Production and Marketing Characteristics of U.S. Pork Producers, 1997–1998

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Introduction

The pork production sector is undergoing a significant, perhaps unprecedented change in its size and ownership structure. Further, the marketing linkages of pork producers with meat packers are changing dramatically. These changes can have profound effects on industry performance and the appropriate strategies for virtually all the players in or associated with the pork industry, such as feed companies, breeding stock and animal health suppliers, producers, processors, pork merchandisers, and others.

In the 1980s, there were very limited arrangements for contract production and long-term marketing in the pork sector, and large-scale production was beginning to grow rapidly in the Southeast (Hayenga et al., 1985). In the 1980s and 1990s, the smaller number of hog producers and their increasing size and growth rates have been well documented by the USDA and others. In addition, Grimes and Rhodes (summarized by Rhodes (RAE, 1995) documented the changing size distribution of producers, and the extent and kind of production contracting in pork production, primarily producer-to-producer contracts. In the mid-1990s, Grimes and Rhodes and a closely related study by Hayenga, Rhodes, Grimes, and Lawrence (Hayenga et al., 1996, Lawrence et al., 1997) documented the growing importance of long-term marketing links between producers and packers, and the rationale for that growth for both producers and packers. Large-scale producer-integrators were rapidly increasing their share of U.S. pork production, extensively using long-term production contracts with other producers to expand their scale with less capital required. Vertical integration of packers into hog production was relatively small, but growing, while long-term marketing contracts were expected to rapidly expand n themid-90s.

The objective of this survey of more than 8,300 pork producers is to provide a quantitative snapshot of their economic structure in 1997, and likely future changes in the size, ownership structure, and ong-term contractual marketing linkages of pork production enterprises.

The Vance Publishing mailing list of pork producers, compiled by *Pork* magazine was used to identify producers according to their volume of annual marketings. Two separate, but nearly identical surveys were used to collect information from February through May 1998. Approximately 145 operations marketing 50,000 or more hogs a year were contacted by telephone. If they confirmed that they marketed over 50,000 hogs annually, they were faxed a survey and returned it by fax. All 18 operations marketing 500,000 hogs a year or more participated in the study, as did 88 of the 127 operations marketing between 50,000 and 499,999 head annually. A random sample of operations marketing between 1,000 and 50,000 hogs annually by size category was mailed a survey and asked to complete it and return it in a self-addressed, stamped envelope. A one-dollar bill was included in each mail survey to increase response rates. Approximately 25% of the mail surveys were returned. Employees of, or contract growers for other producers were excluded from the analysis to eliminate duplication.

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Survey Results

Size of Producers

Consolidation of the pork industry is continuing. However, the changes are occurring primarily in the largest and smallest groups of producers. The largest operations are gaining the greatest market share and the very smallest are showing the greatest loss. In 1997, 145 firms marketing 50,000 hogs or more a year marketed approximately 33.1 million head (37% of U.S. produced) of hogs in 1997 (Table 1). This figure compares with 16 million head from 66 firms in that size class in 1994, the last such study completed (Grimes and Rhodes, 1995). This is a dramatic increase in only three years. Another 51.7 million hogs (56%) were marketed by an estimated 23,400 operations selling 1,000-49,999 head a year. The remaining 5% of the U.S. hogs were marketed by approximately 80,000 farms selling fewer than 1,000 hogs annually based on USDA estimate of the number of farms with hogs, December 1997, Hogs and Pigs.

Table 1. Estimated number of operations and share of U.S. slaughter 1997, by size category.

Annual Marketings 1000 Head	Number of Operations	Market Share (%)
<1	80,000	5.4
1-2	11,708	12.1
2-3	4,996	9.7
3-5	3,438	9.9
5-10	1,978	9.9
10-50	1,318	16.2
50-500	127	13.1
500+	18	23.8

The majority of U.S. production is in farrow-to-finish operations (Table 2). Nationally, 83% of the market hogs are marketed by the operation that farrowed them and the remainder is sold as either feeder pigs (or weaned pigs) or seedstock. There is a slight tendency for the larger, medium sized operations (5-10 and 10-5- thousand head) to sell more feeder pigs compared with the smaller and larger operations.

Total production by medium and large producers in 1997 was 89.8 million head, 6.5 million fewer than in 1994 (Table 3). Collectively, operations marketing fewer than 50,000 head produced 26.5 million fewer hogs in 1997 than they did in 1994—a 33% decline. Operations marketing fewer than 1,000 hogs probably produced 11.7 million fewer hogs in 1997 than in 1994—a 70% decline based on USDA estimates and our survey results. This decline in production was partially offset by increases in the two largest size classes. The 50-500,000 class more than doubled in the number of operations and increased production 79%. The 500,000+ class doubled in number of operations from 9 to 18 and more than doubled production, a 144% increase in three years.

Table 2. Annual hog marketings by medium and large producers by size, 1997.

Size class 1,000 hd.	Market Hogs	Feeder Pigs Million Head	Seedstock	Total
1-2	8.3	1.6	0.1	10.0
2-3	6.6	1.1	0.2	7.9
3-5	7.3	1.6	0.2	9.1
5-10	7.2	1.9	0.2	9.3
10-50	11.8	3.3	0.5	15.6
50-500	11.8	1.9	0.4	14.0
500+	21.4	2.2	0.4	24.0
Total	74.2	13.6	1.9	89.8

Table 3. Number of operations and marketings by size, 1994 and 1997.

Size class 1,000 hd.	1994 Firms	1997 Firms	1994 Marketings	1997 Marketings	Change Million hd.
1-2	15,201	11,708	19.9	10.0	-9.9
2-3	6,192	4,996	13.7	7.9	-4.6
3-5	3,806	3,438	13.5	9.1	-4.4
5-10	2,209	1,978	14.5	9.3	-5.2
10-50	1,062	1,318	16.8	15.6	-1.2
50-500	57	127	7.8	14.0	+6.2
500+	9	18	9.8	24.0	+14.2
Total	28,536	23,583	96.3	89.8	-6.5

The trend to fewer and larger operations has accelerated in recent years (Table 4). Over the last ten years the share of hogs produced by firms marketing 50,000 head or more has increased from 7% in 1988 to 37% in 1997. This gain has offset a decline in production from operations marketing fewer than 1,000 head; their share dropped from 32 to 5% over the same period. Since 1994, the 10-50,000 head group has gained market share at the expense of the 1-2,000 head category. The 2,000 to 9,999 head classes have maintained a relatively stable share of the industry over the last decade. The decline in the fewer than 1,000 head category is consistent with an earlier study that found that 90% of Iowa farmers who quit raising hogs between 1992-1997 sold fewer than 1,000 head a year (Lawrence, 1997). In the fewer than 50,000 size class, average marketings by operation differed somewhat by region, with Iowa being smaller than the national average, while operations outside the Corn Belt were larger, and the Eastern Corn Belt (ECB) and other Western Corn Belt (WCB) states ranked in the middle (Table 4a). The 50-500 and 500+ thousand classes were not included in those figures; they were much larger and usually involved in production in many states, most heavily in the Southeast.

Table 4. U.S. hogs produced by size of operation, 1988-1997 (%).

1,000 Head	1988	1991	1994	1997
<1	32	23	17	5
1-2	19	20	17	12
2-3	11	13	12	10
3-5	10	12	12	10
5-10	9	10	12	10
10-50	12	13	13	16
50+	7	9	17	37

Table 4a. Average annual marketings per operation, 1997.

Region	Marketings
Iowa	3,860
Other WCB	4,942
ECB	4,921
Outside CB	6,001
Nation	4,777
50-500	133,860
500+	1,332,045

Planned Growth

The structural shift to larger operations is expected to continue. The survey asked producers how many hogs they planned to produce in the years 1998 and 2000. Producers in all size classes indicated that they planned to grow in the coming years, with a total growth of 15% in 1998 and 36% by the end of the year 2000 (Table 5). While the under 5,000 head farms planned 6-14% growth between 1997 and 1998, they did not plan additional growth in 1999 and 2000. In contrast, the over 5,000 head indicated plans for 15-20% growth in 1998, with growth continuing into 1999 and 2000. The less than 50,000 head operations reported more rapid growth planned in the Eastern Corn Belt and outside the Corn Belt, compared with the Western Corn Belt (Table 5a). Iowa producers reported expansion for 1998, but a decline after that. If the plans are carried through, hog production in the year 2000 would be 122 million head. The obvious problem with the planned growth is that these growth plans will result in larger pork supplies and lower prices. Note that this survey was completed after hog prices dropped into the mid-$30s for a short period of time and cyclical expansion of sow herds and market hog supplies had been forecast

Table 5. Planned growth by size group compared with 1997 (%).

Size class 1,000 hd.	1998	2000
1-2	12	10
2-3	6	6
3-5	14	15
5-10	15	25
10-50	20	39
50+	16	64
Total	15	36

Table 5a. Growth and planned growth by region (%).

Size class 1,000 hd.	1996-1997	1997-1998	1997-2000
1-50			
Iowa	10	23	17
WCB-Iowa	7	16	23
ECB	4	12	32
Other	9	10	35
Nation	7	16	26
50-500	18	27	66
500+	19	13	27

The survey asked producers marketing 1-50 thousand hogs a year what factors may limit their expansion plans. They scored the responses on a six point scale with 6 being a major limitation and 1 having no effect (Table 6). As expected, (low) profit forecasts was the greatest limitation to expansion of these producers. However, the producers with the fastest expansion planned (5,000 head and larger) rated profits as a slightly lower concern and on a comparable or lower level than environmental regulations. Finding good employees, and local opposition to new or expanded hog operations were important limitations for the larger medium-sized operations. Profits, fear of larger producers, environmental regulations and market access were all concerns for smaller producers. Regional differences in perceived limitations (not summarized in tabular form) were small; loan availability was perceived as less restrictive in the Eastern Corn Belt; environmental regulations and market access were more important outside the Corn Belt; local opposition, fear of big farms, environmental regulations and availability of good employees were least important in Iowa versus other regions (Table 6a).

Table 6. Limitations on further expansion, by size (1=no effect, 6=greatly limits).

Size class 1,000 hd.	Facility loans	Operating loans	Good employees	Local opposition	Environ regs	No one to take over	Market access	Forecast profits	Fear of big farms
1-2	2.73	2.58	2.44	2.90	3.68	3.05	3.36	4.25	3.31
2-3	3.09	2.93	2.94	3.09	3.70	2.76	3.15	4.13	3.28
3-5	3.11	2.76	3.20	3.26	4.15	2.86	2.97	4.17	2.88
5-10	3.62	3.18	3.83	3.35	4.04	2.67	2.69	4.08	2.50
10-50	3.37	3.09	3.63	3.65	4.27	2.26	2.47	3.84	2.24
1-50	3.15	2.88	3.15	3.22	3.95	2.75	2.97	4.11	2.90

Table 6a. Limitations to further expansion, by region (1=no effect, 6=greatly limits).

Region	Facility loans	Operating loans	Good employees	Local opposition	Environ regs	No one to take over	Market access	Forecast profits	Fear of big farms
Iowa	3.33	3.02	2.95	2.84	3.57	2.80	2.91	4.18	2.80
WCB-IA	3.29	3.02	3.20	3.56	4.12	2.78	2.99	4.13	2.94
ECB	2.85	2.61	3.24	3.23	4.03	2.66	2.77	4.03	2.94
Other	3.10	2.87	3.27	3.34	4.23	2.78	3.43	4.10	2.96
Nation	3.15	2.88	3.15	3.22	3.95	2.75	2.97	4.11	2.90

Producers were asked to identify their minimum "stay-in" price, defined as the hog price they would need to stay in business for the next 3-5 years if the central Iowa corn price was $2.50 per bushel. Their responses likely reflect their variable cost of production and their perceived opportunity cost for resources used in pork production. It was quite interesting to see that a larger share of smaller producers would be willing to stay in hog production if hog prices were in the $34-36 range compared with larger producers (Table 7a). However, a very high 89% of the production in the 500,000+ size category would remain with $42 prices, compared with only 66% for the smaller operations (Table 7b). Of the medium sized producers, 36% indicated that they would not continue if prices are in the $46-48 range, comparable to the average prices of the last decade ($47.29 in Iowa-Southern Minnesota). While each size category planned to increase production, not all producers will continue in the hog business.

Table 7a. Hog prices needed to sustain the hog production business until the year 2002 (%).[a]

Size class	Marketings by Size Group and Hog Price						
1,000 hd.	$34-36	$37-39	$40-42	$43-45	$46-48	$48+	Quit
1-2	16.6	25.4	24.1	19.3	8.5	5.0	1.1
2-3	13.0	24.3	30.8	22.8	4.8	4.3	0.0
3-5	12.7	25.8	28.9	15.4	14.3	1.6	1.4
5-10	10.2	27.4	34.3	19.3	6.1	1.9	0.8
10-50	9.6	23.5	29.0	25.0	9.5	1.4	1.9
50-500	6.0	15.0	40.0	35.0	5.0	0.0	0.0
500+	9.0	42.0	38.0	9.0	2.0	0.0	0.0

[a/] Central Iowa corn price at $2.50 per bushel

Table 7b. Willingness to stay in production until 2002 by size group at each hog price (%).

Size class	Marketings by Size Group and Hog Price				
1,000 hd.	$36	$39	$42	$45	$48
1-2	16.6	42.0	66.0	85.4	93.9
2-3	13.0	37.3	68.1	90.9	95.7
3-5	12.7	38.5	67.4	82.8	97.1
5-10	10.2	37.6	71.9	91.2	97.3
10-50	9.6	33.2	62.2	87.2	96.7
50-500	6.0	21.0	61.0	96.0	100.0
500+	9.0	51.0	89.0	98.0	100.0

The growth plans and stay-in prices reported by producers are expected to change the size structure of the industry. In Table 8, we combine the planned growth to 2000 with the stay-in prices to approximate the likely size distribution of hog operations under different average price scenarios (analysis assumes that the behavior of the under 1,000 head producers is similar to that of the 1,000-2,000 head producers). At $42

per cwt., a likely long-term average, the very large producers would increase their share from the current 24% to 37%. Medium-size classes would continue to have a 10-15% share of production each, and the under 2,000 head classes would drop from 17.5% to 13% share. The $42 price level was used because there is significant growth planned by producers who have a stay-in price in excess of $42. Even with significant increases in exports and domestic demand growing at 1% a year, supplies are expected to grow faster than demand and prices are expected to average in the low $40s in the years ahead.

The analysis does not account for producers altering their plans (which seems likely) based on cyclical very low hog prices and low cash flow we expect from hog production in later 1998 and early 1999. Many producers may choose a stand-pat strategy rather than expansion. If so, the planned structural changes in Table 8 may change. The exit of the high stay-in price operations may accelerate, and the growth of the other firms may be slowed or delayed.

Table 8. Projected increase in pork industry size structure in the year 2000 at different hog price levels (%).

Size class	Percent of Increase by Size Group and Hog Price				
1,000 hd.	$36	$39	$42	$45	$48
Under 2	26	16	13	14	14
2-3	10	7	7	8	7
3-5	10	10	9	8	9
5-10	9	10	10	10	10
10-50	13	13	14	15	16
50-500	6	7	10	11	11
500+	25	38	37	34	33

One factor impacting the future plans of producers is their age. In smaller family operations the life cycle of the business is often tied to the life cycle of the operator. Table 6 indicated that "No one to take over the business" was an important limitation to further expansion to smaller medium-sized producers. The survey asked for the age of the person completing the form and the age of the major equity holder in the business. Often these were one and the same, but there were several examples that appeared to be two-generation businesses where the major equity holder was approximately 20-25 years older than the producer was. The average age of producers in medium-sized operations was 47.5 and the major equity holder averaged 1.3 years older (Table 9a). There are many more producers over age 60 than there are under age 30 in all size categories (Table 9b). There is an equal percentage of producers over age 50 as there is under age 40. As expected, the major equity holder is slightly older than the producer is. These figures suggest that attrition through retirement will also impact the industry structure in the next 10 years. There was little difference in age structure among the various size classes or regions.

Table 9a. Average age of pork producer and major equity holder in medium-sized pork operations (%).

Size class 1,000 hd.	Producer	Major Equity Holder
1-2	46.4	47.6
2-3	46.1	48.0
3-5	45.4	48.8
5-10	45.9	48.4
10-50	46.3	48.3
1-50	47.5	48.8

Table 9b. Age distribution in medium-sized pork production operations (%).

Age	Size class/1,000 hd.					
Producers	1-2	2-3	3-5	5-10	10-50	1-50
30 or under	3	6	8	5	6	6
31-40	28	28	23	32	28	27
41-50	33	33	39	32	33	34
51-60	23	22	20	22	21	22
Over 60	13	12	10	8	11	11
Major Equity Holders						
30 or under	2	5	8	3	3	5
31-40	25	25	21	27	23	24
41-50	33	34	36	29	34	33
51-60	23	23	20	24	25	23
Over 60	17	14	15	16	15	15

Business Arrangements: Contract Production, Marketing Contracts, And Networking

Production Contracts

In 1997, 40% of the hogs farrowed and 44% of the hogs finished were by producers involved in production contracts (Table 10). This number is up from 29% in 1994. Most of the growth was in the over 50,000 head size class. Half or more of the contract production came from the 18 largest producers; however, not all of their production was via contract arrangements. Contract finishing was more common than contract farrowing; 17% of the pigs were farrowed by contract growers and 30% of the pigs were finished by contract growers. About one-third of the contract production involved payments per pig space rather than payments per head (53%) or pound produced (10%) (Table 10a).

Table 10. 1997 marketings by producers using production contracts (%).

Size Class (1,000 Head)	Total Farrowing	Total Finishing	Contract Farrowed	Contract Finished
1-50	10	14	1	8
50-500	8	9	4	7
500+	22	22	11	16
Total	40	44	17	30

Table 10a. Type of payment system for production contracts (%).

Payment Basis Incentive	Pig space	Pig Space	Head	Head	Pound	Pound	Other
	Yes	No	Yes	No	Yes	No	
	10	22	29	24	8	2	5

Additional expansion, access to capital, reduced risk were cited as perceived benefits by medium sized producers offering production contracts (Table 11a). However, access to capital was not rated as highly as the other factors. Lower production costs were not rated as importantly as the other factors, suggesting that contract production may not lower cost of production for some contractors. It shifts costs from debt payments and the other fixed costs (taxes, insurance, etc.) associated with facilities to contract payments to growers. Contractors also perceive disadvantages to contract production. With the exception of a diverse set of "other" factors, management problems were cited as the largest problem (Table 11b). However, even

management problems were mostly considered minor disadvantages. Increased financial risk and difficulty with growers were not seen as major problems.

Table 11a. Potential benefits of production contracts for medium sized producers (1=no benefit, 6=major benefit).

	% of responses from medium sized producers					
Benefit	1	2	3	4	5	6
Access to capital	21	9	11	22	18	19
Additional expansion	11	6	4	14	35	30
Lower cost of production	15	18	21	21	14	11
Reduced risk	14	7	19	21	18	20
Other	14	5	0	23	23	36

Table 11b. Potential disadvantages of production contracts for medium sized producers (1=no disadvantage, 6=major disadvantage).

	% of responses from medium sized producers					
Disadvantage	1	2	3	4	5	6
Management problems	24	15	18	16	22	6
Difficulty with growers	29	27	20	12	10	4
Increased financial risk	31	23	20	14	7	6
Other	44	17	6	00	6	28

The above 50,000 head producer surveys asked about production contracting advantages and disadvantages. Table 12 summarizes the number of responses out of the 106 returned surveys. Financial leverage, addressing environmental constraints, and accessing labor were the three largest advantages. Fewer disadvantages were reported, but a loss of management control and increased production cost were the most common. All producer size groups over 1,000 head reported "other" advantages and disadvantages, but no specific "other" feature was noted frequently.

Table 12. Production contract advantages and disadvantages reported by large and very large producers.

Advantages	Responses	Disadvantages	Responses
Increased financial leverage	39	Loss of control	21
Reduced environmental and regulatory problems	24	Increased production costs	13
Accessing motivated labor	18	Paying for grower assets	10
Enhanced local support	8	Differing agendas	10
Cost control	7	Grower mismanagement	5
Reduced disease risk	5	Growers not motivated	3
Increased management leverage	4	Product inconsistency	3
Other	3	Other	7

Marketing Contracts

The use of marketing contracts between producers and packers has increased sharply in recent years. Nearly 57% of the 1997 marketings were under some type of prearranged agreement with the packer (Table 13). This compares with 37% in 1994 and 11% in 1993. The above 50,000 size classes and those operations outside the Corn Belt (not shown in tabular form) had 75% or more of their hogs under contract with a packer. Because market access is a big issue for large-scale operations and those not in areas with many competing packers, this should not be surprising.

The dominant type of agreement is a formula price contract, especially for the largest producers and other producers outside the Corn Belt. These contracts are ongoing agreements between the packer and producer in which the selling price is based on an observable market (i.e., Iowa Southern Minnesota, or Western Corn Belt Lean Value). Although 39% of all hogs were formula priced, the largest producers marketed 75% of their production using the formula price system. Relatively few hogs (3%) were priced based on the futures market.

The risk-share window contract is a contract of fixed length in which the packer and producer share the pain and gain above or below predetermined upper and lower price boundaries. While the 500,000+ operations sold no hogs on this contract, 13% of the 50-500 thousand head hogs were marketed on such a contract. The risk-share, cost-plus contract establishes a price floor based on a standardized cost of production and changing corn and soybean meal prices. Producers and packers split the price above the floor price; at times of higher hog prices, the producer must pay back any previously received prices above the market price. Medium sized producers are more heavily involved in these contracts than other size classes of producers.

Table 13. U.S. hog marketings under a prearranged packer marketing agreement, 1997 (%).

Size Class (1,000 Head)	Percent Contracted	Formula	Tied to Futures	Risk share Window	Risk share Cost-base	Other
1-2	23.9	16.1	2.6	0.3	0.0	4.9
2-3	32.2	19.3	1.6	1.3	7.8	2.1
3-5	36.0	20.5	4.2	3.6	5.1	2.5
5-10	44.5	26.8	2.6	3.6	6.2	5.2
10-50	54.2	27.5	6.7	3.1	16.5	0.5
50-500	81.5	56.9	3.1	13.2	3.3	5.0
500+	91.8	75.0	0.5	0.0	1.2	15.1
All Hogs	56.6	39.1	2.9	3.1	5.3	6.1

The trend toward long-term marketing contracts has been accelerating dramatically in the last few years, moving another ten points higher in the below 50,000 size class in 1998 (Table 14). Remaining hog producers without a contract show a substantial interest in contracting in the future. Of the producers who did not have a contract in 1997, 22% indicated they were interested in considering a contract.

Table 14. Marketings contracted, 1997 and 1998 and potential interest by size group (%).

Size Class (1,000 Head)	Contract percentage 1997	1998	Not currently, but interested
1-2	24	34	21
2-3	32	38	28
3-5	36	48	25
5-10	44	59	24
10-50	54	62	13
1-50	39	49	22

Producers report that the primary advantage of marketing contracts is increase in prices received. Access to capital, allowed to be in the hog business, or allowed for expansion were moderately important advantages across all size classes below 50,000 head (Table 15). In prior studies, access to shackle space was

considered particularly important to large producers, especially in the Southeast. Disadvantages were less important than advantages, with none being outstanding

Table 15. Advantages and disadvantages of marketing contracts reported by producers with marketing contracts (6=very important, 1= not important at all).

	Advantages					Disadvantages	
Size class 1,000 Hd.	Access to capital	Increased price	Allowed for more expansion	Allow to be in hog business	Reduced Price risk	Locked out of higher prices	Not Treated fairly by packer
1-2	2.72	3.98	2.40	3.20	3.17	2.04	1.84
2-3	2.79	3.88	2.83	2.94	3.26	2.97	2.46
3-5	2.96	4.27	2.63	2.87	3.67	2.40	1.80
5-10	2.99	4.07	2.81	2.90	3.65	2.41	1.89
10-50	3.49	4.29	3.06	3.00	3.93	2.59	2.06
1-50	3.05	4.13	2.79	2.96	3.60	2.50	2.00

In contrast, producers without marketing contracts rate their disadvantages relatively higher (Table 16). Their perceptions were that the performance of the marketing system deteriorated in many respects—reduced number of buyers, reduced market access, more expansion, and lower open market prices. In their views, the advantages associated with contracting were slightly less important—better product quality, more efficiency in marketing system, better communication, and better consumer service.

Table 16. Advantages and disadvantages of marketing contracts reported by producers who do not have marketing contracts (6=very important, 1= not important at all).

1,000 Head Marketed	1-2	2-3	3-5	5-10	10-50	1-50
Consumer better served	2.87	2.93	2.92	3.21	3.43	3.04
More expansion	4.76	4.69	4.59	4.66	4.76	4.69
Better product quality	3.33	3.53	3.43	3.82	4.01	3.59
Lower open market prices	4.64	4.50	4.34	4.26	4.26	4.42
Better consumer to producer communication	2.90	2.99	2.90	3.18	3.24	3.02
More efficient marketing system	2.97	3.12	3.03	3.34	3.41	3.15
Unfair advantage over those without contract	4.45	4.26	4.11	3.67	3.67	4.07
Reduces number of buyers	4.82	4.67	4.84	4.51	4.43	4.68
Reduce market access	4.92	4.69	4.99	4.41	4.26	4.70

Producers interested in a marketing contract were asked to rate the importance of potential contract features (Table 17) .The most important by far was the ability to receive higher prices if they occur, followed by improved prices without risk protection. Minimum price features were considered somewhat important, but price risk avoidance was not high on the priority list for these producers. This is consistent with the dominant contracting methods already used in the industry, as formula pricing has the least price risk protection of all the contract types in use.

Table 17. Importance of features in a long-term packer contract.

1,000 Head Marketed	1-2	2-3	3-5	5-10	10-50	1-50
Minimum prices tied to feed cost, but give up higher hog prices	3.69	3.60	3.75	3.66	3.75	3.69
Minimum prices tied to feed cost, but pay back difference at higher hog prices	3.95	3.80	3.72	3.70	3.75	3.79
Higher than spot market price, no risk protection	3.92	3.91	3.95	3.85	4.01	3.92
Ability to receive higher prices if they occur	5.05	4.80	5.08	5.10	4.97	5.00

Vertical Integration

Although there is a great deal of concern about the pork industry becoming vertically integrated, a relatively small percentage of total hog production is partially or completely owned by a vertically related firm in the pork chain. Fewer than 10% of the hogs marketed in 1997 were involved with packer ownership (Table 18). Only 5% were involved with ownership by a feed company. Slightly more than 1% were involved with another vertically related firm such as a genetics company.

Table 18. U.S. hogs partially or completely owned by a packer, feed company, or other vertically related firm (%).

	Percent of U.S. Slaughter, 1997		
Size Class (1,000 Head)	Packer	Feed Company	Other
500+	8.0	2.2	0.0
50 – 500	0.7	1.5	0.9
1 – 50	0.7	1.5	0.3
Total	9.4	5.1	1.1

A very high proportion of hogs marketed in 1997 were evaluated and priced on a carcass weight and merit basis**.** Seventy five percent of the operations sold 73% of the market hogs on a carcass basis. The smallest size classes sold a smaller percentage on a carcass basis, but virtually all the other size classes were very similar in their marketing practices.

Table 19. Market hogs sold on a carcass basis, 1997 (%).

Size class 1,000 Hd.	Farms	Hogs
1-2	62	52
2-3	80	67
3-5	75	70
5-10	85	71
10-50	75	77
50-500	100	88
500+	100	76
All Producers	75	73

Networking

Networking is an alternative to production and marketing contracts or vertical integration, sometimes advocated as a means to get the benefits of larger scale operations or vertical market linkages without formal contract or ownership ties. The below 50,000 head producers reported that approximately 14% of operations (17% of their hogs) were involved in hog market networking arrangements; close to 10% of these operations and a higher percentage of their hogs were involved in input purchasing, and hog production and information-sharing networks. Larger operations were typically more involved in networking. The values in the columns of Tables 20a and 20b are not additive, as often a firm involved in one type of network was also involved in other networks. At a minimum, approximately 10% of the U.S. production accounted for by medium-sized producers is involved in networking.

Although networking is often cited as a management tool for smaller producers, there is more networking activity among the largest size groups within the medium-sized operations. Hog marketing and pig production are the most commonly used types of networks by medium-sized producers.
Large and very large producers were also involved in networking. Five of the 18 very large producers, accounting for 46% of the hogs they produced and 11% of the U.S. production, were involved in a network. Nineteen percent of the 50-500 thousand head producers used networking, accounting for 21% of their production and 2.7% of the U.S. total. The types of networks used by large and very large producers were not identified. Combining the share of U.S. production involved in networks from the three size groups suggests that producers involved in networking raised approximately 24% or more of 1997 hog marketings.

Table 20a. M**edium sized operations networking, by type and size and type of network (%).**

Size class 1,000 Hd.	Input Purchasing	Feed Milling	Hog Marketing	Information Sharing	Genetic Access	Farrow - Finish	Pig Production	Other
1-50	8	5	14	9	6	7	10	1
1-2	6	6	10	3	2	4	3	0
2-3	6	2	10	4	3	6	6	1
3-5	9	4	15	10	4	7	12	1
5-10	7	5	18	12	9	8	19	0
10-50	15	8	21	18	16	9	12	2

Table 20b. Hogs from medium sized operations in a network, by type and size and type of network (%).

Size class 1,000 Hd.	Input Purchasing	Feed Milling	Hog Marketing	Informatio n Sharing	Genetic Access	Farrow -Finish	Pig Production	Other
1-50	12	7	17	13	11	8	13	1
1-2	5	5	9	3	2	5	3	0
2-3	5	2	9	3	3	6	6	1
3-5	9	3	16	10	7	5	11	1
5-10	8	5	18	13	8	8	22	0
10-50	16	10	19	17	17	9	13	3

Input Supplier Contract Links

Very limited proportions of the below 50,000 head operations were involved in exclusive arrangements with input suppliers (Tables 21a and 21b). Smaller producers were involved the least. Medium-sized operations were involved slightly more, with feed companies having exclusive arrangements with 7% of these operations, accounting for 11% of the hogs marketed. Larger operations had more exclusive links with seedstock suppliers than others did, involving 11% of their production. Of the medium-sized operations, 5% had exclusive input supply arrangements with packers (8% of their marketings).

Table 21a. Medium sized operations with an exclusive agreement with a vertically related firm (%).

	Vertically Related Firm					
Size class 1,000 Hd.	Feed	Marketing Service	Veterinarian	Packer	Seedstock	Other
1-2	5	2	1	3	2	0
2-3	8	5	2	3	2	1
3-5	9	5	4	8	4	0
5-10	9	5	4	8	4	0
10-50	8	5	4	7	7	1
1-50	7	4	2	5	3	0

Table 21b. Marketings from medium sized operations with an exclusive agreement with a vertically related firm (%).

	Vertically Related Firm					
Size class 1,000 Hd.	Feed	Marketing Service	Veterinarian	Packer	Seedstock	Other
1-2	5	2	1	3	2	0
2-3	9	7	2	3	3	1
3-5	12	6	6	12	6	1
5-10	12	6	6	12	6	1
10-50	13	6	6	9	11	1
1-50	11	6	5	8	7	1

Artificial Insemination

The market for breeding stock is changing dramatically as the large-scale producers increasingly turn to artificial insemination (AI) for more rapid genetic improvement and herd health security. Approximately 47% of hogs marketed by producers with more than 1,000 head in 1997 were produced using AI. The largest producers are near 80% AI (Table 22). While smaller operations are dramatically increasing AI use, they still rely mostly on conventional breeding methods.

Table 22. Pigs Bred by AI by Size Class, 1997 (%).

Size class - 1,000 Hd	1997	1998	Growth percent
1-2	4	13	346
2-3	17	23	134
3-5	21	29	136
5-10	39	53	148
10-50	58	72	142
50-500	75		
500+	84		
Total	47.4		

Overview and Implications

An early 1998 survey of more than 8,300 U.S. pork producers offers a quantitative snapshot of their operations in 1997, and likely changes in the size, ownership structure, and long-term contractual marketing linkages of pork production enterprises. Hog operations marketing more than 50,000 head accounted for 37% of all hogs marketed in 1997. Reported growth plans indicate substantial expansion by all size classes which, if realized, would lead to 36% more hogs marketed in the year 2000. That growth is also likely to increase the share of production from the over 50,000 head size class, as more producers enter that class and current members expand faster than other size classes. Production contract volumes are especially high among the largest producers. In 1997, contract growers farrowed approximately 17% of U.S. pigs, and they finished 30% of the pigs. Producers of most market hogs produced under contract are still paid by the head or pound, although almost one-third are now paid for the use of their building space.

The survey results show a dramatic surge in long-term marketing contract arrangements between producers and packers—accounting for 57% of all hogs in 1997. Virtually all very large producers are involved in long-term arrangements, and many more large size producers have gotten involved in the last few years. Including several who self-produce, packers acquire a high proportion of their slaughter volume outside the spot market, and that percentage is likely to increase based on expressed interest by many other producers in long-term contracts. Fewer than 10% of U.S. hogs were owned partially or completely by packers.

Networking is becoming increasingly important in producer linkages with other producers, feed companies, veterinarians, etc. Approximately 24% or more of 1997 marketings were by producers involved in a network of some type. Exclusive supply relationships with input suppliers are modest in volume.

What are the implications of or issues raised by these dramatic changes? In the short term, the growth plans seem very likely to result in much lower market prices, perhaps for a longer period than typically occurs in the hog production cycle. The low prices will undoubtedly stall or slow the growth plans reported here unless there is a dramatic surge in export demand to bail the domestic industry out of an oversupply situation. The operations reporting high stay-in prices will be most at risk in the short run.

The growing market share of the largest producers and the likelihood of increased market share in the future have significant implications. It seems likely that the continuing shift toward larger scale operations gradually will dampen the seasonal and cyclical swings in hog production and prices, but will not eliminate them. Furthermore, the tendency for larger scale operators to be among the lower cost producers of leaner hogs may make the U.S. more competitive in world markets for pork. Yet the increasingly stringent environmental constraints being considered or imposed by the state, federal, and sometimes local governments, or the litigation costs from private nuisance or related suits may be triggered by this growth in many areas, or may slow growth from producers' reported plans. Growth may simply occur in other locations for the mobile producers.

Packers and producers currently relying on the spot market may have to become linked to maintain access to supplies and markets. This will involve a continuing shift away from spot markets, as long-term contracts or vertical integration (to a lesser degree) grow even more in importance. That will make government price reporting in the more thinly traded markets more problematic, and reliance on a pricing formula based on spot market price reports may not be practical. Those contracts using formula pricing may need to include a clause that would trigger a renegotiated pricing base if spot markets get too thin. Input suppliers who have serviced small and medium sized producers will have increasing difficulty. They will have to determine how to serve the large-scale producer with products or services more effectively than a producer can do it, or encourage growth of the medium sized customers using their products and services..

Smaller producers have to be much more aware of the best practices necessary to compete on the cost and product performance basis with the largest producers, and the steps necessary to qualify as a preferred supplier to packers who want assured volumes of consistently high quality hogs. To achieve some of these objectives, networking may grow in importance among independent producers.

Views of the important issues arising from the survey results will depend greatly on the perspectives of the individual:

- Will major problems in market price reporting develop, and what can be done as we transition to what might be called a "contract marketing system? " Will concerns about potential manipulation of reported market prices become more prevalent? Will mandatory spot price reporting be a short-term solution that will make sense? Will contract reporting in some form be necessary?
- Won't virtually all long-term marketing contracts based upon reported spot prices have to be restructured? How can they give the right signals and be equitable without relying on spot prices?
- How will the futures market contracts have to change to be consistent with the evolving industry marketing system?
- Will the survival of independent producers be threatened? How can they prosper in this economic environment? Will networking be a panacea?
- How can input suppliers survive and prosper in this fast changing industry?
- How will the locations of pork slaughter/processing operations change?

These are some of the issues likely to arise or increase in importance over the next 3-5 years as the organizational structure of the pork industry continues to change dramatically. They will serve as major issues for economic research, educators, industry organizations, strategic planners, and managers in farms and firms participating in all phases of the pork sector.

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Appendix

Table A1. Mailing list, sample size and returned surveys.

Category	Sample List	Surveys Mailed	Returned Blank	Useable Returns	Owners Useable	Contract Growers	Percent Growers
10,000+	2321	1640	57	391	222	112	28.6%
5000-9999	3061	1640	49	393	254	90	22.9%
3000-4999	4445	1640	43	415	321	51	12.3%
2000-2999	6506	1640	69	405	311	25	6.2%
1000-1999	14541	1640	64	426	343	19	4.5%
Total	30,874	8200	282	2030	1451	297	14.6%