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Update On South Dakota's Hog Market

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South Dakota farmers continue to produce a sizeable number of hogs despite recent contraction throughout the hog industry. USDA-NASS reports an inventory of over 1 million hogs in the state (SDASS). South Dakota ranked 11th among U.S. states in hog inventory and ranked 12th in pig crop size in 2000. Production practices vary from farrow-to-finish to specialization in farrowing, growing, and finishing. This paper seeks to highlight recent trends and new information related to South Dakota's hog market.

Several findings pertain to national (and global) structural changes that have implications for South Dakota. With the general trend toward continuous production by the remaining producers, producers need risk management tactics that accommodate selective hedging. Prices have returned to profitable levels and there has been an improvement of the basis in South Dakota. Mandatory price reporting and the monthly Hogs and Pigs report bring new information that may be useful when making management decisions.

Structural Changes and Market Concerns

In 2000, there were only 1,900 farmers in South Dakota raising hogs (SDASS). The decline in farms with hogs was mainly among the smallest sized operations, and the remaining producers have increased the size of their operations. There used to be a substantial jump in farrowings during the second quarter of the year (March through May). When small operators left hogs as an enterprise, they stabilized the farrowing pattern from quarter to quarter giving a more stable supply of hogs throughout the year.

The performance of the remaining producers increased, as a gap between U.S. and S.D. pigs per litter has closed. The number of hogs marketed has increased as in shipments, presumably of feeder pigs, have grown. Based on inventory numbers, hogs consume a substantial portion of the corn and soybean meal produced in South Dakota. Similar observations have been made at the state (Diersen) and national level (GIPSA).

Foot and mouth disease, which plagued Europe in early 2001, has affected the U.S. market through trade channels. Several states, including South Dakota, developed contingency plans in the event of a similar disease outbreak. Such steps are prudent given the devastating potential impacts. One useful case study is Taiwan, which had its markets and structure upset by an outbreak in 1997 (Huang).

Given the shift from seasonal to continuous production, in South Dakota and nationwide, producers face price risk every month. The Chicago Mercantile Exchange (CME) introduced cash index options for months without a futures contract. The options are European style options, meaning they cannot be exercised before expiration, but can be traded like other option contracts. The CME has also added a regular contract for the month of May, starting with 2002 contract. Beginning with that contract, the lean hog contracts will settle to the Lean Hog index that may be modified somewhat by mandatory price reporting.

The CME has also introduced e-mini contracts, one-fourth the size of the regular contracts. With the Mid-American Exchange presumably exiting the livestock segment of the industry, these CME contracts may see more volume. Knowledge of volatility may be useful for evaluating the desirability of these different contracts, and historic volatility of the lean hog futures prices is available (MRCI).

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Recent Market and Price Trends

The largest single markets in South Dakota are located in Sioux Falls for both slaughter hogs and feeder pigs (Table 1). In addition, seven other auction locations in South Dakota sold over 10,000 head of various classes of hogs from July 2000 to June 2001 (Tri-State Livestock News). The total number of head traded is down 9% from a year earlier.

TABLE 1. SALES VOLUME OF HOGS AT SOUTH DAKOTA AUCTIONS

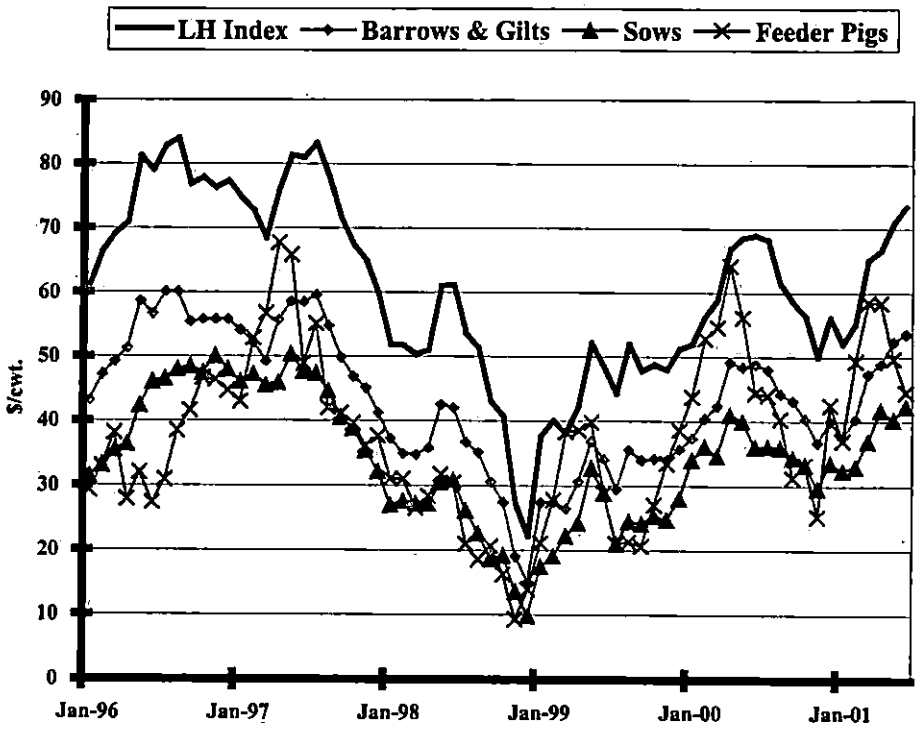
Auction Market	*Head Sold*
Sioux Falls Stockyards Co.	42,341
Gettysburg Livestock Exchange Inc.	21,948
Hub City Livestock Auction Inc.	19,848
Charles Mix County Livestock Market Inc.	16,314
Menno Livestock Auction	15,581
Sisseton Livestock Auction Inc.	14,708
Yankton Livestock Auction Market	12,439
Willow Lake Livestock Auction	11,170
Others (15 locations)	21,021
Total	175,370

Source: Tri-State Livestock News

The overall price trend for hogs has been moving steadily upward since early 1999. The primary Sioux Falls prices and the monthly average of the CME Lean Hog Index are shown in figure 1. The CME index is generally the highest observed price. Its pattern is closely matched by the Sioux Falls' barrows and gilts price. Seasonally, two factors combine to drive slaughter hog prices higher during the summer months. Demand tends to be higher during the summer as more pork is consumed. Supply is also relatively small during the second quarter of the year.

The sow price is consistently lower than the barrows and gilts price. Seasonally, slaughter sow prices peak during late spring to early summer. Culling patterns show that sow slaughter tends to increase throughout the year. However, the price peak comes during the seasonal low in barrow and gilt slaughter numbers. Feeder pig prices show substantial variability – as any price changes for slaughter animals are quickly passed on to the farrower-grower segment. Seasonally, feeder pigs reach a price peak in March through May.

Figure 1. Monthly Sioux Falls' and CME hog prices



Sources: Chicago Mercantile Exchange and USDA-AMS

In recent years the CME index has probably been the most relevant price series for determining national price trends. The CME index is reported daily, but the monthly average is perhaps more informative for discerning trends. Shown in table 2, the index prices peak during the summer for most recent years. Index prices, as well as live prices, hit recent lows during December of 1998. A similar pattern is evident in the Sioux Falls market (table 3).

TABLE 2. MONTHLY AVERAGE OF CME LEAN HOG INDEX VALUES

Year	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
						($/cwt. lean)						
1996	61.16	66.40	69.13	70.86	81.22	79.00	82.75	83.95	76.79	77.82	76.24	77.31
1997	74.82	72.65	68.38	75.79	81.26	80.95	83.20	78.03	71.54	67.39	64.92	59.79
1998	51.79	51.62	50.25	50.92	60.94	61.09	53.47	51.25	43.05	40.73	27.24	22.21
1999	37.63	40.09	38.08	42.23	51.97	48.35	44.30	51.90	47.79	48.71	47.96	51.12
2000	51.82	56.18	58.90	66.78	68.46	68.89	68.16	61.42	58.60	56.34	50.02	56.06
2001	52.00	55.04	65.02	66.58	70.80	73.42						

Source: Chicago Mercantile Exchange

Table 3. Sioux Falls' Slaughter Barrows and Gilts Price (U.S. 1-2, 230-250#)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
						($/cwt.)						
1996	43.19	47.18	49.19	51.21	58.64	56.61	60.05	60.05	55.30	55.73	55.68	55.72
1997	53.99	52.15	49.16	55.62	58.53	58.39	59.52	54.70	49.84	46.88	45.11	41.23
1998	37.24	34.93	34.76	35.81	42.56	42.02	36.72	35.15	30.58	27.43	19.00	15.02
1999	27.39	27.47	26.46	30.69	36.83	34.11	29.44	35.56	33.96	34.18	34.00	35.65
2000	37.38	40.39	42.40	49.14	48.39	48.86	48.01	44.24	43.20	40.37	36.68	40.01
2001	37.49	40.34	47.31	48.88	52.27	53.49						

Source: USDA-AMS

The other price issue relates to the basis, the difference between cash and futures prices. Basis is important because it determines how the futures prices should be adjusted for planning purposes and for comparing futures and options prices with any forward prices. Rather than using futures prices, the price for market hogs in Sioux Falls is compared to the CME index. The CME index is on a dressed basis and the dressing percentage for butcher hogs is about 74 percent of live weight. The Sioux Falls price can be converted to a lean equivalent by multiplying the live price by 1.35.

The difference between the CME index and the Sioux Falls' lean equivalent is often called the location basis. As shown in table 4, the Sioux Falls' basis was negative and ranged from -$4.56 to -$0.24. Recent narrowing suggests either a quality improvement in the hogs marketed at Sioux Falls or a regional shift in supply and demand. Basis bids can be compared to the table values, which may need to be adjusted for any seasonal pattern in futures prices. A basis level of -$2.00 implies that for any observed futures price, the implied Sioux Falls' cash price is obtained by subtracting $2.00, then converting to a cash price by multiplying the result by 0.74.

TABLE 4. LOCATION BASIS FOR SIOUX FALLS' CASH AND CME LH INDEX

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
						($/cwt. lean)						
1997	-1.93	-2.25	-2.01	-0.70	-2.24	-2.12	-2.85	-4.18	-4.26	-4.10	-4.02	-4.13
1998	-1.52	-4.46	-3.32	-2.58	-3.48	-4.36	-3.90	-3.80	-1.77	-3.70	-1.59	-1.93
1999	-0.65	-3.01	-2.36	-0.80	-2.25	-2.30	-4.56	-3.89	-1.94	-2.57	-2.06	-2.99
2000	-1.36	-1.65	-1.66	-0.44	-3.13	-2.93	-3.35	-1.70	-0.28	-1.84	-0.50	-2.05
2001	-1.39	-0.58	-1.15	-0.59	-0.24	-1.21						

Note: Cash is lean equivalent of the prices in Table 3 (i.e., they are multiplied by 1.35).

Mandatory Price Reporting

National mandatory livestock price reports began in April of 2001. Hog reports cover a national carcass price series, national and regional daily direct prices, a range of grid prices, and a range of base prices. Although these new reports took the place of some voluntary reports, South Dakota reports remain unaffected. Auction summaries remain unchanged, and may now contain the best, if not only, reported hog prices that can be specifically tied to South Dakota. Some other state-specific direct reports were lost with the inception of mandatory price reporting.

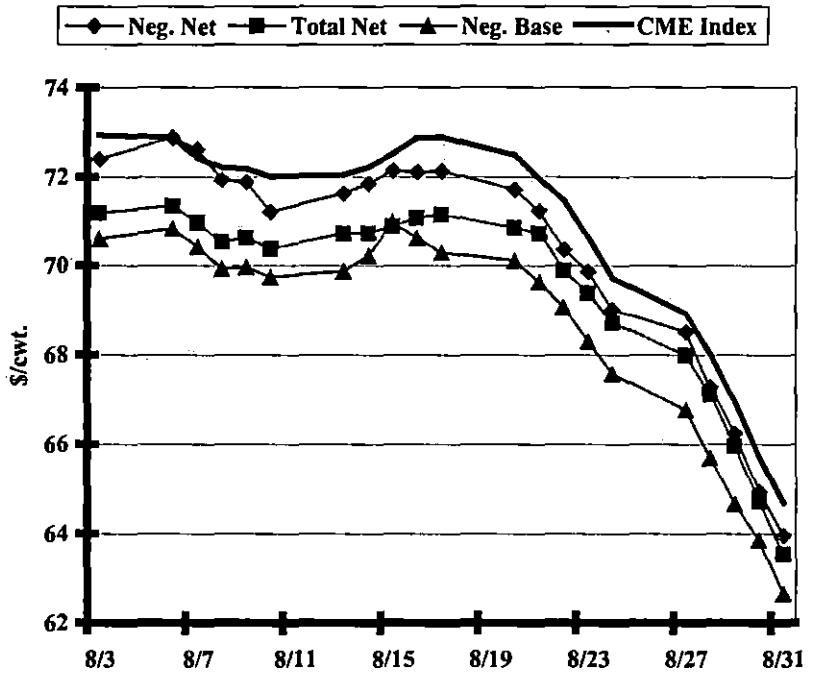
Mandatory price reports cover a few regional reports such as Eastern and Western Corn Belt, and Iowa/Minnesota daily direct, but national reports seem to be the most informative for South Dakota. For example, the weekly non-carcass merit premium report is useful as a

broad indicator of the range of premiums available.

Perhaps the most informative report is that for prior day slaughtered swine, which was first published in August of 2001. It covers slaughter volume, price series for all purchase arrangements, and a two-week delivery schedule to packing plants. Data from this report can be used to gauge short-run price and supply conditions in the hog market. Similar information is available in the prior day purchased report, such as amount and price of hogs purchased on each type of purchase arrangement along with carcass weight differentials. AMS has yet to release a carcass cost report, but continues to report the national carcass price series.

The relevance of the prior day slaughtered swine report was evident in the first month of its existence. Data from the report show relatively stable prices for the first half of August with a decrease for the second part of the month, which is consistent with previous years (figure 2). The prior day report covers the supply side and shows an increase in slaughter throughout the month, having a negative effect on price.

Figure 2. August Prior Day Slaughtered Swine Prices and CME Index
Sources: USDA-AMS and Chicago Mercantile Exchange



Looking closer at the price information from the report shows a higher negotiated average net price than the negotiated base price. This denotes that hogs are selling at a premium to the base price, possibly because of quality characteristics. The negotiated net price tends to be lower than the CME index, reflecting the above-average quality of the hogs reflected by the index. Both prices tended to be higher than the total net price, which reflects either a quality differential between spot and other purchases or a price premium for spot hogs at that time.

A two-week delivery schedule to packing plants can be accessed from the prior day slaughter report as well to give an indication of short-run supply conditions. The two-week out through ten-day figures have not given accurate clues on how supply is going to fluctuate, but week out through slaughter day

figures do seem to show a closer representation of supply in the next coming days.

As the week progresses from Monday to Friday, the number of hogs slated for the next week (Monday to Monday, Tuesday to Tuesday, etc.) increases as a percentage of slaughtered hogs for that day. For example, hogs slated for Monday and Tuesday slaughters are around 80,000 while the predictions for Friday kills usually run around 200,000 hogs. What is happening is that predicted slaughter for the week prior for Mondays and Tuesdays is only 20-25% of the total actual amount slaughtered. As the week progresses this percentage gets larger, with Friday having the largest percentage predicted at 55-65% of total hogs slaughtered. Accordingly as it gets closer to slaughter day, the number of hogs slated for Monday and Tuesday is going to grow faster as a percentage of actual slaughter. This indicates that the cash market is more active at the beginning of the week, leaving more forward contract or other purchase arrangements occurring towards the end. Keeping this fact in mind when looking at this report can give a good representation of the supply conditions for the next week.

U.S. Farrowing Intentions

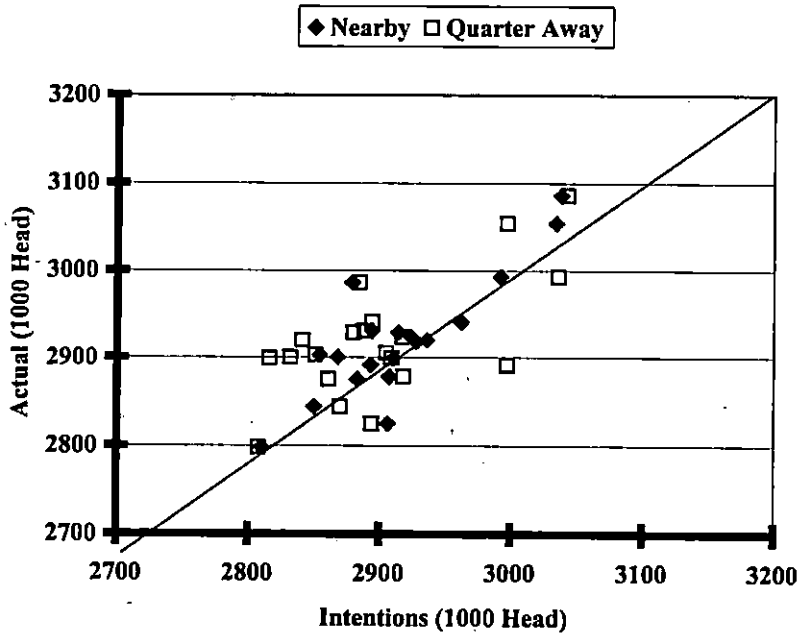
Farrowing intentions give some insight into longer-run supply changes. USDA-NASS reports farrowing intentions quarterly in the *Hogs and Pigs* report. Intentions are for the next quarter and two quarters ahead. For the intentions (or forecasts) of farrowings to be useful from a supply-forecasting perspective, the intentions should indicate the actual farrowing levels. Producers may fail to account for all available information when reporting their intentions (Runkle), but the accuracy of the intentions does not seem to have been addressed.

Actual farrowings in the U.S. changed every quarter during the sample period from December 1994 to March 2001 (30 observations). To assess how well the intentions perform, the farrowing intentions were mapped against actual farrowings in figure 3. Perfectly accurate intentions would fall on the 45-degree or diagonal line; that is, the intentions would match the actual farrowings. The intentions indicate the general level of actual farrowings as most of the intentions observations lie close to the diagonal line. Casual observation also suggests the nearby intentions are closer to the actual farrowings than are the quarter away intentions. Several times, the intentions did not change, resulting in an overlap of the observations.

The intentions were positively correlated with the actual farrowings. The correlation between the quarter away intentions and actual farrowings was 0.64. The correlation between the nearby intentions and actual farrowings was even higher at 0.78. The highest correlation, surprisingly, was between the nearby and quarter away intentions. At 0.89, the correlation implies that the intentions have less of a tendency to differ from quarter to quarter than from actual farrowings.

Intentions were further assessed by looking at their turning-point forecasting ability. The intentions and actual farrowings were cross-tabulated based on whether they were up or down relative to the previous quarter's actual farrowing number. For the nearby intentions, in 24 of the 30 observations producers either intended to increase farrowings when actual farrowings went up or intended to decrease farrowings when actual farrowings went down. There were four observations where a positive change was predicted and the farrowings decreased. Two other observations predicted a decrease when actual farrowings increased. For the quarter away intentions, the performance was similar as 23 of the 30 observations predicted direction changes correctly.

Figure 3. Quarterly U.S. intended and actual sow farrowings



Note: The most recent intentions are shown with "shadows." Source: USDA-NASS

USDA-NASS has added a monthly *Hogs and Pigs* report that gives nationwide numbers typically reported in the quarterly reports. The report has been somewhat maligned to date, but it should send more timely signals about the supply of pork to market participants. One possible use is in a comparison of the monthly reported farrowing levels to the intentions for the quarter.

Summary

Several structural changes have occurred both nationally and in South Dakota. These changes have affected the markets for hogs, and may be starting to affect prices. Several new tools are available for managing risk in the new paradigm. Absolute and relative prices have increased in South Dakota in the last couple of years. New information is also available as mandatory price reporting gives insights into the relative prices for negotiated versus other transactions. Farrowing intentions are good indicators of potential supply and allow for the utilization of the information in the monthly *Hogs and Pigs* report.

References

Diersen, M.A. *Recent Developments in South Dakota's Hog Market.* FS 908, Cooperative Extension Service, South Dakota State University (July 2001).

GIPSA. *Assessment of the Cattle and Hog Industries: Calendar Year 2000.* Grain Inspection, Packers and Stockyards Administration, U.S. Department of Agriculture (June 2001).

Huang, S. "Taiwan's Hog Industry – 3 Years After Disease Outbreak." *Agricultural Outlook* (October 2000): 20-23.

MRCI. Historical Lean Hog/Pork Belly Report 2001 Edition. Moore Research Center, Inc. 2001.

Runkle, D.E. "Are Farrowing Intentions Rational Forecasts?" *American Journal of Agricultural Economics* 73(August 1991): 594-600.

SDASS. *South Dakota Agriculture 2001.* South Dakota Agricultural Statistics Service, Sioux Falls, S.D., Bulletin No. 61 (June 2001).

Tri-State Livestock News. "Auction Agency Report Fiscal Year 2001 (July 1, 2000 – June 30, 2001)." *Tri-State Livestock News*, Saturday, August 18, 2001, p. A1