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**PREFERENTIAL CATTLE AND HOG PRICING BY PACKERS:
EVIDENCE FROM MANDATORY PRICE REPORTS**

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Preferential Cattle and Hog Pricing by Packers: Evidence from Mandatory Price Reports

Abstract

Preferential pricing was one of several concerns leading to mandatory price reporting. Seven years of “new” data from mandatory reports are examined to determine if evidence exists of preferential pricing by packers for fed cattle and slaughter hogs. Weekly data show some alternative marketing methods track closer to cash market prices than others. Some differences can be explained, while others are not as clear. Evidence was found that cash prices lead prices for alternative marketing methods on rising markets but trail them on declining markets.

Keywords

Alternative marketing arrangements, Cattle, Hogs, Marketing, Meatpacking procurement, Price discovery, Pricing

Introduction

Passage of the Livestock Mandatory Reporting Act of 1999 resulted largely from a grassroots effort by producers and advocates. One of many concerns expressed by producers was preferential pricing or sweetheart pricing arrangements between meatpacking firms and livestock suppliers (cattle feeders and hog producers), especially those contracting with meatpackers. Producers’ concerns were related to and a continuation of concerns regarding so-called captive supplies which began in the 1980s. Preferential pricing as alleged by producers is akin to price discrimination for which no quality or cost basis exists. For example, packers regularly and legitimately pay differential prices for varying qualities or quantities of livestock, specially handled livestock (such as source and age verified or produced under natural standards), or livestock delivered to a plant at a specific time, each of which may affect value or costs.

Economists have studied effects of captive supplies, more recently referred to as alternative marketing arrangements (AMAs) and the phrase used in this paper, but primarily with transaction level data collected by or for special studies funded by the Grain Inspection, Packers

and Stockyards Administration (GIPSA) of the U.S. Department of Agriculture (USDA). Published research from these major data collection efforts include: Muth et al. 2008; Schroeter and Azzam 2003, 2004; Hunnicutt, Bailey, and Crook 2004; Crespi and Sexton 2004, 2005; Capps et al. 1999; Ward, Koontz, and Schroeder 1998). Passage of mandatory price reporting legislation created several new data series regarding volume and prices for purchases of livestock by packers under AMAs. Some have suggested these new reports increased transparency regarding use of AMAs (Perry et al. 2006; Ward 2006)

The objective of this paper is to examine the behavior of weekly AMA prices for the first seven years of mandatory price reporting, both for fed cattle and hogs. The analysis is largely graphical in nature with limited statistical testing. Thus, work reported here may be considered preliminary but represents an initial effort to determine whether or not there is evidence of preferential pricing by packers for fed cattle and hogs.

Data and Procedure

Data were compiled from multiple Agricultural Marketing Service (AMS), USDA, mandatory price reports. By number, reports include: fed cattle – LM_CT150, LM_CT151, LM_CT153, LM_CT163, LM_CT164, LM_CT165, LM_CT166, and LM_CT167; hogs – LM_HG200. All can be accessed at <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateA&navID=MarketNewsAndTransportationData&leftNav=MarketNewsAndTransportationData&page=MarketNewsAndTransportationData&acct=AMSPW> . Data were collected in part by the Livestock Marketing Information Center and Texas Cattle Feeders Association, as well as the author and associates.

For fed cattle, AMAs include negotiated cash trades, negotiated grids (with the base price resulting from buyer-seller negotiation) formula priced trades (typically with the base price tied to a cash market quote or plant average cost), forward contracts (typically with price tied to the futures market or future market basis), and packer owned transactions (for which no price is reported since they are typically internal transfers from one division of the packing firm to another).

For hogs, AMAs include negotiated cash trades, swine market formula priced trades (typically with the base price tied to a cash market quote), other market formula trades (typically with price tied to the futures market), and other purchase methods (which may include window or ledger contracts and cost of production contracts).

The next section discusses a graphical depiction regarding the extent of AMAs for fed cattle and hogs. While the focus of this paper is on price differences between procurement methods, it is deemed important to understand the extent of procurement by AMAs.

The subsequent section focuses on price differences between procurement methods and first differences for each procurement method. Along with a discussion of the graphical analysis, are results of statistical tests for mean price differences and a regression estimation to determine price difference differences during rising and falling markets.

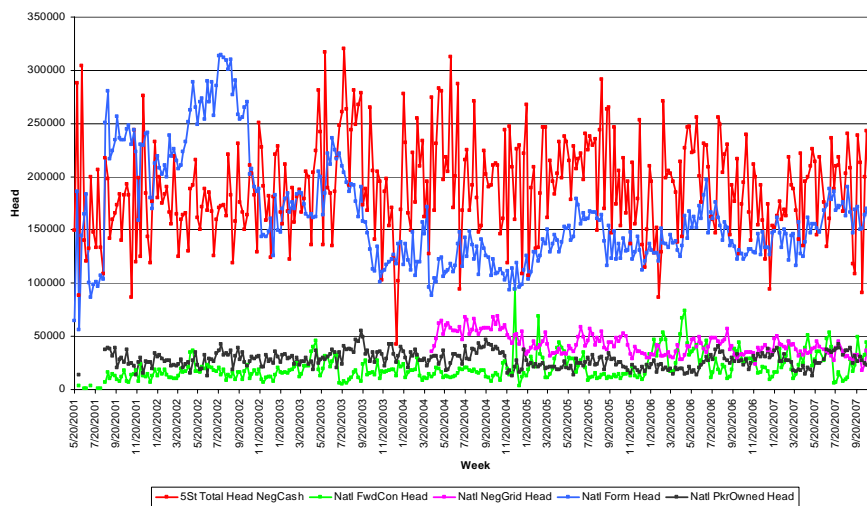
Extent of Procurement by AMAs from 2001-2008

Fed cattle – Figure 1 shows weekly purchases of fed cattle by AMAs. Considerable variability is evident from week to week. However, the two types of procurement categories that seem to be closest substitutes are cash transactions and formula transactions. In recent months of the series, each accounted for about 40% of all fed cattle purchased. Each of the other three

methods, i.e., negotiated grids, forward contracts, and packer owned trades, accounted for 10% or less of all purchases, combining to account for about 20% of fed cattle purchases.

AMAs (i.e., formula trades, forward contracts, and packer owned transfers) were highest in 2002-03, reaching 59.2% of all fed cattle purchases. However, they declined the next few years and represented 52.0% of all purchases in 2007-08.

Figure 1. Weekly fed cattle procurement by AMA (number of head), May 2001 to May 2008



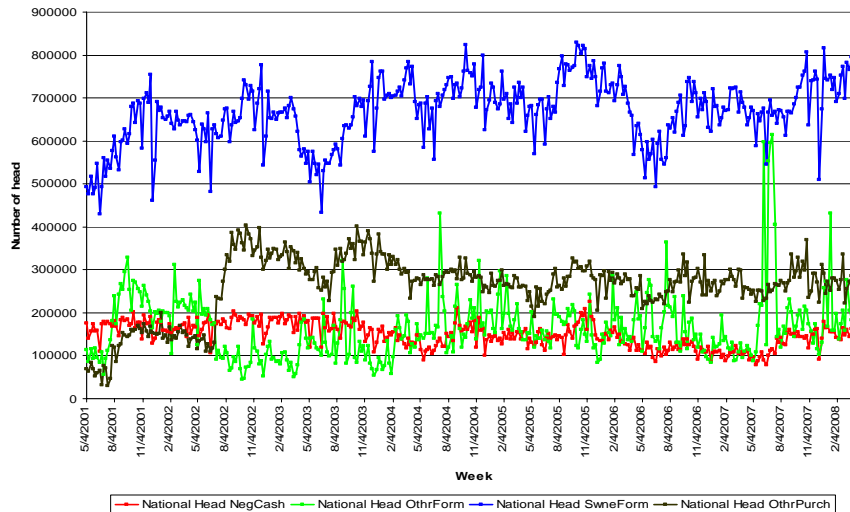
Hogs – Figure 2 shows comparable weekly purchases of slaughter hogs by packers for AMAs.

The situation in hogs differs markedly from fed cattle, as is evident from Figures 1 and 2. Swine formula trades dominate slaughter hog procurement, typically representing about 55% of total hog procurement. Cash market purchases accounted for 9.5% to 15.5% annually, with the average in 2007-08 being 10.3%. Other formula purchases and other purchases accounted for just under a third of hog purchases on average over the seven years.

Procurement Price Differences for AMAs from 2001-2008

The extent of purchases by procurement method is indeed important. However, the focus

Figure 2. Weekly hog procurement by AMA (number of head), May 2001 to May 2008

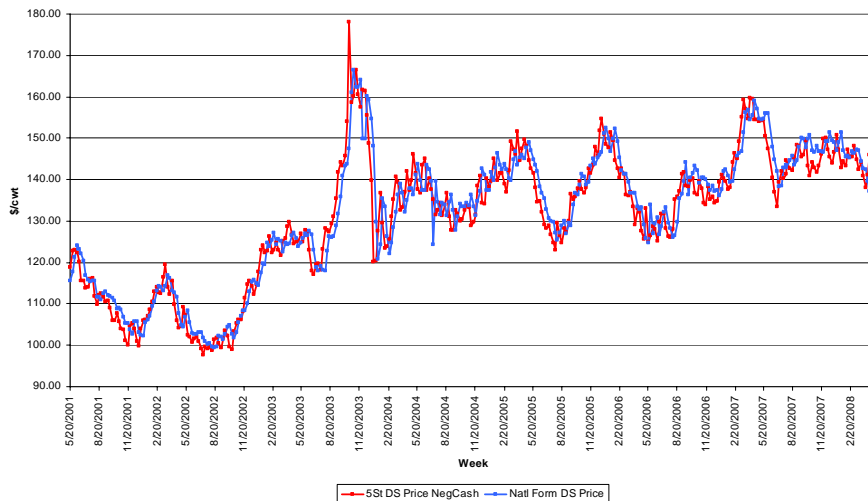


of this paper is on prices paid by procurement methods, especially price differences and week-to-week changes in prices and price differences. In all cases, I assume cash market trades are the base or standard for comparison purposes.

Fed cattle – Weekly average prices paid for fed cattle by packers are shown in Figure 3 for cash market purchases compared with formula trades. Two points are relevant. First, the two price series track very closely with each other, thus both reflecting equally well, supply-demand market conditions.

The gap between the two series is quite consistent upon cursory examination. That consistency is not surprising since formula priced fed cattle delivered this week for slaughter are tied to cash market prices last week in most cases. Formulas are tied to a quoted market price, such as the five-state weighted average, or to a plant average price (cost) last week for cattle delivered to the plant where formula priced cattle are harvested. Therefore, formula prices and cash market prices should track very closely, as they appear to do in Figure 3.

Figure 3. Fed cattle price differences: formula trades compared with cash, May 2001 to May 2008



Upon closer examination, the difference between formula prices and cash market prices differs in rising and falling markets. This difference will be addressed later.

Figure 4 shows cash market prices compared with forward contract prices for fed cattle. Again, the two price series appear to track reasonably closely, but not as closely as the previous comparison. Larger gaps are evident between cash market prices and forward contract prices. Again, there is an explanation for the price differences. Cattle feeders can forward contract cattle virtually anytime between when they are placed on feed and up to two weeks prior to harvest. Most forward contracts are basis contracts, thus tied to the futures market price. Between the time of contracting and harvest, feeders chose when they believe the futures market has peaked and cattle are priced at that point. Thus, Figure 4 represents more of an apples and oranges comparison than for formula trades compared with cash market prices. Fed cattle prices this week for forward contracted cattle may include cattle priced anytime over the past six months, not just those priced in the last couple weeks.

Figure 4. Fed cattle price differences: forward contracts compared with cash, May 2001 to May 2008

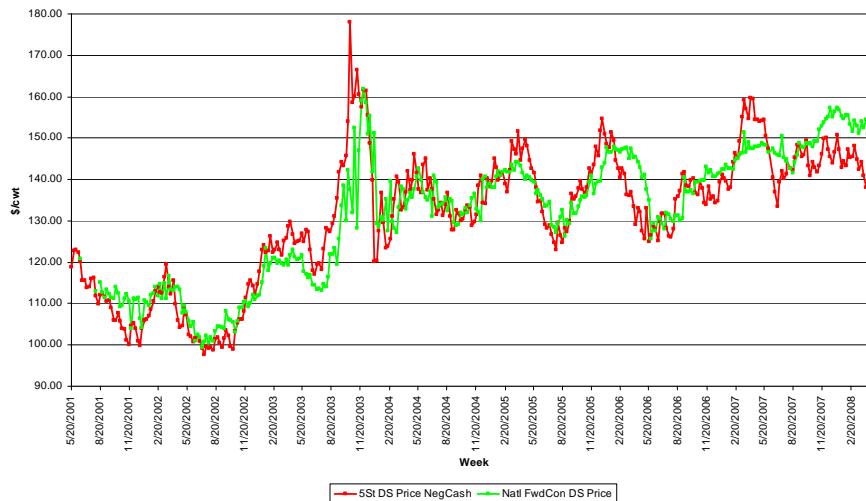
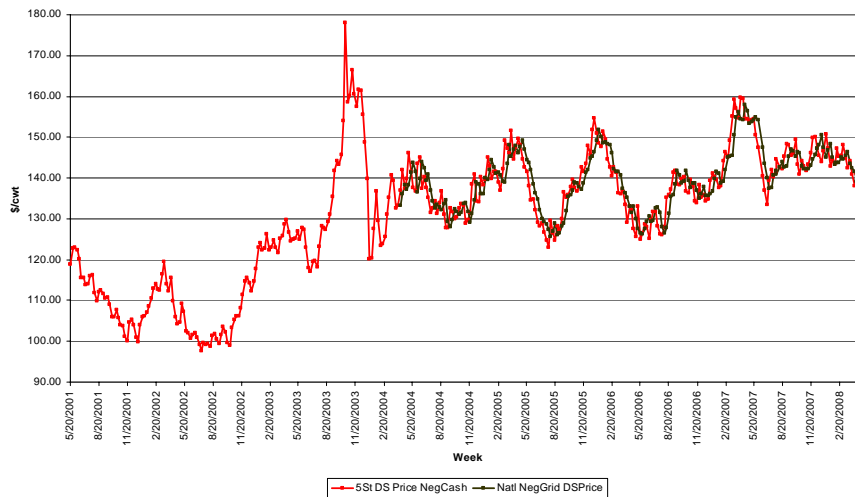


Figure 5 shows cash market prices compared with negotiated grid prices. Given considerable concern over formula pricing of fed cattle but an interest in value-based pricing (i.e., grid pricing), several in the industry expressed an interest in negotiating the base price in grid pricing transactions as an alternative to formula pricing. Negotiated grid prices were added to mandatory price reports in 2004. Figure 5 shows that negotiated grid prices track cash market prices closely, much like formula trades and cash market prices. In fact, in 2007-08, the average price difference between negotiated prices and cash market prices was \$0.11/cwt in favor of cash prices.

Mean differences in prices by year were tested with a t test. In each case the price difference variable was cash market price less AMA price. Results summarized were

- Cash- Formula – Not significant, 4 years; Negative and significant, 3 years
- Cash-Forward – Not significant, 3 years; Negative and significant, 3 years; Positive and significant, 1 year

Figure 5. Fed cattle price differences: negotiated grid compared with cash, May 201 to May 2008



- Cash-Negotiated grid – Not significant, 5 years; Positive and significant, 1 (partial) year.

Hogs – Figure 6 shows cash market prices for slaughter barrows and gilts compared with hogs purchased on some type of swine market formula. Formula prices may be tied to a cash market quote, plant average cost (price), and may be tied to the wholesale pork market such as the boxed pork cutout value. As is clearly evident from Figure 6, cash and swine market formula prices are nearly indistinguishable. Over the seven-year period, price differences averaged just \$0.18/cwt.

Price differences between cash market prices and other formula prices are shown in Figure 7. Significant differences can be noted immediately. The two series do not track as closely as cash and swine market formulas. Other market formulas are usually tied to the futures market, thus are comparable to the comparison for fed cattle between cash market prices and forward contracts. As with fed cattle, part of the explanation for the considerable gaps may be

Figure 6. Hog price differences: swine formula trades compared with cash, May 2001 to May 2008

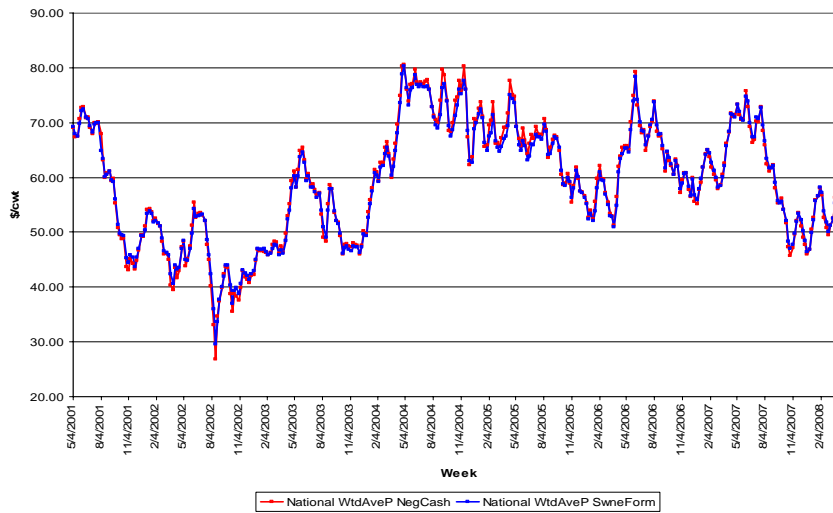
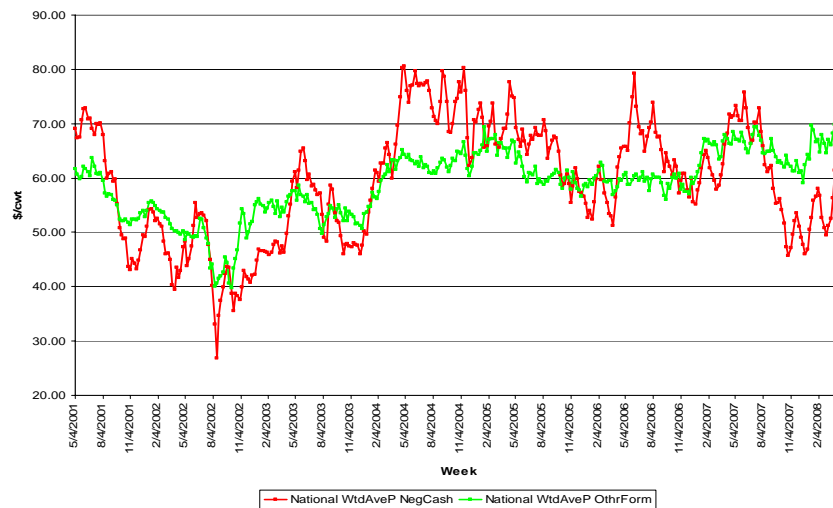


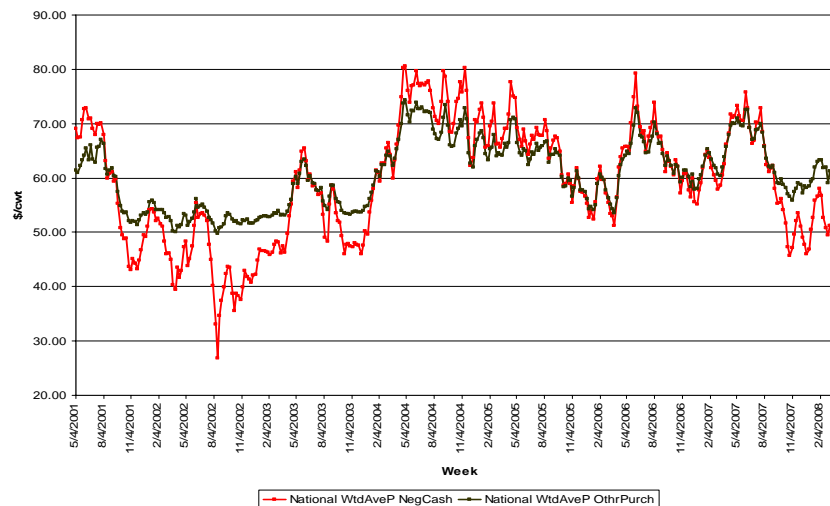
Figure 7. Hog price differences: other formula trades compared with cash, May 2001 to May 2008



when price is actually discovered via the formula and market prices at the time hogs are harvested. Formula prices tied to the futures market are intended to reduce price risk; and variability in other formula prices is significantly less than that for cash market prices.

The relationship between cash market prices and other procurement methods is similar to that just discussed, as shown in Figure 8. At times over the seven-year period, there were significant differences between cash market prices and prices for hogs under alternative purchasing arrangements. Other purchase arrangements may include window or ledger contracts and cost of production contracts. Thus, the intent is to reduce risk and potentially stabilize prices and returns, both of which may be accomplished based on Figure 8.

Figure 8. Hog price differences: other purchases compared with cash, May 2001 to May 2008



Mean differences in prices paid for hogs by year were tested with a t test. In each case, the price difference variable was cash market price less AMA price. Results summarized were

- Cash- Swine market formula – Not significant, 1 year; Negative and significant, 2 years; Positive and significant, 4 years
- Cash-Other formula – Not significant, 1 year; Negative and significant, 3 years; Positive and significant, 3 years

- Cash-Other purchase arrangements – Not significant, 1 year; Negative and significant, 3 years; Positive and significant, 3 years.

Summary – Clearly, data show prices for some procurement methods track cash market prices more closely than others, both for fed cattle and hogs. How some pricing methods operate can explain part of the difference but more detail would have to be known to more fully understand why some prices deviate more from cash prices than others.

Significantly, for this paper's purpose, there is no strong evidence one procurement method has consistently higher or lower prices than others. Yearly averages do not consistently favor one procurement method over another, both for fed cattle and hogs.

First Differences of Procurement Price Differences for AMAs from 2001-2008

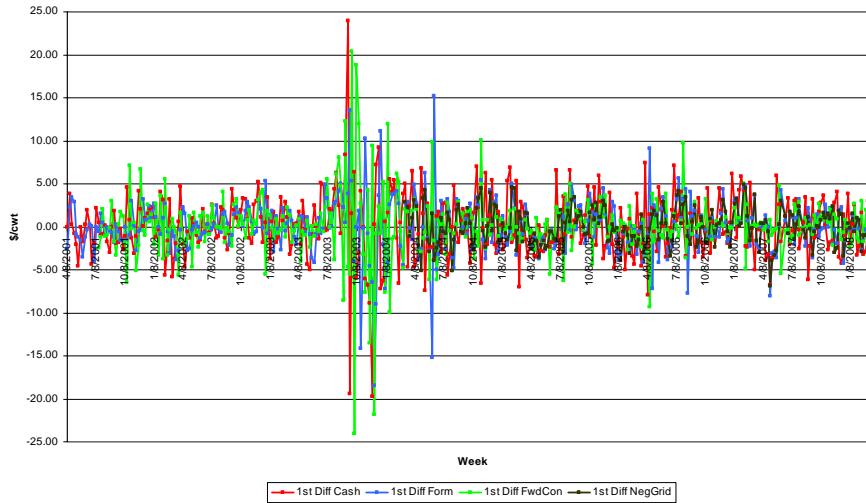
Of immediate interest for prices by AMAs is the difference in prices between cash market prices and AMAs, as discussed and shown above. First differences of the pricing method differences were examined to see if prices behaved differently for week-to-week changes in price differences between AMAs.

Fed cattle – Figure 9 shows first differences for each of the price difference series discussed above. Considerable week-to-week variability exists, especially during a sharp run-up in fed cattle prices in 2003. Though somewhat difficult to see from the figure, no apparent patterns are evident for one price difference series or another.

First difference means of price difference series were tested for each year with a t test. No significant differences were found across years for any of the price difference series.

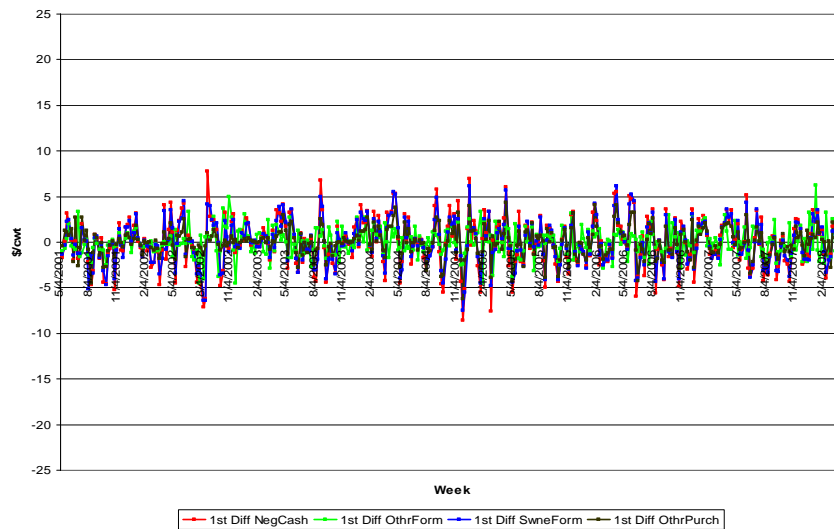
Hogs – Figure 10 shows comparable first differences for each price difference series for hogs over the seven-year period. First differences occurred in a narrower trading range and appear more uniform across price difference series than for fed cattle. Again, no unusual trading pattern

Figure 9. First differences for fed cattle AMAs, May 2001 to May 2008



appears to exist. And t tests of first differences means of the price difference series were not statistically significant.

Figure 10. First differences for hog AMAs, May 2001 to May 2008



Price Differences for AMAs in Rising and Falling Markets from 2001-2008

In several of the price difference comparisons, there appeared to be a difference between leading and lagging series when market prices trended up or down. Thus, the following regression model in implicit form was estimated for each price difference series.

$$(1) \text{ Weekly price difference} = f(\text{upward trend, downward trend, seasonality})$$

where the price difference in each case was cash market price less AMA price, upward and downward trends were defined as three consecutive week-to-week positive (upward) or negative (downward) movement in price differences, and seasonality was included as monthly dummy variables.

Seasonal dummy variables were significant in only one price difference series for fed cattle (cash-forward contract) and one for hogs (cash-other formula). In all six estimations (three for fed cattle and three for hogs), the upward trend variable was positive and significant and the downward trend variable was negative and significant. Therefore, cash prices led AMA prices in upward trending markets and trailed AMA prices in downward trending markets.

Implications and Conclusions

To the author's knowledge, this is the first attempt to identify preferential pricing patterns in mandatory price report series since passage of the Livestock Mandatory Reporting Act. Was there evidence of preferential pricing in weekly price data for AMAs over the past seven years (2001-2008)? Nothing obvious was identified.

Can preferential pricing be ruled out as a result of this analysis? Certainly not. A major weakness is attempting to identify preferential pricing in weekly price data. It is likely that preferential pricing might only be found with daily reported prices, or most likely, with actual transaction prices between packers and cattle feeders or hog producers.

What can be concluded is that for fed cattle, prices by AMAs track cash market prices relatively closely with the exception of forward contracts. For hogs, swine market formula arrangements track cash market prices very closely, though other formula arrangements and other procurement method prices do not. Both for cattle and hogs, arrangements that include some sort of price risk management element, do not track cash market prices as well as those that simply facilitate price discovery tied to the cash market.

Also, no procurement method consistently pays higher or lower prices than another. Yearly averages showed some procurement methods are better in some years, poorer in others, and not significantly different in others, both for fed cattle and hogs.

Because of the nature of formula arrangements, especially those which are tied directly to the cash market, differences exist in price deviations from cash prices. Indeed, for all AMAs, cash market prices lead other procurement method prices in rising markets and trail them in declining markets.

Lastly, a couple statements can be said about the extent of AMAs vs negotiated cash prices. For fed cattle, the primary tradeoff is between formula arrangements and cash market procurement. And no discernable upward trend is evident regarding use of AMAs. For hogs, swine market formula pricing dominates cash market pricing. No strong trend exists in greater use of formula pricing relative to cash market pricing, though a weak downward trend in cash market procurement is evident over the seven-year period.

References

Capps, Oral, Jr., H. Alan Love, Gary W. Williams, and Wendi L. Adams. "Examining Packer Choice of Slaughter Cattle Procurement and Pricing Methods." *Agricultural and Resource Economics Review* 28(1999):11-25.

Crespi, John M. and Richard J. Sexton. "Bidding for Cattle in the Texas Panhandle." *American Journal of Agricultural Economics*. 86,3(2004):660-74.

Crespi, John M. and Richard J. Sexton. "A Multinomial Logit Framework to Estimate Bid Shading in Procurement Auctions: Application to Cattle Sales in the Texas Panhandle." *Review of Industrial Organization*. 27(November 2005):253-78.

Hunnicut, Lynn, DeeVon.Bailey, and Michelle Crook. "Rigidity in Packer-Feeder Relationships." *Journal of Agricultural and Applied Economics*. 36,3(2004):627-38.

Muth, Mary K., Yanyan Liu, Stephen R. Koontz, and John D. Lawrence. "Differences in Prices and Price Risk Across Alternative Marketing Arrangements Used in the Fed Cattle Industry." *Journal of Agricultural and Resource Economics* 33,1(2008):118-135.

Perry, Janet, James MacDonald, Ken. Nelson, William. Hahn, Carlos Arnade, and Gerald Plato. *Did the Mandatory Requirement Aid the Market? Impact of the Livestock Mandatory Reporting Act*. USDA Economic Research Service, LDP-M-135-01, September 2005.

Schroeter, John R. and Azzeddine Azzam. "Captive Supplies and the Spot Market Price of Fed Cattle: The Plant-Level Relationship." *Agribusiness* 19,4(2003):489-504.

Schroeter, John R. and Azzeddine Azzam. "Captive Supplies and Cash Market Prices for Fed Cattle: The Role of Delivery Timing Incentives." *Agribusiness* 20,3(2004):347-62.

Ward, Clement E. *An Assessment of the Livestock Mandatory Reporting Act*. Oklahoma Cooperative Extension Service, Oklahoma State University, AGEC-606, July 2006

Ward, Clement E., Stephen R. Koontz, and Ted C. Schroeder. "Impacts from Captive Supplies on Fed Cattle Transaction Prices." *Journal of Agricultural and Resource Economics* 23(1998):249-514.