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**Discontinued Voluntary Price Reports For Live Cattle:
Will They Be Missed By Producers?**

by

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ABSTRACT

One consequence of federal mandatory livestock price reporting regulations for the cattle industry was the discontinuation of eight regional voluntary price reports for slaughter cattle. The economic implication for market transparency in those affected regional markets is investigated.

Agricultural Marketing News Services data were collected from discontinued price reports for a five-year period, along with aggregated regional price reports that were not eliminated under the new price reporting regime. Both sets of price reports were analyzed to determine if any of the price series, which continued to be published as mandatory reports, could be used by producers as a replacement for the discontinued reports in their respective regions.

The empirical findings show that western regional markets currently do not have adequate, published, alternatives to replace the discontinued western regional price reports for live cattle. Midwestern regional markets, however, do have alternative price reports currently being published that can be used as alternative sources of market information.

We conclude that market transparency was degraded in western regional markets relative to Midwest regional markets by the decision to eliminate the eight regional live cattle price reports. This implies that price discovery in regional markets may also be negatively impacted. Empirical results suggest that the lack of adequate alternative sources of market information in western regional markets may result in further deterioration in market transparency and price discovery in the future.

Discontinued Voluntary Price Reports For Live Cattle: Will They Be Missed By Producers?

Introduction

The voluntary price reporting system for livestock in the U.S. was replaced by a federal mandatory price reporting system in April of 2001.¹ Potential economic consequences associated with this regime change have received only modest attention by agricultural economists (Wachenheim and DeVuyst 2001, Azzam 2003). The reason for the regime change is complicated. However, agricultural economists are in general agreement that changes in the industrial structure of the livestock industry were the “wellspring of discontent” that provided the political momentum resulting in a federal mandatory price reporting regime for livestock in the U.S.

Within the livestock sector, cattle producers and beef commodity groups were among the most vocal groups advocating reform of the livestock price reporting system in the U.S. Supporters of reform (producer groups, economists, rural political coalitions, etc.) argued that the beef industry had become less competitive because of structural changes that have occurred in the industry over the last 30 years.

Over the last 30 years, these structural changes have been associated with: a) increased concentration in both the packing and feedlot industries, b) the use of alternative marketing arrangements (marketing agreements, forward contracts, etc.), and c) the movement away from publicly reported spot

¹ Five states (Iowa, Minnesota, Missouri, Nebraska, and South Dakota) passed variants of mandatory price reporting legislation prior to passage of federal legislation. National mandatory livestock price reporting legislation was passed in October 1999, and the first publicly issued mandatory price report was released on April 2, 2001. The US Congress delegated the responsibility for collecting and reporting transaction data to the USDA- Agricultural Marketing News Services (AMS). The selection of the AMS was obvious since the AMS has been responsible for operating the national voluntary livestock price reporting system since 1946 (LMPR Review Team 2001).

market transactions. As a consequence of these trends: a) in the spot market for cattle, the use of terminal markets declined from 30% in 1977 to 13% in 1999 (GIPSA 2002), with the four largest packers controlling 82% of steer and heifer slaughter but only making 3.7% of total slaughter purchases from terminal markets, and b) industry participants have exhibited increasing reluctance to voluntarily report all direct sale cash transactions of slaughter cattle. Just prior to the passage of mandatory price reporting at the federal level, the USDA estimated that 30% to 40% of all slaughter cattle cash transactions were not being reported (USDA-AMS 2000).

One of the most damaging charges against the former voluntary price reporting system for slaughter cattle is the claim that its accuracy had greatly diminished because of structural change in the beef industry. A number of research studies lent credence to this position by concluding that such changes contributed to thinning terminal markets and thinning voluntary public price reports, which may have reduced market transparency, and hampered price discovery (Tomek 1980, Schroeder et al. 1997).²

The information structure of livestock markets, and in particular the cash market for live cattle, has changed structurally under the mandatory price reporting regime. A number of regional price reports published under the former voluntary system have been discontinued: Montana Direct, South Dakota Direct, California/Nevada Direct, Arizona Direct, Indiana/Michigan/Ohio Direct, Illinois Direct, Wyoming/Southwest South Dakota/Western Nebraska Direct, and Washington/Oregon/Idaho Direct.³ Information contained in these smaller-area regional voluntary price reports has been subsumed into

² Market transparency refers to a market environment where all relevant information on market conditions is publicly available to all market participants. One important component of market transparency is the concept of price transparency. Price transparency is defined as a market condition where all relevant information on transaction prices are publicly available to all market participants. The goal of public price reporting is to provide accurate and timely market price reporting (Lawrence et. al. 1996). Accurate and timely market price reports are necessary for adequate price discovery and the promotion of market efficiency (Ward 1987).

³ The lone exception is a voluntary feedlot survey that the State of New Mexico continued to issue. Recently, the AMS began to issue a voluntary feedlot slaughter steer and heifer report covering the Texas-Oklahoma Panhandle area and Nebraska (AMS 2003).

aggregated price reports under the mandatory system. The advantage of these new reports is the breakdown of direct sales into negotiated, formulated, and forward contract reports. One possible disadvantage is the potential loss of transparency of local market conditions.

The loss of these voluntary price reports has not been the subject of discussion in the mandatory price reporting literature. The objectives of this research are 1) to provide insight on why this set of voluntary price reports was discontinued with the onset of federal mandatory price reporting, and 2) determine if suitable substitutes for these discontinued live slaughter cattle price reports can be identified. The next section describes the data collected and addresses objective one.

Data

The passage of the Livestock Mandatory Reporting Act of 1999 nullified all state legislation regulating livestock price reporting in the U.S. Problems associated with implementing the federal system delayed enactment of the regulations until April 2001.⁴ To explore the importance of discontinued voluntary public price reports to their respective regions, AMS data were collected for the five-year period prior to the implementation of mandatory price reporting on all: a) discontinued regional voluntary price reports, and b) aggregated regional voluntary price reports converted into mandatory price reports. The data were collected for a 275-week period from January of 1996 to April of 2001. All of the above price series represent the cash market for live steers. Table I contains the summary statistics on the set of discontinued price reports used in the empirical analysis.

TABLE I
DISCONTINUED VOLUNTARY PRICE SERIES FOR THE LIVE STEER CASH MARKET:
JAN 1, 1996 TO APRIL 1, 2001.
SUMMARY STATISTICS (\$/cwt.)¹

Direct Price Series	# of Wkly Obs.	Mean	Standard Deviation	% of Missing Weekly Observations
<hr/>				

⁴ For an overview of the federal legislation and problems with implementation of the federal mandatory price reporting see Haley (2001).

Illinois	254	\$66.50	\$4.85	7.6%
Wy-Neb-SWSD	268	\$66.17	\$4.44	2.5%
Calf-NV	164	\$65.89	\$4.53	40.3%
South Dakota	144	\$66.32	\$4.65	47.6%
Montana	179	\$65.38	\$5.15	34.9%
Wash-Org-Id	88	\$64.92	\$4.62	68.0%
Arizona	174	\$67.39	\$4.81	36.7%
Ind-Mich-Ohio	195	\$66.41	\$4.63	29.1%

1. Voluntary price report data collected from various issues of the AMS Livestock, Meat and Wool Weekly Summary and Statistics report (1996-2001). The data is live price, FOB, with pencil shrink. Pencil shrink for all individual reports remained constant during the five-year period. The only exception is Montana, where pencil shrink increased from 4% to 4% - 5% in March of 2000.

The data in Table I indicate that six of the eight discontinued regional voluntary price reports failed to provide weekly direct sale price reports on a continuous basis. Price reports with the highest level of reporting regularity were the Illinois and the Wyoming-Western Nebraska-Southwest South Dakota series. The implication is that producers living in reporting regions where weekly reporting frequency ranged from 32% to 71% regularly had to look elsewhere for market price data. The data indicate that the lack of reporting regularity probably degraded the informational value of these reports during the 275-week period (just prior to being discontinued) relative to the more aggregate regional voluntary reports that continued to be published by the AMS after April 2001 as mandatory reports.⁵ One plausible reason for the discontinuation of at least six of the voluntary reports was the lack of regular market activity. However, the rationale for discontinuing the Illinois and the Wyoming-Western Nebraska-Southwest South Dakota series

⁵ The regional aggregated price reports that continued to be reported after the start of federal mandatory price reporting are: 1) Texas-Oklahoma, 2) Nebraska Direct, 3) Kansas Direct, 4) Iowa-Minnesota Direct, and 5) Colorado Direct. These weekly price reports were published by the AMS continuously except for holidays. These five reports are also combined and reported as the Five Area Report, the national weekly live cattle price report.

is not due to irregular reporting behavior (Table I). One could speculate that both reports did not contribute to price discovery beyond their local markets.

The loss of these reports represents a loss of market information and degrades market transparency, and may affect price discovery in these smaller regional markets, the extent of which is unknown.

However, providing insight on which alternative market information sources can be used as a substitute for these discontinued reports is possible. A search for potential replacements is conducted by examining the statistical relationship between individual discontinued reports and AMS price reports that continued to be reported under the federal mandatory price reporting system.

Methodology and Empirical Results

We hypothesize that spatial linkages exist between regional markets for fed cattle as a result of competitive arbitrage activity occurring during the period covered in this study.⁶ This assumption implies that if two markets are spatially linked then both markets contain all or part of the same market information set. If two markets are perfectly integrated, then the market price differential (at any particular point in time) between the two regional markets should reflect only the transaction costs associated with moving slaughter cattle from one market to another. This assumption implies that market information sets across regions are identical. Traditionally, these issues have been investigated empirically by applying the econometric technique of cointegration. However, a majority of the discontinued voluntary price reporting series used in this study have a serious missing data problem. Six of the discontinued voluntary price reporting series have a large number of missing weekly observations. Missing time series observations will bias the unit root/cointegration hypothesis tests and increase the probability of committing a type II error.⁷

⁶ There have been numerous studies (e.g. Goodwin and Schroeder 1991) investigating spatial relationship among regional cattle markets. The general conclusion is that competitive arbitrage forges spatial price linkages between regional markets.

⁷ According to Kevin Meyer, SAS consultant, the econometric implication is an increased probability of making a type II error as the number of missing observations increases. This econometric issue is similar to the effect of missing observations on the power of the Durbin-Watson test for serial correlation (Savin and White 1978).

Because of this missing data problem, we introduce a less sophisticated empirical approach for determining which currently published price reports can be selected as substitutes for the discontinued regional voluntary price reports. Very simply, we define the price relationship between two spatially linked markets (A&B) as: $P_t^A - P_t^B = PD_t$, where PD_t is the price differential between markets A and B at time t.

The expected value of PD_t can be interpreted in a manner similar to the long-run intercept term of a cointegration regression that captures transaction costs. This is a reasonable assumption if in the long-run the marginal profit from spatial arbitrage is zero. In a similar way, the variance and standard deviation of the price differential (PD) can be interpreted as measures of the short-run divergence from long-run equilibrium if transaction costs are stationary over time.⁸ Short-run divergence from long-run equilibrium implies positive spatial arbitrage profit opportunities in the short run. If spatially linked markets are integrated, then competitive market forces cause profit opportunities to dissipate quickly. Under this assumption, deviations from the long-run relationship between two spatially linked markets would be minimal. Therefore, the standard deviation of a particular price differential can be interpreted as a measure of the strength of the spatial linkage between two markets. The standard deviation of the price differential is a measure of what we refer to as spatial-price dispersion. The greater the level of spatial-price dispersion, the weaker the spatial link between markets and the longer short-run deviations from long-run equilibrium persist.

In the case of smaller regional markets spatially linked to larger regional markets, this implies that the greater the level of spatial-price dispersion, the more uncertainty producers will have about the relationship between market conditions reported in the larger regional market and actual local market conditions in their region. This implies that as spatial-price dispersion increases, local market transparency

⁸ This is interpreted in a similar manner as the error term of a cointegrating regression. The error term of a cointegrating regression has an expected value of zero and variance σ^2 . The error term is interpreted as the equilibrium error term reflecting a short-run divergence from long-run equilibrium. The variance of the error term is a measure of the dispersion associated with the short-run divergence from long-run equilibrium.

is diminished and price discovery in the local market becomes more difficult if producers lose their local market information source.

Empirically, we are interested in determining which of the currently published mandatory price reports would be the best replacement for a discontinued voluntary price report. The decision criteria will be based on the comparison of the spatial relationship between a discontinued report and mandatory reports selected as potential candidates. First, we are interested in if the spatial price differential between a discontinued region price report and a former regional report (now being published as a mandatory report) is rank correlated with time (t). If the price differential is not rank correlated with time, then this would suggest that the spatial price relationship is stationary. If there is a statistically significant correlation between a particular price differential and time, then either transaction costs are shifting, the spatial linkage between the two price series is shifting, or both. In this case, the validity of a mandatory price report having the statistical properties of being an unbiased and consistent point estimator is suspect.⁹ Second, we are interested in ascertaining which currently published mandatory price report has the lowest level of spatial price dispersion. The lower the level of spatial price dispersion, the less uncertainty associated with a mandatory price report as a point estimator for local market prices.

The criteria used to determine which currently published AMS regional price reports are potential replacement candidates for discontinued reports will be based on a comparison of dispersion measures

⁹ The former AMS voluntary price reporting system provided point estimators (weighted average price estimates) for actual market transaction prices. It is assumed that the AMS statistical procedures generated efficient, unbiased, and consistent point estimators. Producers in regions where price reports were discontinued must now turn to aggregated mandatory price reports for point estimators of local market prices. The robustness of point estimators generated by the mandatory price reporting system, for local market conditions, is dependent on the spatial relationship between the local market and the aggregate market. The expected value of the price differential is a point estimator of that relationship. If a price differential exhibits a trend over time, then the mandatory price report associated with that differential will be a biased point estimator. If the price differential is widening over time, then the mandatory price report associated with that differential will not only be a biased point estimator, but it will also be an inconsistent point estimator for local market conditions. One plausible implication for this case is that the two markets are becoming less integrated over time.

(equality-of-variance hypothesis test) and the Spearman Rank Correlation procedure.¹⁰ These statistical procedures will evaluate the statistical relationship between individual discontinued reports and spatially relevant aggregated mandatory price reports. The decision criterion for selecting acceptable substitutes for a discontinued report from a group of spatially relevant and currently published AMS public price reports is based on: a) the regional price differential with the lowest level of spatial-price dispersion, and b) the sign and level of significance of Spearman correlation coefficients measuring the ordinal relationship between a spatial price differential and time. Ideally, a price report selected as a replacement for a discontinued report will have a stable spatial relationship with the discontinued report over time and the smallest level of spatial-price dispersion among all other possible candidates. A mandatory price report associated with a price differential having these statistical properties will be an unbiased, consistent, and the most efficient point estimator.

A matched-pair price differential was calculated for each of the discontinued voluntary price reports and a set of spatially relevant AMS regional price reports. Decision criteria statistics for the spatial price differentials are provided in Table II.

¹⁰ A discussion of these statistical procedures can be found in most undergraduate probability and statistic textbooks. For example, see Newbold (1995). Empirical analysis procedures were conducted with SAS software (SAS 1993).

TABLE II
MATCHED PAIR PRICE DIFFERENTIALS(\$/cwt.)¹

Price Differential Series	# of Wkly Obs.	Matched Pair: Mean Price Differential	Standard Deviation of Price Diff ²	Spearman Rank Correlation Estimate ³	Price Diff (\$)	
					Min	Max
Wy-SD-Neb (WSN)						
WSN-Kan	260	-\$0.03	0.74 (3)	-0.19***	-3.07	3.39
WSN-Col	256	\$0.01	0.65 (2)	-0.01	-3.21	2.75
WSN-Neb	267	\$0.03	0.55 (1)	0.18***	-2.33	3.02
WSN-5Area	267	-\$0.03	0.67 (2)	-0.15***	-1.79	4.52
Washington-Oregon (WO)						
WO-Col	85	-\$0.70	1.40	-0.21**	-4.49	4.53
WO-Neb	88	-\$0.68	1.44	-0.23**	-4.48	4.24
WO-5Area	88	-\$0.75	1.37	-0.34***	-4.64	2.34
Montana (MT)						
MT-Kan	175	-\$1.27	1.13	0.22***	-4.00	1.75
MT-Col	171	-\$1.23	1.12	0.31***	-3.82	1.75
MT-Neb	178	-\$1.23	1.13	0.42***	-4.21	1.54
MT-5Area	178	-\$1.31	1.12	0.28***	-4.03	2.52
South Dakota (SD)						
SD-IWMN	142	\$0.10	1.15	-0.27***	-7.30	3.15
SD-Col	140	-\$0.18	1.12	-0.18***	-7.38	2.75
SD-Neb	143	-\$0.14	1.03	-0.17**	-7.55	2.83
SD-5Area	143	-\$0.19	1.08	-0.26***	-7.07	3.83
California-Nevada (CN)						
CN-TXOK	163	-\$1.61	1.07	-0.28***	-4.34	2.42
CN-Col	158	-\$1.50	1.09	-0.14*	-4.46	1.61
CN-5Area	163	-\$1.59	1.02	-0.28***	-4.10	1.61
Arizona (AZ)						
AZ-TXOK	172	-\$0.72	0.80(1)	-0.21***	-3.60	1.41
AZ-Col	171	-\$0.59	0.93(2)	-0.01	-3.87	2.17
AZ-5Area	173	-\$0.65	0.84(1)(2)	-0.17**	-3.26	1.96
Indiana-Mich-Ohio (IMO)						
IMO-Kan	190	-\$0.79	1.50(2)	-0.26***	-4.65	4.67
IMO-5Area	194	-\$0.79	1.43(2)	-0.26***	-4.44	3.93
IMO-IWMN	190	-\$0.56	1.06(1)	-.07	-3.65	2.40
Illinois (IL)						
IL-Kan	247	-\$0.01	1.22(2)	-0.17***	-3.75	3.17
IL-IWMN	249	\$0.22	0.72(1)	-0.03	-3.70	3.15
IL-5Area	253	-\$0.01	1.14(2)	-0.15***	-2.87	2.96

1. The regional aggregated price reports that continued to be reported after the start of federal mandatory price reporting are: Texas-Oklahoma, Nebraska Direct, Kansas Direct, Iowa-Minnesota Direct, and Colorado Direct. The AMS publishes these weekly price reports continuously except holidays. These five reports are also combined and reported as the Five Area Report, the national weekly live cattle price report.

2. Equality of variance hypotheses tests were conducted at a 10% level of significance. Results are indicated by a ranking system, based on statistical significance, from smallest to largest. If an equal ranking was given, then there is no difference between variances. If no ranking is given for a group, then there is no statistical difference between variances in that group. 3. The notation *, **, and *** indicate 10%, 5%, and 1% level of significance, respectively. Correlation coefficients reflect linear relationship between the ordinal ranking of a price differential variable and t (time).

Wyoming-Western Nebraska-Southwest South Dakota

The spatial relationships between the weekly Wyoming-Western Nebraska-Southwest South Dakota report and a set of selective alternatives (Kansas Direct, Colorado Direct, Nebraska Direct, and the Five Area weekly reports) were evaluated using the decision criteria discussed. Statistically, the Nebraska Direct had lowest level of spatial-price dispersion, followed by Colorado and the Five Area reports. Stability of the spatial relationship, as measured by the Spearman Rank correlation estimates, indicates only the Colorado Direct price differential was stationary over the five-year period.¹¹ Our recommendation for producers who relied on the Wyoming-Western Nebraska-Southwest South Dakota price report for market information is now to rely on the Colorado Direct, and then the Nebraska Direct, for insight on local market conditions. Over time, however, the statistical significance of the Spearman correlation coefficient suggests that, for the Nebraska Direct price series, the spatial price differential trended higher during the period covered in this study. This infers the reported price paid to Wyoming-Western Nebraska-Southwest South Dakota producers has been increasing relative to the price reported in the Nebraska Direct. This trend indicates that using the Nebraska Direct as a replacement for the Wyoming-Western Nebraska-Southwest South Dakota series should provide a lower bound for prices being paid in this region. However, this empirical finding also suggests that there is increasing uncertainty over the reliability of the Nebraska Direct as an accurate source of market information for producers in the Wyoming-Western Nebraska-Southwest South Dakota region in the future. The implication of the Nebraska Direct price series **not** being a consistent and unbiased point estimator is degraded price transparency in the local market which may affect price discovery.

Compared with other regional markets that lost their voluntary price report, producers marketing slaughter cattle in the Wyoming-Western Nebraska-Southwest South Dakota region do have adequate alternative sources for market information. Thus, we conclude that the loss of the Wyoming-Western

¹¹ In this discussion, the term stationary refers to the absence of statistical evidence of a trend in the price

Nebraska-Southwest South Dakota Direct report will only have a marginal effect on market transparency and price discovery in this region.

Washington-Oregon Direct

The spatial relationships between the weekly Washington-Oregon Direct report and the Colorado Direct, Nebraska Direct, and the Five Area weekly reports were evaluated using the decision criteria discussed. For producers selling slaughter cattle in the Washington-Oregon region there was no statistical difference in spatial-price dispersion among the three possible alternative replacement reports and the discontinued Washington-Oregon Direct report. The empirical evidence also suggests a lack of stability in the spatial relationship between the Washington-Oregon Direct and the three alternative sources of market information, as indicated by the Spearman Rank correlation estimates. Furthermore, the Spearman correlation coefficients indicate a negative relationship for all three price differential estimates and time. For those producers who relied on the Washington-Oregon Direct price report for market information, this suggests an unfavorable widening of the price differential prior to this report being discontinued.¹² Based on the correlation estimates, the three identified alternative price reports are **not** consistent and unbiased point estimators for local market conditions and their informational value for improve local market transparency and the price discovery process in the future is questionable. The empirical evidence does not indicate a candidate among the possible alternative public price reports to replace the discontinued Washington-Oregon report. For producers marketing live slaughter cattle in the Washington-Oregon region, the empirical evidence suggests that market transparency and price discovery have been impaired by the loss of the Washington-Oregon Direct report.

Montana Direct

differential over time.

The spatial relationships between the weekly Montana Direct report and the Colorado Direct, Nebraska Direct, Kansas Direct, and the Five Area weekly reports were evaluated using the decision criteria discussed. For producers selling slaughter cattle in the Montana region there was no statistical difference in spatial-price dispersion among the four possible alternative replacement reports and the discontinued Montana Direct report. The empirical evidence also indicates a lack of stability in the spatial relationship between the Montana Direct and the four alternative sources of market information, as indicated by the Spearman Rank correlation estimates. However, unlike other discontinued western regional reports, the Spearman correlation coefficients indicate a positive relationship for all four price differential estimates and time. For producers who relied on the Montana Direct price report for market information, this suggests a favorable narrowing of the price differential prior to the Montana report being discontinued. The Spearman correlation estimates indicate that all four of the replacement candidates are biased but consistent point estimators.

The conclusion drawn from the empirical evidence is that while no suitable alternative price report can be identified, based on spatial price dispersion, the Colorado and Nebraska price differentials show a stronger tendency to narrow over time compared with the Kansas Direct and the Five-Area report. This tendency for a narrowing of the price differentials over time suggests that the Colorado and Nebraska price differentials should improve as point estimators for the Montana region in the future. Improvement infers that prices paid in the Montana region during the period covered by this study showed a stronger tendency for convergence with prices reported in the Colorado and Nebraska price reports. However, for producers marketing live slaughter cattle in the Montana region, market transparency and price discovery have been impaired by the loss of the Montana Direct report.

South Dakota Direct

¹² An “unfavorable widening” refers to a divergence occurring between the two price series over time.

The spatial relationships between the weekly South Dakota Direct report and the Colorado Direct, Nebraska Direct, Iowa-Minnesota Direct, and the Five Area weekly reports were evaluated using the decision criteria discussed. For producers selling slaughter cattle in the Eastern South Dakota region there was no statistical difference in spatial-price dispersion among the four possible alternative replacement reports and the discontinued South Dakota Direct report. The empirical evidence also suggests a lack of stability in the spatial relationship between the South Dakota Direct and the four alternative sources of market information, as indicated by the Spearman Rank correlation estimates. Furthermore, the correlation coefficients indicate a negative relationship for all four price differential estimates and time. For producers who relied on the South Dakota Direct price report for market information, this implies an unfavorable widening of the price differential prior to this report being discontinued. Based on the correlation estimates, the four identified alternative price reports are **not** consistent and unbiased point estimators for producers to use in the price discovery process. The empirical evidence suggests there is not a suitable replacement candidate among the possible alternative public price reports. For producers marketing live slaughter cattle in the eastern region of South Dakota, market transparency and price discovery have been impaired by the loss of the South Dakota Direct report.

California-Nevada Direct

The spatial relationships between the weekly California-Nevada Direct report and the Colorado Direct, Texas-Oklahoma Direct, and the Five Area weekly reports were evaluated using the decision criteria discussed. For producers selling slaughter cattle in the California-Nevada region there was no statistical difference in spatial-price dispersion among the three possible alternative replacement reports and the discontinued California-Nevada Direct report. The empirical evidence also suggests a lack of stability in the spatial relationship between the discontinued California-Nevada Direct and the three alternative sources of market information, as indicated by the Spearman Rank correlation estimates. Furthermore, the correlation coefficients indicate a negative relationship for all three price differential estimates and time.

For producers who relied on the discontinued California-Nevada Direct price report for market information, an unfavorable widening of the price differential did occur prior to this report being discontinued. Based on the correlation estimates, the three identified alternative price reports are **not** consistent and unbiased point estimators of local market conditions. Empirical evidence does not provide a candidate among the possible alternative public price reports to replace the discontinued California-Nevada report. For producers marketing live slaughter cattle in the California-Nevada region, market transparency and price discovery have been impaired by the loss of the California-Nevada Direct report.

Arizona Direct

The spatial relationships between the Arizona Direct report and the Texas-Oklahoma Direct, Colorado Direct, and the Five-Area weekly reports were evaluated using the decision criteria discussed. Statistically, the Texas-Oklahoma Direct had the lowest level of spatial-price dispersion, followed by the Five-Area and the Colorado reports. Stability of the spatial relationship, as measured by the Spearman Rank correlation estimates, suggests only the Colorado Direct price differential was stationary over the five-year period. Producers who relied on the Arizona Direct price report for market information may now rely on the Colorado Direct, because it is an unbiased and consistent point estimator of local market conditions.

Over time the statistical significance of the Spearman correlation coefficient suggests an unfavorable widening of the spatial price differential between the Arizona Direct regional price series and both the Five-Area and Texas-Oklahoma price series prior to the Arizona report being discontinued. This implies the reported price paid to producers in the Arizona region has been declining relative to the price reported in the Texas-Oklahoma and Five-Area reports. Based on the correlation estimates, the Five-Area and Texas-Oklahoma reports are identified as possible alternative price reports. However, as point estimators, they are biased and are not consistent.

The conclusion drawn from the empirical evidence is that Colorado Direct is the strongest candidate among the possible alternative public price reports to replace the discontinued report in the

Arizona region. For producers marketing live slaughter cattle in the Arizona region, market transparency and price discovery have been marginally affected by the loss of the Arizona Direct report.

Indiana-Michigan-Ohio Direct

The spatial relationships between the Indiana-Michigan-Ohio Direct report and the Kansas Direct, Iowa-Minnesota Direct, and the Five Area weekly reports were evaluated using the decision criteria discussed. Statistically, the Iowa-Minnesota Direct had the lowest level of spatial-price dispersion, followed by the Five Area and the Kansas reports. Stability of the spatial relationship, as measured by the Spearman Rank correlation estimates, indicates only the Iowa-Minnesota Direct price differential was stationary over the five-year period. Producers who relied on the Indiana-Michigan-Ohio Direct price report for market information may now rely on the Iowa-Minnesota Direct for insight on local market conditions. The conclusion drawn from the empirical evidence is that the Iowa-Minnesota report is the only unbiased and consistent point estimator among the possible alternative public price reports for producers in the Indiana-Michigan-Ohio region to replace the discontinued report and assist producers in the price discovery process.

The Kansas Direct and the Five Area reports are identified as possible alternative price reports. Based on the correlation estimates they are not consistent and unbiased point estimators. Therefore, they will become less reliable as point estimators for producers to use in the price discovery process in the future. For producers marketing live slaughter cattle in the Indiana-Michigan-Ohio region, market transparency and price discovery have been marginally affected by the loss of the Indiana-Michigan-Ohio Direct report.

Illinois Direct

The spatial relationships between the Illinois Direct report and the Kansas Direct, Iowa-Minnesota Direct, and the Five-Area weekly reports were evaluated using the decision criteria discussed. Statistically, the Iowa-Minnesota Direct had the lowest level of spatial-price dispersion, followed by the Five Area and the

Kansas reports. Stability of the spatial relationship, as measured by the Spearman Rank correlation estimates, indicates only the Iowa-Minnesota Direct price differential was stationary over the five-year period. Producers who relied on the Illinois Direct price report for market information may now rely on the Iowa-Minnesota Direct for insight on local market conditions. The conclusion drawn from the empirical evidence is that the Iowa-Minnesota report is the only unbiased and consistent point estimator among the possible alternative public price reports for producers in the Illinois region.

The Kansas Direct and the Five Area reports are identified as possible alternative price reports. Based on the correlation estimates, however, they will become less reliable as point estimators in the future. For producers marketing live slaughter cattle in the Illinois region, market transparency and price discovery has been marginally affected by the loss of the Illinois Direct report.

Conclusions and Summary

The regime change that ushered in federal mandatory price reporting regulations also eliminated eight regional voluntary price reports. An explanation of why these reports were discontinued, beyond that they would not be necessary under the new federal price reporting regime, has not been provided in the legislation. Upon examining the AMS records, six of the eight reports, over a five-year period just prior to elimination, revealed substantial gaps in the weekly reporting records. The lack of consistent market reporting on a weekly basis and the fact that these regional markets are small may have played a role in the decision by Congress not to support the continued publication of these regional reports. However, empirical analysis of the potential consequences resulting from the loss of these regional live cattle price reports indicate that there is a loss of regional pricing information that has not been replaced by the new series of mandatory price reports. Regions associated with discontinued price reports negatively affected are CA-NV, MT, SD, and WA-OR-ID.

While these discontinued regional reports may not have made a meaningful contribution to price discovery and market transparency in the national market for live slaughter cattle, they did provide

additional market information for producers marketing live cattle in those affected regions. The legislative decision to discontinue these reports may have affected price discovery and market transparency within those regional markets. An important question addressed in this study is: Where do producers in these regions look for alternative market information sources? The answer varies across affected regions.

The empirical results indicate the discontinued west coast regional reports were the most valuable to their respective regions. This conclusion is based on the empirical evidence that there is no currently published AMS price report that had a strong spatial relationship, over a five-year period, with the discontinued west coast price reports. The empirical evidence also suggests the spatial price relationship between west coast price reports and AMS regional price reports has been shifting over time. If this trend continues, currently published regional AMS mandatory price reports upon which west coast producers now rely on will become less reliable as point estimators over time.

Eastern South Dakota producers face a similar problem. Spatial price dispersion is similar across all potential AMS price series alternatives available to South Dakota producers. The correlation results indicate there is a tendency for an unfavorable widening of all of the relevant regional price differentials prior to federal mandatory price reporting. Under these circumstances, the loss of the South Dakota Direct report will impede the price discovery process for South Dakota producers. South Dakota producers, however, do have the advantage of an active terminal market in Sioux Falls.

Montana producers are in a slightly better position than producers in the other western regions just discussed. None of the potential alternative AMS reports has an advantage with respect to having a lower level of spatial price dispersion. All of the potential AMS price report alternatives, however, do exhibit a narrowing price differential. The implication is that there seems to be a tendency for the convergence of those alternative price reports and the prices paid to Montana producers as reported in the discontinued Montana Direct report. If this trend continues under the new federal regime, then Montana producers using either the Nebraska Direct or the Colorado Direct should experience improved price discovery in the future.

Producers that relied on the Wyoming-Western Nebraska-Southwest South Dakota, the Illinois Direct, the Indiana-Michigan-Ohio Direct, and the Arizona Direct have clear-cut alternative sources of market information to replace those discontinued reports. Producers in the Wyoming-Western Nebraska-Southwest South Dakota and Arizona regions should now focus on the AMS Colorado Direct report as a source of market information relevant to their respective regional markets. From it, producers should be able to gauge current market conditions in their respective regions and engage in effective price discovery in the market for live cattle. Producers in the Indiana-Michigan-Ohio and Illinois regions should now focus on the Iowa-Minnesota Direct report. From it, producers should be able to gauge current market conditions in their respective regions and engage in effective price discovery in the market for live cattle. We conclude that additional research is needed to determine: 1) How severely has market transparency and price discovery, in local markets, been impaired without adequate alternative market information sources for discontinued price reports, and 2) Will market transparency and price discovery deteriorate over time in regions without adequate replacements for discontinued reports? and 3) Should the AMS consider reactivating regional price reports in areas that do not have adequate market information sources to replace their discontinued regional price reports?

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