1965	1,057,570	47.8
1970	871,200	77.2
1975	661,700	74.5
1980	666,550	96.7
1985	388,570	134.6
1990	268,140	202.9
1995	168,450	345.5
2000	85,760	689.6

Table 1. Number of U.S. hog operations and average inventory by year. Sources: USDA/NASS and Census of Agriculture

Size of Producers

Although most hog operations are small, most of the hogs are owned by a few large operations. *The smallest half of U.S. hog operations produces less than 1% of the nation's hogs and the largest 1% of hog operations produces over half of the hogs.*

Table 2 shows the estimated number of independent pork operations and their market volume in 2000 by size category. The 20 largest firms marketed 33.3 million hogs in 2000, nearly 35% of total U.S. marketings. Combined with the 136 operations in the 50,000 to 500,000 category, these 156 firms produced 51% of all hogs in 2000. At least 25 of the 136 operations in the 50,000 to 500,000 head category are producer networks owned by multiple individual farmers who finish the feeder pigs produced in centralized sow units.

Each network may have a dozen or more owners who finished the hogs on their own farms, but it is counted as a single operation because a single firm manages the sow unit and members of the network typically are under a common marketing contract.

Growth of Larger Producers

There was a dramatic shift in hog production from small to large operations during the last decade of the 20th century (Table 3). In 1988, operations which marketed fewer than 1000 head per year accounted for 32% of total U.S. hog production. In 2000, this size category produced only 2% of the nation's hogs. Operations marketing over 50,000 head per year produced 7% of the nation's hogs in 1988 and 51% in 2000. The 5,000 to 10,000 group has maintained a stable market share over the 12-year period, and is the dividing line between those gaining and those losing market share.

One reason for this shift to larger operations is profitability. Sixty-five percent of the firms that marketed 1,000 to 1,999 hogs reported a profit during 2000 in Lawrence and Grimes' survey compared to 95% of the firms that marketed over 500,000 hogs. The economic advantages of size have not gone unnoticed by producers or by lenders.

Considering the cost structure of large farms and recent prices, it is not surprising that the large producers are satisfied with the pork business. The large producers were asked by Lawrence and Grimes to rate their satisfaction with pork production on a scale of 1 (not satisfied at all) to 6 (extremely satisfied). The average rating for the 50,000 to 500,000 head producers was 4.67 compared with 4.95 for the 500,000 and more producers.

Location of Production

Historically, hog production has been concentrated in those states that are major producers of feed grains. This relationship is weakening. North Carolina and Oklahoma have made it into the top 10 without being major producers of feed grains. Table 4 lists the production and market share of the top 15 hog producing states in 2000 along with their production in 1990.

Production Contracts

Production contracts have become common in the pork industry with 22% of farrowings and 34% of hogs finished under a production contract in 2000 (Table 5). These numbers are 4 to 5 points higher than in 1997. Producers who use production contracts owned 39% of farrowings and 55% of market hogs in 2000. However, approximately 44% of the farrowings and 38% of the hogs finished by these producers are in company owned facilities. Based on responses from contract growers, Lawrence and Grimes determined the common types of production contracts in 2000 (Table 6). Payment on a per head basis with incentives was the most common type of contract (37%), and per head without incentives accounted for 14% of production contracts. The per pound contract is more likely to have an incentive. However, there is little difference in the the share of payment per pig space with or without incentives.

Annual Marketings	# of Operations	million head marketed in 2000			
		Market Hogs	Feeder Pigs	Seed-stock	Total
<1,000	54,512	1.7	—	—	—
1,000-2,000	10,034	6.5	1.1	0.2	7.8
2,000-3,000	4,118	4.9	0.9	0.0	5.8
3,000-5,000	3,312	6.4	0.7	0.2	7.3
5,000-10,000	2,627	9.3	1.0	0.1	10.5
10,000-50,000	2,501	17.7	3.4	0.3	21.4
50,000-500,000	136	16.0	1.0	0.2	17.2
500,000+	20	33.3	5.3	0.4	39.0
Total	77,260	96.0	—	—	—

Table 2. Number of independent U.S. hog operations and marketings by size of operation (2000). Sources: Lawrence & Grimes and USDA/NASS.

Annual Marketings	1988	1991	1994	1997	2000
<1,000	54,512	1.7	—	—	—
1,000-2,000	10,034	6.5	1.1	0.2	7.8
2,000-3,000	4,118	4.9	0.9	0.0	5.8
3,000-5,000	3,312	6.4	0.7	0.2	7.3
5,000-10,000	2,627	9.3	1.0	0.1	10.5
10,000-50,000	2,501	17.7	3.4	0.3	21.4
50,000-500,000	136	16.0	1.0	0.2	17.2
500,000+	20	33.3	5.3	0.4	39.0
Total	77,260	96.0	—	—	—

Table 3. Share of annual hog marketings by size of operation(1988-2000). Source: Lawrence & Grimes.

The contract growers surveyed generally found contracts gave them better access to capital, allowed for additional expansion, and reduced risk. Contractors and growers were both generally satisfied with contracting (Table 7). On a 1 to 6 scale with 1 being very satisfied and 6 being unsatisfied, 92% of the contractors and 85% of the growers rated their satisfaction a 1, 2, or 3. Thus, individuals on both sides of contracts reported that the agreement is working relatively well. Seventy-two percent of the large and very large producers reported training and supervising growers closely. Another 16% reported providing little training and supervision and 11% said they try to have experienced growers who need little supervision. Contract production is expected to continue as more than 80% indicated they plan to maintain the relative share of contracts to owned facilities, or they plan to expand contracting.

2000 Rank State	2000		1990	
	(000 head)	% of U.S.	(000 head)	% of U.S.
1 Iowa	25,425	26.4	22,224	25.4
2 N. Carolina	14,474	15.0	5,727	5.8
3 Minnesota	10,733	11.1	7,278	8.3
4 Illinois	6,599	6.8	9,903	11.3
5 Nebraska	5,847	6.1	6,540	7.5
6 Indiana	5,537	5.7	7,081	8.1
7 Missouri	4,584	4.8	4,837	5.5
8 Oklahoma	2,997	3.1	273	0.3
9 Ohio	2,680	2.8	3,218	3.7
10 Kansas	2,163	2.2	2,384	2.7
11 S. Dakota	2,121	2.2	2,993	3.4
12 Pennsylvania	1,782	1.8	1,479	1.7
13 Michigan	1,579	1.6	1,792	2.0
14 Arkansas	1,087	1.1	918	1.0
15 Texas	1,081	1.1	950	1.1
U.S.	96,363	100.0	87,558	100.0

Table 4. Slaughter hog marketings of 15 leading states. Source: Pork Board checkoff data reflecting the state where the hogs were finished.

Marketing Contracts

The number of hogs sold on the spot market has declined rapidly in recent years as producers have moved to marketing contracts. Surveys conducted by Glenn Grimes at the University of Missouri indicate that 62% of market hogs were sold on the spot market in 1994, compared with 43% in 1997 and 29% in 2000. A pork checkoff funded survey (Table 8) of packers suggests that only 17% of the barrows and gilts were purchased in the spot market in January 2001. The remainder were procured via some type of marketing agreement. Fifty-four percent were acquired via a formula price contract, i.e. the price was set in relation to some contemporary publicly reported price for hogs or pork. Two percent were acquired via a window contract with a ledger. A window contract is similar to a formula contract except that extreme high and low prices are moderated. A ledger provision keeps track of payments under the contract relative to spot market prices and requires some sort of "settling-up" of the difference when the contract expires. Five percent of barrows and gilts were purchased on a window contract without a ledger. Six percent were purchased with the price set in relation to the futures market price when the contract was established. Sixteen percent were purchased using a price determined by the cost of feed.

% hogs raised under Contract Size class 1,000 hd. Mktd.	% hogs owned by contractors							
	Farrowed		Finished		Farrowed		Finished	
	1997	2000	1997	2000	1997	2000	1997	2000
1-50	10	5	14	9	1	2	8	3
50-500	8	8	9	13	4	7	7	10
500+	22	26	22	33	11	13	16	21
Total	40	39	44	55	17	22	30	34

Table 5. Percent of U.S. hogs owned by contractors and percent raised under production contracts, 1997 and 2000. Source: Lawrence & Grimes.

Payment Basis	Pig Space	Pig Space	Head	Head	Pound	Pound	Other
Incentive	Yes	No	Yes	No	Yes	No	
Contract	19	18	37	14	7	2	3

Table 6. Type of payment system for production contracts (%). Source: Lawrence & Grimes.

Satisfaction rating	1	2	3	4	5	6
	% of responses					
Contractors	22	42	28	5	3	0
Growers	27	33	26	8	3	4

Table 7. Level of satisfaction with production contract reported by contractors and growers (1=very satisfied, 6=not satisfied) (%). Source: Lawrence & Grimes.

It should be noted that most vertically integrated producers report their sales to their packer-owner as

formula sales, thus packer ownership does not appear explicitly in the table. There is a strong trend to use marketing contracts as firms get larger. Lawrence and Grimes found that three-fourths of hogs marketed by firms selling fewer than 3,000 head in 2000 were sold on the spot market. Less than 10% of hogs sold by the largest 156 firms were sold on the spot market in 2000. Mandatory price reporting data show that roughly 17% of barrows and gilts were sold on the spot market in the fall of 2001, implying that the rapid shift away from spot market sales is slowing.

54%	formula off a public price
2%	window with a ledger
5%	window w/o a ledger
6%	futures market base
10%	feed cost base with a ledger
6%	feed cost base w/o a ledger
17%	Spot market

Table 8. Packer purchases of barrows and gilts, January 2001.

Producer-Packers

A growing number of packers have gotten into hog production and vice versa. Of the nation's eight largest hog producers, five are also major hog packers. Raising hogs not only provides packers with an assured supply of hogs with known characteristics, but the profitability of hog production and hog packing are inversely related. Thus, combining production with packing stabilizes income.

Head/Year (000s)	1981	1984	1987	1990	1993	1996	1999	2000
	Number of plants							
<1	899	894	811	676	557	477	438	459
1-9	269	241	196	198	194	161	166	136
10-99	110	107	88	88	78	71	70	70
100-249	23	26	13	15	12	16	13	14
250-499	26	19	13	11	8	9	4	5
500-999	23	21	25	9	7	3	5	7
1000-1500	28	20	13	9	10	5	2	*
1500+	10	13	23	22	25	28	30	*
Total	1388	1341	1182	1028	891	770	728	721

Table 8. Packer purchases of barrows and gilts, January 2001.

***30 firms slaughtered more than 1 million hogs in 2000. Source: USDA/NASS.**

According to Lawrence and Grimes, in 2000 packers owned approximately 23% of U.S. slaughter hogs. Feed companies or feed dealers owned approximately 10% and veterinarians and genetic companies accounted for an additional 2% each. Their results suggest that 37% of U.S. slaughter hogs were owned by processors or input suppliers and the remaining 63% were owned by farmers.

The number of hog packing plants continues to decline. Table 9 shows the number of federally inspected hog slaughter plants by size and year. The total number of federally inspected hog slaughter plants has declined from 1,388 in 1981 to 721 in 2000. As the number of plants declines, producers face longer hauls to get hogs to market.

Forces Driving Structural Change

Perhaps the strongest force driving the rapid pace of structural change is economies of size. Numerous studies indicate that larger hog operations can usually purchase needed inputs at a lower per unit cost, sell hogs at a higher price per pound, and are more resource efficient than smaller hog operations. Table 10 provides one set of numbers to support this latter statement. According to USDA's quarterly hogs and pigs reports, large operations averaged 1.35 more pigs per litter in 2000 than did small hog operations. The increased efficiency appears to largely arise from the advantages associated with specialized labor.

Herd Size	Pigs/Litter
1-99	7.58
100-499	7.98
500-999	8.30
1,000-1,999	8.63
2,000-4,999	8.78
5,000+	8.93

Table 10. Pigs per litter by herd size, 2000. Source: USDA/NASS.

New technology and new production systems are also forces pressuring hog operations to get bigger. Artificial insemination, split-sex feeding, multiple-site production, and all-in/allout stocking are all recent developments that are easier to adopt when one is raising many hogs.

Summary

The U.S. pork industry continues to evolve toward fewer and larger producers who rely on contracts for both hog production and marketing. In 2000, over half of the hogs were from approximately 156 firms marketing more than 50,000 head annually. These producers finished 60% of their production in contract facilities. Over 90% of their marketings were under contract or were owned by a packer. These producers

expressed a high level of satisfaction with hog production. They and contract growers were satisfied with production contracts. These large producers were satisfied with their marketing contracts and planned to continue them in the future.

The less than 5,000 head per year producers have been losing market share. The less than 1,000 head producers in particular have declined dramatically in number and production. Lawrence and Grimes found that smaller producers are less likely to use production or marketing contracts, artificial insemination, or sell on a carcass basis. The use of producer networking has leveled off or even declined among the less than 50,000 head producers. Marketing networks are more commonly used than other types of networks.

The smaller producers who survived the terrible financial adversity of 1998-99 are adopting the practices of larger producers. Smaller producers are rapidly increasing use of technology, such as artificial insemination and marketing contracts. While there will continue to be attrition from the ranks of smaller producers, there also will be those who continue successfully into the years ahead.

References

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