

CHANGES IN THE MIDWESTERN U.S. PORK INDUSTRY

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ABSTRACT

Midwest pork production has changed dramatically in the past ten years and continues to evolve. This traditional home of US hog production had the most to lose and was perhaps the slowest to change because of its long-standing dominance and culture. Part way through the 1990s, production companies began to apply emerging production technologies used in other regions in the Midwest. All states in the region lost breeding herd numbers, but Iowa and Minnesota increased the number of market hogs. The eastern part of the region experienced a greater loss of hogs and farms than did the western states evaluated. At least a portion of the difference in inventory changes is due to existence of large-scale producers in the state. Marketing methods also changed dramatically. While still the prominent place of price discovery, trading several thousand hogs a day, the percent of hogs negotiated in the daily market stands at less than 20 percent.

INTRODUCTION

The global pork industry has changed dramatically in the last 10 years and perhaps no place is the change more apparent than in the "hog belt" of the US. The Midwest traditionally produced the majority of US hogs. During the 1980s, nine Midwestern states accounted for approximately 71 percent of the nation's breeding herd and 72 percent of the market hog inventory. Today these same states have 57 percent of the US breeding herd and 63 percent of the market hogs. The regional shift was driven by, or at least in conjunction with, a consolidation in the sector. In 1982, there were 197,500 farms with hogs that had an average inventory of 199 head per farm. By 2002, the number of farms had declined to 36,000 with an average inventory of 1026 head.

Declining profitability in pork production is one driving force. The estimated returns to farrow to finish operations for the five-years 1980-1984 averaged \$13.99, and averaged \$7.30 for the five-years 1998-2002. While gross margins over feed costs on 400 hogs marketed a year (199 head inventory turned twice a year) would have made a significant contribution to family income in 1980, there may be little margin left after feed and direct costs and debt service today. Another significant change in Midwest hog production is marketing methods. As recently as 1993, 87 percent of US hogs were purchased in the cash market. Today that number is approximately 17 percent as nearly two-thirds of hogs are sold through marketing contracts and packers own an estimated 18 percent of the hogs.

CHANGING DEMOGRAPHICS

The Midwest's advantage in hog production is its relatively low feed costs. Thus, it is no surprise that the breeding herd inventory has declined faster than the market hog inventory. The breeding herd in the nine states dropped nearly 1.6 million head in 10 years, a 32 percent decline from 1993 (Table 1). Iowa and the eastern states (IL, MI, IN, and WS) declined 38 and 40 percent, respectively while the western states (MN, MO, NE, and SD) declined only 19 percent. It should be noted that the US breeding herd declined 16 percent over the same period, so the four western states basically maintained their share of the US sow herd, but Iowa and the four eastern states lost their share. In total, these Midwestern states went from having 70 percent of the nation's breeding herd to only 57 percent by the end of 2002.

Table 1. December Breeding Herd Inventories for Selected Midwestern States (1,000s).

	Iowa	ILMIINWS	MNMONESD	MW Total	US Share
1993	1,700	1,525	1,780	5,005	70%
1994	1,500	1,455	1,750	4,705	67%
1995	1,350	1,285	1,715	4,350	64%
1996	1,250	1,225	1,595	4,070	61%
1997	1,360	1,245	1,690	4,295	62%
1998	1,260	1,185	1,570	4,015	60%
1999	1,160	975	1,480	3,615	58%
2000	1,120	1,010	1,480	3,610	58%
2001	1,130	965	1,465	3,560	57%
2002	1,050	920	1,445	3,415	57%

ILMIINWS: Illinois, Michigan, Indiana, Wisconsin

MNMONESD: Minnesota, Missouri, Nebraska, South Dakota

Iowa has 1.05 million animals in the 2002 breeding herd, 5,000 more than the second largest hog producing state, North Carolina. North Carolina's breeding herd increased from approximately 300,000 head during the early 1980s to 625,000 in 1993, to 1 million in 1996 where it has remained. The breeding herd has also increased in "non-traditional" states such as Oklahoma (+180,000 sows, 300 percent increase), Colorado (+85,000 sows, 113 percent increase), Texas (+40,000, 62 percent increase) and Utah (+30,000, 600 percent increase) as production companies found that these arid regions had fewer hogs and fewer neighbors. These four states added 325,000 breeding animals in 10 years.

The number of market hogs in the Midwest has not changed as dramatically as the breeding herd has. The market hog inventory in these nine Midwest states declined 2.4 million head over the 10 years or about 7 percent (Table 2). However, there are differences within the region. Iowa increased its market hog inventory 950,000 head (7 percent) while the four eastern states decreased 2.9 million head (28 percent). The remaining four western states saw a 425,000 (4 percent) decline. The regional share of the US market hog inventory fell from 71 to 63 percent. Corn prices are cheaper as you move west across the Midwest with the

lowest prices near the corner of Iowa, Minnesota, and South Dakota. There remains excess packer capacity in Iowa providing strong demand for hogs.

Although not as dramatic as the increase in sow farms, finishing has increased outside the Corn Belt. North Carolina's market hog inventory increased 80 percent, 3.825 million head in 10 years. A new Smithfield processing plant that opened in 1998 facilitated this growth. Other "new" states have also increased finishing inventory: Texas, up 325,000 or 90 percent, Colorado, up 255,000 or 68 percent, and Oklahoma up 1.83 million or more than a 500 percent increase. A new plant was opened in the Panhandle of Oklahoma in the late 1990s as this production came on line.

Table 2. December Market Hog Inventories for Selected Midwestern States (1,000s).

	Iowa	ILMIINWS	MNMONESD	MW Total	US Share
1993	13,300	10,595	12,020	35,915	71%
1994	13,000	10,685	12,690	36,375	69%
1995	12,050	9,595	12,335	33,980	66%
1996	10,950	8,725	11,555	31,230	63%
1997	13,240	9,165	12,460	34,865	64%
1998	14,040	9,525	12,230	35,795	64%
1999	14,240	7,925	11,430	33,595	63%
2000	13,980	8,050	11,590	33,620	64%
2001	13,870	7,935	11,315	33,120	63%
2002	14,250	7,660	11,595	33,505	63%

ILMIINWS: Illinois, Michigan, Indiana, Wisconsin

MNMONESD: Minnesota, Missouri, Nebraska, South Dakota

The one place where the Midwest has not lost its share of the US pork industry is in the number of farms with hogs. Farms with hogs declined 70 percent in these states from 1993 to 2002 (Table 3). Table 4 shows the average number of hogs per farm and shows the trend to larger farms. Iowa farm size increased by three-fold as have the farms in the four western states. The farms in the eastern states doubled in size.

Iowa's finishing inventory dropped sharply before rebuilding to record levels. In 1996, during record high corn prices and in the midst of a pronounced change in industry structure, market hog inventories declined to less than 11 million head. By 1999, inventories had grown nearly 3.3 million head to 14.24 million. Although difficult to quantify, there has been significant reinvestment in finishing space in Iowa between 1993 when contract production was first beginning and double curtain-sided barns were introduced. Iowa has retired older facilities that ranged from outdoor earthen lots, Cargill-style open lots, to Modified Open Front facilities built in the 1970s. Today the majority of hogs are finished in double curtain-sided barns typically with 900-1200 head capacity built 2-4 buildings per site. These buildings have either deep-pit or external formed storage and the bulk of the manure is injected in nearby fields with some transported to fields as much as 6-8 miles away. This model is still being built today with relatively little resistance from neighbors (there are exceptions).

Table 3. Number of Farms with Hogs for Selected Midwestern States.

	Iowa	ILMIINWS	MNMONESD	Total	US Share
1993	33,000	37,100	43,800	113,900	51%
1994	29,000	34,800	42,000	105,800	51%
1995	25,000	30,100	35,900	91,000	50%
1996	21,000	26,400	29,500	76,900	49%
1997	18,000	22,500	24,000	64,500	53%
1998	17,500	19,500	22,600	59,600	52%
1999	14,500	18,000	19,200	51,700	53%
2000	12,300	14,700	16,800	43,800	51%
2001	10,500	15,000	14,600	40,100	49%
2002	10,000	12,600	13,400	36,000	48%

ILMIINWS: Illinois, Michigan, Indiana, Wisconsin

MNMONESD: Minnesota, Missouri, Nebraska, South Dakota

Table 4. Average Number of Hogs per Farm in Selected Midwestern States.

	Iowa	ILMIINWS	MNMONESD	Total
1993	455	327	315	359
1994	500	349	344	388
1995	536	361	391	421
1996	581	377	446	459
1997	811	463	590	607
1998	874	549	611	668
1999	1,062	494	672	720
2000	1,228	616	778	850
2001	1,429	593	875	915
2002	1,530	681	973	1,026

The eastern states declined in market hog inventory and smaller average inventory reflects the loss of small farms, but with less reinvestment in new finishing facilities. Each of the four states had losses of 24-54 percent of their market hog inventory. There are vast differences in changes in market hogs inventories within the four western states. From 1993 to 2002 Missouri's numbers were basically unchanged, +1 percent. Minnesota increased 28 percent (1.16 million head) while Nebraska and South Dakota declined 33 and 25 percent, respectively (1.225 and 0.385 million head, respectively). Table 5 is the distribution of hog inventory by size of operation. Iowa and the western states tend to have more inventory on farms, with more than 5000 head, than do the four eastern states.

Much of the difference in state market hog inventories can be related to the existence of large operations. Iowa has several of the 40 largest pork producers finishing hogs in the state (Freese 2002). Minnesota and Missouri also have some of the largest producers. The breeding herd losses in the Midwest would have been larger without investment by these

larger firms in the region. National, or international, firms can choose where to produce and the relative feed costs and packer capacity in the region likely influenced their decision.

Table 5. Percent of Hog Inventory by Size of Operation, Selected States, December 2003.

Head	Under 1000	1000-1999	2000-4999	5000+
IA	13.7	17.3	26.0	43.0
MN	16.0	15.0	25.0	44.0
SD	21.0	11.0	21.0	47.0
NE	21.8	15.2	21.0	42.0
MO	11.0	4.0	20.0	65.0
IL	18.0	19.0	30.0	33.0
IN	15.5	17.5	29.0	38.0
MI	15.0	12.0	34.0	39.0
WS	40.0	25.0	22.0	13.0

CHANGING MARKET COORDINATION

Methods of hog marketing have changed dramatically over the last 10 years. In 1993, 87 percent of U.S. hogs were sold in the spot market, 2 percent were owned by packers and the remaining 11 percent were purchased on contract (Hayenga *et al.*, 1996). Table 6 shows the recent trend in hog procurement. By early 2002 the percent of hogs in the cash market declined to less than 17 percent. At the same time packers owned over 18 percent of hogs with a portion of these sold to other packers. Marketing contracts accounted for the remaining 65 percent of the hogs. Hog marketing contracts between producers and packers are typically 3-10 years in length or perpetually renewing, and clearly establish a long-term relationship regarding delivery schedules, carcass specifications, and quality assurance.

Table 6. Percent of U.S. Hogs Sold Through Various Pricing Arrangements, January 1999-2002.*

	1999	2000	2001	2002
Hog or meat market formula	44.2	47.2	54	44.5
Other market formula	13.2	20.8	21.9	11.8
Other purchase arrangement	4.6	4.6	6.6	8.6
Packer-sold				2.1
Packer-owned				16.4
Negotiated – spot	35.8	25.7	17.3	16.7

*2002 data based on USDA Mandatory Reports, 1999-2001 based on industry survey by University of Missouri and National Pork Board

While there are significantly fewer hogs in the cash market today than 10 years ago, there are still several thousand hogs a day traded. USDA Mandatory Price Reporting (MPR) indicated

the number of hogs purchased and slaughtered daily by procurement method. Table 7 is a snapshot of the Iowa Southern Minnesota market during the third week of January 2003. The report is of "Purchased Swine" meaning the hogs that were bought that day to be slaughtered some time within the next seven days. Note that between 15,000-28,000 hogs traded each day that week when the total volume was in the 120,000 - 140,000 range, approximately 14 percent for the week. The larger numbers on Friday may reflect Saturday purchases. Iowa does not allow packers to own hogs and thus there is no report of packer owned hogs in the Iowa report. . (This Iowa law was found unconstitutional in recent court case. The state plans an appeal.)

Table 7. Iowa Southern Minnesota Barrows and Gilts Prior Day Purchased Swine Volume.

Date	Negotiated	Other Market Formula	Swine/pork Market Formula	Other Purchase Agreement
01/20/03	20,141	6,672	72,667	38,202
01/21/03	22,176	9,716	66,144	21,731
01/22/03	15,859	5,150	68,215	17,761
01/23/03	17,374	7,607	65,085	16,289
01/24/03	28,505	43,330	77,594	116,539

Table 8 is a summary of the national report of hogs slaughtered the previous day by procurement method. The number of negotiated hogs in the national report was approximately 13 percent of the hogs covered under MPR. Packers that slaughter less than 125,000 hogs annually do not have to report and this accounted for the additional hogs reported in the Federally Inspected Slaughter that were not reported in MPR for the same week. Packers owned more hogs than they bought in the cash market.

Table 8. National Daily Direct Hog Prior Day Report - Slaughtered Swine Barrows and Gilts.

Date	Negotiated	Other Market Formula	Swine/pork Market Formula	Other Purchase Agreement	Packer Sold	Packer Owned	Total MPR Count
01/20/03	44,123	19,411	133,025	66,594	4,730	60,023	327,906
01/21/03	42,716	19,626	143,100	62,089	9,883	64,049	341,463
01/22/03	46,519	25,114	143,361	70,165	8,390	57,427	350,976
01/23/03	39,106	19,230	125,898	68,773	6,538	55,891	315,436
01/24/03	57,891	19,185	145,819	83,138	8,999	67,442	382,474

As noted earlier, most hogs trade on a formula. The largest category is the Swine/Pork Market Formula which represents hogs purchased on a formula tied to the cash market for

hogs or wholesale pork. The Other Market Formula are hogs bought on a formula based on some market other than hogs and pork, typically feed prices. The Other Purchase Agreement category is a bit of a catch-all, but includes window contract purchases.

While there is legislation introduced in Congress to prohibit packer ownership of livestock and force them to buy a minimum number of hogs in the open market, marketing contracts will likely continue. Both producers and packers have identified positive aspects of marketing contracts. Pork producers identified price level and price risk as the two greatest advantages to having a marketing contract. Two potential concerns about contracts—being locked out of higher prices and not being treated fairly by packer—were considered unimportant by producers in a recent survey (Lawrence and Grimes, 2001).

Packers' primary motivations for the use of long-term marketing agreements are their need for a consistent supply of quality animals and higher quality animals to meet consumer demand. They expect these reasons to be even more important in the future (Hayenga, *et al.* 2000). In addition to quality traits that impact eating experience, consumers value food safety and the ability to trace product to the point of origin. In some, but not all, cases the processor or retailer is willing to pay for the additional cost of certain food safety measures in order to reduce their liability (Lawrence and Hayenga, 2002).

Changes in hog marketing methods have introduced market access concerns to many Midwest pork producers. Larger producers more readily use these new marketing arrangements (Lawrence and Grimes, 2001). Seventy-five percent of the farms selling less than 3,000 hogs per year sold their hogs in the cash market. Farms selling 3,000-10,000 and 10,000-50,000 hogs a year sold 55 and 40 percent, respectively in the cash market. Those marketing 50-500,000 hogs a year sold 10 percent in the cash market and farms selling over a half a million head annually sold only one percent of their hogs in the cash market.

CONCLUSIONS

Midwest pork production has changed dramatically in the past ten years and continues to evolve. This traditional home of US hog production had the most to lose and was perhaps the slowest to change because of its long-standing dominance and culture. Production companies began to apply emerging production technologies used in other regions in the Midwest beginning in the mid-1990s. All states in the region lost breeding herd numbers, but Iowa and Minnesota increased the number of market hogs. The eastern part of the region experienced a greater loss of hogs and farms than did the western states evaluated. At least a portion of the difference in inventory changes is due to existence of large-scale producers in the state.

A concern of producers that have marketing contracts is that of accurate price discovery. Many of the Swine/Pork Market Formula and Other Market Agreement contracts are based on the price "discovered" by Negotiated transactions. The producers in these contracts have entered the contract to avoid the cash market, but hope that the producers still in the cash market are aggressive negotiators and extract a good price for their hogs.

Minnesota is worthy of further discussion. It had only a 2 percent decline in breeding herd inventory compared to a 38 percent drop in Iowa and 16 percent decline for the nation as a whole between 1993 to 2002. Minnesota also increased market hog inventory 28 percent, 1.16 million head, the largest increase in the nine states. What is unique about Minnesota's success is that it has largely come from within. Of the nine companies on the US top 40 largest producers list operating in Minnesota, 5 are Minnesota based companies and at least one is farmer network with multiple farmer owners under a common management. Other states have natives' sons and daughters that have grown, but few of the local firms are as large a part of the state's sector as is the case in Minnesota.

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