Journal of Agricultural & Food Industrial Organization

Volume 9 2011 *Article* 9

Livestock Mandatory Price Reporting: A Literature Review and Synthesis of Related Market Information Research

Stephen R. Koontz, *Colorado State University*
Clement E. Ward, *Oklahoma State University*

Recommended Citation:
Koontz, Stephen R. and Ward, Clement E. (2011) "Livestock Mandatory Price Reporting: A Literature Review and Synthesis of Related Market Information Research," *Journal of Agricultural & Food Industrial Organization*: Vol. 9: Iss. 1, Article 9.
Available at: http://www.bepress.com/jafio/vol9/iss1/art9
DOI: 10.2202/1542-0485.1254

Livestock Mandatory Price Reporting: A Literature Review and Synthesis of Related Market Information Research

Stephen R. Koontz and Clement E. Ward

Abstract

Congress passed into law the Livestock Mandatory Reporting Act in 1999 and a mandatory pricing reporting system for livestock and meat began in 2001. The implementation was problematic. It is also difficult to find any research prior to the legislation that demonstrated inadequacies in the voluntary price reporting system that had been in existence since the Agricultural Marketing Act of 1946. Thus, there is little evidence upon which to evaluate the new system. Available research suggests mandatory price reporting increased transparency and information at the national level and across cash and non-cash market choices, reduced price information in regional markets, and increased spatial and vertical market integration. Research shows diverse opinions on the success of the new system. Research also shows the potential for retail meat scanner data to significantly improve the accuracy of reported retail meat prices. Related research suggests clear benefits of the new system will be hard to measure. A primary conclusion from the literature is that benefits were unforeseen and unintended consequences were large. And that continued cost/benefit oriented research of the policy and legislation would be useful.

KEYWORDS: mandatory price reporting, livestock, meat, market information, voluntary price reporting, literature review

Author Notes: Stephen R. Koontz is Associate Professor and Extension Specialist, Department of Agricultural and Resource Economics, Colorado State University (stephen.koontz@colostate.edu); Clement E. Ward is Professor and Extension Economist, Department of Agricultural Economics, Oklahoma State University (clement.ward@okstate.edu).

1. Introduction

Structural trends within livestock and meat markets over the past four decades have led to often contentious debate of economic and policy issues related to competition, thin markets, market transparency, and price discovery. While mandatory price reporting (MPR) was mentioned as a policy option from the late 1960s to the late 1970s (see, e.g., discussions in Hayenga 1979 and Hayenga, Johnson, and Marion 1980), it received little attention for the next two decades. Much of the thinking about price reporting changed in 1999. Strong populist support led to Congressional passage of the Livestock Mandatory Reporting Act (LMRA). The Act mandated that the USDA Agricultural Marketing Service (AMS) implement a new and mandatory system of price reporting for many livestock and meat products, which it did in April 2001.

Livestock price reporting has been a service provided by the AMS since 1946. (See Becker 2006 for a brief legislative history of price reporting.) Prices were reported voluntarily by buyers and sellers to AMS Market News reporters. AMS required confirmation by the other side of any trade for the transaction to be considered in market summaries. AMS reporters were involved in communicating with a large number of market participants and in attempting to provide a useful summary of market prices.

As we discuss in this paper, there was no published research supporting a need for the change from a voluntary to mandatory price reporting system. There was anecdotal evidence but we found no analysis. Questions related to the documented need and possible outcome of mandatory price reporting did not much enter the policy discussion. What could MPR accomplish? At what cost? What were likely gains? What might be lost? What known problems could be resolved? What might be the unintended consequences?

Interestingly, many of these questions remain open and the MPR issue remains important. LMRA was reauthorized in 2010 but will expire in September 2015 – and will then likely have another sunset. Many panel leaders from the U.S. Department of Justice and the USDA asked many panel participants about their perception of livestock and meat market transparency at the "Public Workshop Exploring Competition Issues in Agriculture: Livestock Workshop" in Fort Collins, Colorado, on August 27, 2010 (see USDOJ-USDA August 2010). Finally, changes to the Act are anticipated to be part of the future Farm Bill discussions. There is a developing literature related to mandatory price reporting. As expected, some passage of time was needed for secondary data to be accumulated so that common econometric research methods could be employed. But big questions remain. What has mandatory price reporting accomplished? What are the benefits and what are the costs? Do the livestock and meat markets

perform better? Do producers benefit? And how extensive have been the unintended consequences?

The objectives of this survey of literature include: Discuss the research prior to passage of the LMRA; Review assessment research completed since implementation of the LMRA; Identify related research on information like that provided through the LMRA and its relevance for market performance; and Suggest needed policy and further research. The goal is also to provide a broad synthesis of research both on the MPR topic and present a perspective related to what other research might contribute to the issue. There is much interesting existing work that can be synthesized but many remaining questions.

2. Research Prior to Mandatory Price Reporting

A review of the literature prior to the passage of the LMRA reveals no published research identifying voluntary price reporting as a problem. Thus, there appears to be a major change in price reporting policy without supporting scientific evidence that the change was needed. However, the literature has many examples of research on pricing issues. It is not possible to prove a negative – the complete absence of this research – but our intent is to briefly identify organizations which focused on pricing research and offer a perspective of that focus.

Snapshots into the thinking by agricultural economists prior to 1980 on pricing issues are well-illustrated within Marion (1976), Hayenga (1979), and Hayenga, Johnson, and Marion (1980). These were results from the USDA regional research committee N.C.-117.[1] These edited works were for the most part papers by experienced researchers and were literature reviews, original applied research, issues discussion, and position papers. Concerns about livestock and meat markets were clearly focused on vertical coordination, thin markets, and questions of market power. Discussions as related to pricing systems were largely conceptual. Researchers raised questions about thin markets and potential problems with limited price reporting. Researchers also raised questions about vertical coordination and appropriate coordinating mechanisms. However, no research was found that examined specifically the adequacy of voluntary price reporting.

Some of the earliest discussion of mandatory price reporting was done in the U.S. National Commission on Food Marketing (1966). Helmberger, Campbell, and Dodson (1981) discuss this aspect of the commission's report. But they, Tomek and Robinson (1977), Upchurch (1977), and Bonnen (1977) make no reference to any literature examining problems with voluntary price reporting or demonstrating the need for mandatory price reporting. This is important as these

[1] Work published through N.C.-117 can be found on the website of the Food Systems Research Group at the University of Wisconsin.

four works are comprehensive literature reviews of agricultural economics research on market performance, price analysis, and data from the 1940s through the 1970s.

After 1980, the literature on issues within the livestock and meat industries decidedly broadened. The industrialization of agriculture and food systems resulted in broader policy, strategy, and food safety interests. Notable projects in this period included the N.E.-165 (see Cotterill 1993 and Caswell and Cotterill 1996) and the Food and Agricultural Marketing Consortium (see Padberg 1993 & 1994). The project focused most on livestock and meat pricing issues was the Research Institute on Livestock Pricing at Virginia Tech (see Purcell and Rowsell 1987, and Purcell 1990, 1992, and 1997a).[2] Research from the institute looked at meat demand (e.g., Purcell 1998a&b), price discovery (e.g., Schroeder et al. 1997), and vertical coordination (e.g., Lawrence, Schroeder, and Hayenga 2001 and Ward 2009). All of these organizations were important outlets for pricing research leading up to MPR. And a reading of this literature simply does not lead one to conclude that voluntary price reporting was inadequate.

Three articles were written when mandatory price reporting was being considered. One was published shortly after the LMRA was implemented and the other two were published two years later.

Strategic Response – Wachenheim and DeVuyst (2001) discussed the perceived need for mandatory price reporting. They cite the "widespread, albeit incomplete, agreement that the current system does not provide the necessary level of price transparency." (p.180). They cite USDA estimates that 35-40% of cattle, 75% of hog, and 40% of lamb transactions were not being reported. Our question is does it matter? Statisticians rarely work with a census but rather with a sample. What percentage is needed to achieve the desired degree of accuracy in reported prices? This question was raised thirty years ago (see Hayenga 1979) and has not been answered. What evidence was there that reported prices were unacceptably inaccurate? Without an answer to this question then there is little concrete evidence of how mandatory price reporting could be evaluated post-implementation.

Wachenheim and DeVuyst spend most of their article discussing a significant potential disadvantage of MPR. Specifically, they focus on the possible strategic behavior of buyers in a highly concentrated market, notably the potential for noncompetitive behavior among the few large buyers. They note that greater transparency may assist firms to behave noncompetitively by speeding the flow of information among the few firms and providing rapid access

[2] Work published through the Research Institute on Livestock Pricing at Virginia Tech can be found on the website of the North American Institute for Beef Economic Research (NAIBER) at Kansas State University.

to price data of rivals.[3] While correct if such detail were included in mandatory reports, guidelines regarding confidentiality mitigated some of the concerns raised regarding cooperative behavior from mandatory price reporting. Confidentiality itself became an immediate issue when the LMRA was implemented as will be noted shortly. Wachenheim and DeVuyst close their article raising some pertinent questions about potential benefits and costs associated with implementing mandatory price reporting.

Vertical Market Effects – Azzam (2003) took a more theoretical approach to predicting the impacts of mandatory price reporting on producers, packers, and the market for livestock. His model consists of two subgroups of packers: low-cost dominant large packers and high-cost fringe or small packers. He shows that large firms benefit from information sharing via the mandatory pooling by USDA. However, he also concludes that mandatory price reporting could slow the trend toward increased concentration, thus having benefits also for small packers.

Overall, competition increases and industry performance improved under mandatory price reporting. Azzam argued that usefulness of the mandatory reports to cattle feeding businesses may not be in the value of reported information but in forcing packers to pool information at negligible marginal cost and increasing the derived demand for livestock. His conclusion is cited in post-Act assessment research as evidence of the expectation that mandatory price reporting would increase prices and reduce variance of reported prices. Both these findings are influenced, as will be seen, by messy implementation details.

Information Pooling and Collusion – Njorage (2003) extended Azzam's (2003) model by expanding on an assumption Azzam made regarding packers' having consistent conjectures. Njorage shows that mandatory price reports may enable packers to update asymmetric prior conjectures, thus leading to a convergence of posterior conjectures. That, in turn, increases their effectiveness for implementing noncompetitive pricing strategies.

Since individual packers with multiple plants likely had more price distribution information than what was being reported with voluntary price reporting, one might question how asymmetric were their prior conjectures. All the largest packers are multiple-plant firms and buy fed cattle from multiple feeding regions. Thus, packers have considerable data on the distribution of prices paid and for which they may surmise rivals are paying. Our understanding of the industry suggests packers are more knowledgeable of other packers behavior than Njorage may have assumed, leaning toward the assumption made by Azzam on consistency across packers in prior conjectures. Mandatory price reports may confirm what packers already suspect, but not likely changing priors substantively. However, their assumptions and our assessment ask for empirical

[3] Murphy (2008) showed that some information and analysis firms, specifically Informa Economics, perform a service similar to this for clients.

verification which to date has not been done. Therefore, Njorage, Azzam, and Wachenheim and DeVuyst raise relevant questions as to the extent to which mandatory price reporting may lead to increased collusion or competition among packers.

3. Direct Examination of the Need for Mandatory Price Reporting

One piece of research examined the need-for-MPR question directly. Koontz (1999) examined a private database containing closeout information on fed cattle transactions. The closeout data were national in scope and included about 20% of the cattle traded in the U.S. during the 1986-1993 sample time period. The closeout information contained transaction prices and weights but no carcass quality information.[4] From the closeout information, fed cattle transaction prices were calculated for the reported weight groups and AMS regions. For any given day, the transaction price distribution had a very large measure of dispersion relative to the AMS reported price range. One main question yet to be answered is what is a market price? For example, an AMS reported price during the voluntary period may be $76.50-78.50/cwt but less than 15% of the transactions may have been in that range. Eighty percent of the transactions may have been from $71.25-80.25/cwt. This was not unusual. And there always remained 20% of the transactions that were well below this larger range and a few very high-priced transactions. What is the market price when the transaction range is easily 20% of the average price? The distributions were also highly negatively skewed – most of the prices are bunched in the high portion of the range with a long tail that captured the large percentage of transactions that were some discount to the higher prices. Any statistic that summarizes the average price without some measure of dispersion and skewness may not be informative in livestock markets.

The main objective of the work was to examine for evidence of selective price reporting. Under the voluntary system, the AMS policy was not to include transactions in reported prices if not confirmed by both sides. So models were used to examine the probability of individual transaction prices being within, below and above the AMS reported range. Was there evidence of asymmetries in reporting? For example, did the asymmetries favor the packer with lower prices or favor the cattle feeder with higher prices? The bottom line was that significant asymmetries were present and favored the packer, but only slightly. There was also significant evidence of cattle feeders underreporting lower prices and over reporting higher prices. The conclusion was that strategic behavior was implemented by both meatpackers and cattle feeders.

[4] The work was not published because of the lack of pen quality information and lack of information on whether the transaction was a non-cash transaction – for example, a forward contract or not.

Koontz (1999) also discussed how selective reporting was confounded with any filtering or interpretation by market news reporters. AMS reported prices appeared to be slow to reveal changing market conditions and prices – both increases and decreases. There were a significant number of higher and lower priced transactions that were outside the reported range prior to the range increasing or decreasing. This may in part be due to the filtering of the leading changes by market reporters or selective reporting by market participants. But provided there was no bias in the filtering, then again the strategic behavior was seen to slightly favor packers. Another interesting result is that, while the reporting of changing conditions may be slow in the cash market, the presence of a futures market for fed cattle helps reveal these eminent changes. The futures market improves the competitiveness and limits the possible strategic behavior in the cash market. Discussions of MPR, both policy and research, have not recognized this spillover. In fact, many policy discussions of the futures market refer to the packers' asymmetric knowledge of the underlying cash market conditions, relative to cattle producers, and infer the potential to manipulate the underlying futures market (see, e.g., testimony of Williams and Breimeyer in Part 1 of U.S. 95th Congress 1977, R-CALF USA 2010, and McEowen 2010).

Because of the strategic reporting, the answer to the question in the paper's title was yes, mandatory pricing reporting was needed. But the answer was from a conceptual perspective. The paper did not perform a cost/benefit analysis. We do not know if strategic reporting impacted market prices substantively. But microeconomic theory is clear about pricing systems in that incorrect market prices lead to losses in economic welfare and efficiency. Further, the simple question has also not been answered: what is a market price?

4. Congressional Information and Grass-Roots Positions

A review of statements at Congressional Hearings on agricultural industry structure and a review of statements by grass-roots producers groups are also interesting. We think little has changed in 30-to-40 years and in some cases strong positions are taken based on no scientific evidence.

From early 1977 through mid-1980, the Subcommittee on SBA and SBIC Authority and General Small Business Problems, within the Committee on Small Business, U.S. House of Representatives, held 18 days of hearings under entitled, "Small Business Problems in the Marketing of Meat and Other Commodities." There was a seven part series of the hearings published by the subcommittee (see U.S. 95th Congress, multiple dates 1977-1980). The committee staff also published a report on those hearings with the same title in October 1980 (see U.S. 95th Congress 1980). The hearings and report discuss many potential problems within the livestock and meat industry markets. The most prevalent was formula

pricing in thin markets. Mandatory price reporting was mentioned (see Williams's testimony in Part 1 of U.S. 95th Congress 1977) but only as a choice within a long list of potential policy actions.

The focus of the hearings, from a price reporting perspective, was clearly on the thinness of price reporting in wholesale beef markets and the use of those reports in formula trading of wholesale beef. The outcome of those hearings, again from a price reporting perspective, was the development of boxed beef price reporting by the USDA AMS (See USDA 1979a&b). This outcome is interesting because it is difficult to identify a similar outcome from a review of subsequent hearings. And, the reliance on research appears also to be unique.

Congress has a persistent interest in concentration and market power within the livestock and meat industries and holds periodic hearings. A representative example, some 10 years after the SBA and SBIC hearings, was that on July 20, 1990, the Subcommittee on Nutrition and Investigations of the Committee on Agriculture, Nutrition, and Forestry, U.S. Senate held a hearing entitled, "Economic Concentration in the Meatpacking Industry." (See U.S. 101st Congress 1990.) A similar list of issues and concerns were discussed but with a notable absence of concerns regarding price reporting. A review of twenty-plus Congressional hearings simply finds practically no discussion of problems with voluntary price reporting and the need for mandatory price reporting.

When Congress held hearings regarding the LMRA – on April 29, 1999, the Subcommittee on Livestock and Horticulture of the Committee on Agriculture, U.S. House of Representatives held a hearing entitled, "Mandatory Price Reporting for Livestock" – it is apparent from the testimony that the legislation was impending and that the participants at the hearing had met earlier to discuss execution of the policy.[5] (See U.S. 106th Congress 1999.)

The most well-known grass-roots position on livestock mandatory price reporting has circulated email lists and web postings for a number of years before and after the passage of legislation. The original press release from the Western Organization of Resource Councils (WORC) was entitled, "Ranchers Say Secret Cattle Deals Cost Millions" and was released September 8, 1998. Other versions of the release – as found on other websites – replace "secret deals" with "sweet deals" or "sweetheart deals." WORC, R-CALF USA (Ranchers and Cattlemen's Action Legal Fund United Stockgrowers of America), and the Organization for Competitive Markets (OCM) were the grass-roots groups most well known to be involved in circulating this position.[6] However, there is no referenced research,

[5] There were two other hearings by the same committee held prior to passage of the LMRA where MPR was discussed – "Livestock Prices" on February 10, 1999 and "Agribusiness Consolidation" on February 11, 1999 – but no evidence supporting the need for MPR was presented.

[6] Rhetoric on sweetheart deals continues. See, e.g., CattleNetwork webpage, "South Dakota Livestock Producers Optimistic About Updating Act," 6/23/2010.

and no peer-reviewed scientific research, upon which this position was taken. From a scientific perspective, there was no evidence presented to support this position. Also from a scientific perspective, this question remains a potentially good research opportunity: from where does this position originate? Likewise, what are the specific continuing concerns with transparency within markets with mandatory price reporting? (See USDOJ-USDA August 2010.)

5. Implementation of Mandatory Price Reporting

The implementation of MPR was simple in concept. Prior to the LMRA, price reporting was voluntary. USDA AMS market reporters would contact buyers and sellers of livestock and meat. It was AMS policy that for a price to be considered for reporting, it needed to be confirmed by the opposite side of the transaction. Market reporters then had some degree of flexibility in determining if the price was representative. Ultimately, price ranges were reported. After the LMRA, almost all transactions of appropriate grades and standards were used to construct weighted average prices. Since reporting was mandatory, only meatpacking firms were contacted and contact was performed through electronic means. Packers of certain large size were required to participate. AMS personnel worked with packing company personnel to automate communication. Queries access transactions databases at each packer to obtain the appropriate price information. However, MPR does more than report the cash market. In addition to complete reporting of cash transactions, terms of trade – prices – and volumes are also obtained for non-cash market transactions: forward contracts, and marketing agreements. Also the volumes, but not prices, of packer owned cattle are reported. So MPR involves the collection of all cash market transactions and new information on non-cash market transactions.

Under the voluntary price reporting system it was that forward contracts, marketing agreements, and packer owned cattle were considered by the AMS to be private treaties and outside of the purview of reporting the cash market. These transactions were the 30-40% that Wachenheim and DeVuyst identify as not reported. They are not the cash market. They are alternatives to the cash market. However, under MPR many terms of trade of these transactions are reported.

Before turning to available evaluative research, some discussion of the implementation of the LMRA is worthwhile. (Heykoop 2001 provides an interesting and more detailed discussion of the original law and its implementation problems.) AMS price reports can be accessed at http://www.ams.usda.gov/lsmnpubs/. While a few reports were modified or added some time following initial implementation of MPR, most were available with advent of the new system. For people who make use of this data, the website itself is a substantive improvement on how the AMS provides information.

Reports are readily available in electronic format. Further, histories can be constructed from the archive. At a minimum, MPR is a technological update of AMS and the information that the agency provides. The authors view this as much needed progress – though failure to improve the use of technology is not necessarily a fault of the agency. AMS provides an important function as evidenced by the LMRA itself and has generally not been well-supported by administrations and policy makers.[7]

Two reactions were immediate from the new reports. First, it was difficult to find information directly comparable to voluntary price reporting. Some types of information were discontinued, especially some regional market reports. Discontinuity of data series is an inconvenience for researchers but difficulty in finding comparable information readily used by industry participants is likely more serious. Sometimes the information format was changed, but the data series remained reasonably comparable to that under voluntary reporting. Changes created minor or major disruptions in data and information market participants may have used regularly. Some information was new and not comparable with anything in the previous system.

Second, many reports were not available due to confidentiality conflicts. Non-reportable reports were one of two serious problems created by MPR. Initially, AMS instituted a 3/60 rule regarding confidentiality. Data were reported only if at least three firms supplied the data and no single entity accounted for 60% or more of the data for each respective reporting period. With regional and national four-firm concentration ratios in steer and heifer slaughter over 75%, many fed cattle price reports were unavailable. AMS revised its 3/60 rule and create a 3/70/20 rule. For the preceding 60 days, at least three firms must be reporting transactions 50% of the time. No single firm can have 70% or more of all trades in a reporting period. And no single firm can be the sole reporting firm 20% of the time. This modification greatly reduced non-reporting problems created by the initial confidentiality rule. Grunewald, Schroeder, and Ward (2004) found that 81% of regional and national, daily afternoon fed cattle reports from April 2 to August 17, 2001, were withheld. After the confidentiality rule change, all such reports were reported between August 20, 2001 and April 2, 2002.

[7] We say this based on what happened to the AMS during and following the Reagan Administration (see Purcell 1994 and 1997b). During this time period, federal government services were at times discussed as competing with private providers. Federal services were both reduced and some were turned over to state departments of agriculture. Regular budget problems experienced by states have resulted in further reductions and eliminations. For example, California provides no resources for the collection of price information or market news within that state. All market news is a federal service and is at a reduced real level compared to 1980.

Confidentiality issues appear to not be present under the voluntary system. AMS rules did not list any requirement and market participants may not have been concerned. Further, the filtering process that accompanies collection of information in the reporting process was human based in that it could be adapted to the market situation. Discussions with market news reporters revealed a commitment to "reporting the market price," or price range, and accurately representing "the market." Experienced market news reporters used a variety of information – most notably the daily discussions with multiple buyers and sellers. Within a computerized reporting system all the rules and contingencies are programmed. There is little flexibility that is not programmed. Further, once the rules are written down then AMS made them comply with Federal laws, rules, and guidelines.

A second problem surfaced shortly after moving to the mandatory system and this resulted in a lawsuit which went to trial in April 2006. For a six-week period, a software error at AMS underreported boxed beef prices.[8] While the software error was ultimately corrected, USDA made no known attempt to determine the number and extent of those adversely affected, or experiencing unforeseen gains, and to provide or suggest compensation associated with the errors. (See LMPR Review Team 2001.) These are clearly unintended consequences.

6. Evaluative Research since Mandatory Price Reporting

A growing body of research has addressed various aspects of mandatory price reporting. These are reviewed here in chronological order.

Feedlot Managers' Reaction – The first study involved a survey of cattle feeders located in Iowa, Nebraska, Kansas, and Texas in March 2002 (Grunewald, Schroeder, and Ward 2004). Feeders were asked several questions pertaining to mandatory price reports. Opinions varied widely. One key question was whether mandatory price reporting benefited the industry. Among respondents, 49% expressed some level of disagreement on a nine-point scale while another 28% expressed some level of agreement that MPR did benefit the industry. Areas of large commercial cattle feeders (Kansas and Texas) were more apt to disagree compared with an area characterized by smaller farmer feeders (Iowa). Certainly, responses must be evaluated relative to expectations for the move to a mandatory

[8] Losses to cattlemen were estimated at $42.8M and some producers alleged that the four largest packers knew of the errors and intentionally bid lower than market conditions warranted. A U.S. District Court ruled in favor of producers' allegations and jurors recommended fines of $9.25 million for three of the largest packers. In January 2008, an appellate court reversed the lower court verdict, stating that producers failed to prove packers intentionally manipulated or controlled prices.

system. Given other responses in the survey to questions on packer concentration and captive supplies, it can be argued farmer feeders and cattle producers in the upper Midwest were more concerned about voluntary price reporting than feeders and producers in the more concentrated cattle feeding areas. Regional differences regarding benefits from mandatory price reporting should be anticipated.

Feeders were asked if mandatory price reports increased information on fed cattle prices, base prices in grids, and boxed beef prices. Again, there was rather sharp disparity among respondents. Fifty-seven percent disagreed to some extent and 20% agreed. These reactions could have been affected by several factors: reduced reports for some regions, reduced timeliness of certain reports, and confidentiality problems immediately after implementing the LMRA.

A major reason for MPR was to have increased information for price discovery. Feeders were asked whether mandatory price reports enhanced their ability to negotiate cash market prices, base prices for grids, formulas, or premiums/discounts with packers. Nearly ¾'s of responses disagreed to some extent while only 10% agreed. As before, disagreement was more likely among feeders in Nebraska or Iowa, than in Kansas and Texas. Here also, the response is likely influenced by expectations developed as the proposed legislation was being debated.

Captive Supply Information – Ward (2004a&b) argued that mandatory price reporting increased information in some areas, though he focused on discussing captive supplies with the new data series and not on assessing the new system. In particular, he used data generated by MPR on prices and volumes of fed cattle purchases for 2001-2004 by packers using these alternative procurement methods. He argued that the new reports significantly improved the amount, type, and timeliness of data related to captive supplies compared with information available prior to implementing the mandatory system. Post-MPR data were available on fed cattle purchases by negotiated trading, formula trading, forward contracting, and packer owned cattle. This enabled comparing prices paid by packers across procurement methods, something which had only been possible after special data collection efforts by the Grain Inspection, Packers and Stockyards Administration (GIPSA) or using annual average data released by GIPSA with about a two-year delay. Thus, transparency was enhanced. It was our experience that reaction to the increased information was critical by some producers; especially those who expected more transparency than was possible given confidentiality requirements. These producers also expected large price differences between prices paid across procurement methods, reflecting perhaps expectations regarding "secret deals" between large packers and feeders, which were not evident in the data.

Interestingly, while Ward conducts analysis on "new" data, the skeptic recognizes there are no surprises or surprising results. Formula prices follow the

cash market with a one week delay and forward contract prices also follow the cash market but are more stable in that there are higher lows and lower highs. We suggest that mandatory price reporting was not needed to discover these facts.

Information Pooling and Collusion Analysis – Azzam and Salvador (2004) provide a unique test of the impact of MPR on collusive behavior by meatpackers. That work adapts a squared sales test from Jin (1996) and finds that the pooling of information required by MPR does not lead to collusive behavior in the five major fed cattle price reporting regions. The test is unique and specific. A risk adverse Cournot firm is better off participating in an information-sharing arrangement if its average squared sales decrease. Decreasing squared sales is evidence of collusive behavior precipitated by the information sharing. Azzam and Salvador find mainly increasing squared volumes and insignificant decreasing volumes in the five regions after MPR relative to before.

We find the specificity of the test useful but are unsure of the extension to the meatpacking industry. The cattle industry completed a substantial liquidation phase in 1998 and began cyclical rebuilding by the time MPR was instituted and this rebuilding phase is the majority of Azzam and Salvador's sample.[9] They model these convoluting factors with temporal variables but the quantity decisions within the cattle industry are some distance from the meatpacker. Packers in essence slaughter all animals marketed through the beef production system and price is the adjusting factor. The packing industry does not forego slaughter of available fed animals and cannot secure additional animals if the supplies available are inadequate. This, in one sense, is different from Jin.

Economic Research Service (ERS) Assessment – Research by ERS considered mandatory price reporting from several vantage points (Perry et al. 2005). They extended the work by Ward (2004a&b) with another year's data and findings were similar. Perry et al. suggested that MPR may have contributed to a reduction in formula trading and an increase in negotiated trading of fed cattle. While they did not prove a causal relationship, evidence supported their argument. However, given the benefit of additional time, that linkage likely can be dismissed. Formula pricing has increased while cash marketing trading has declined over the 2004-2010 period.

Perry et al. also examined price volatility before and after the implementation of MPR. They concluded prices were twice as volatile under the mandatory system, which was unexpected by the research team. These findings conflict with the expectations by Njoroge (2003) that mandatory price reporting would reduce volatility of slaughter livestock prices. A key to this disparity is

[9] Rebuilding requires reducing the number of animals in the meat system to increase the number in the breeding herd. Partial liquidation has also persisted through the rebuilding phase particularly with corn and energy price spikes in 2006 and thereafter. But this is outside of the sample period considered.

how voluntary versus mandatory price reporting operate. One explanation relates to the filtering or interpretive role of market reporters under voluntary reporting relative to the reduced filtering role with mandatory reporting. In the voluntary reporting system, market reporters would seek to report the bulk of trades, thus omitting extreme high and low prices. This was apparent in the Koontz (1999) study. In effect, this filtering would reduce both the range of prices reported and the variance of reported prices. Further, the result should have been anticipated given the AMS experience a few years earlier with hogs. There, AMS began reporting weighted average slaughter hog prices, which included the full range of observations. The effect was a wider price range and increased variability of reported prices. Thus, increased variability under mandatory reporting also relates in part to the interpretive role of market reporters and inclusion of the full range of prices being transacted.

USGAO Report for Congress – A U.S. Government Accountability Office (USGAO 2005) review focused on USDA's mandatory price reporting procedures, especially on the role of market reporters and audits of the packers reporting prices and volumes. They found that the filtering role of market reporters continued in the mandatory system, though it was much decreased compared with the voluntary system. Over a three-month sample period in 2005, market reporters omitted nearly 9% of cattle transactions which statistically altered the weighted average price over this period. For many users of the mandatory reports, this was a greater filtering role than was anticipated (USGAO). USDA's response was to improve their instructions to market reporters regarding the omission of market transactions (USGAO).

USDA audits of packers revealed that nearly ⅔'s of the time, errors were found in packers' reporting of prices (USGAO). While these represented a small (but unstated) percentage of trades, USGAO argued that USDA had not adequately addressed the misreporting by certain packers. USDA responded that steps had been taken to improve the audit process.

Retail Price Reporting – The 1999 LMRA directed USDA to develop a more representative measure of retail meat prices. Lensing and Purcell (2006) compared the well-known retail meat prices reported by the Bureau of Labor Statistics (BLS) with scanner-based prices, which included price featuring by retailers, that resulted from the mandatory price reporting mandate. Lensing and Purcell found that quantity-weighted, monthly average retail prices for five of six beef items were lower than BLS prices. Quantity-weighted prices also had a higher variance for five of the six items. This is important because it is the BLS data that have been used in the research which employs retail meat prices. Likewise, it is the BLS data that are used to calculate farm-to-retail and wholesale-to-retail price spreads. These spreads are used in discussions about the

changing structure and increasing concentration on the livestock industries.[10] Lensing and Purcell found that simple averaging of weekly prices to generate monthly average prices overstated prices and increased empirical own-price elasticity estimates.

Rojas, Andino, and Purcell (2008) also document the upward bias in BLS reported retail beef prices, the farm-to-retail and wholesale-to-retail beef price spreads. And further examine the responsiveness of retail beef prices to changes in the wholesale market conditions. The authors found the retail scanner prices were more responsive than prior research suggested. The posted price is simply not the price the consumer pays because retailers adjust the posted price through package and shopper-loyalty discounts.

All-in-all, provision of scanner data appeared to be a step toward improving retail meat price reporting and was a benefit of the LMRA.

Spatial Market Integration – Pendell and Schroeder (2006) explored how mandatory price reports affected spatial market integration of five regional fed cattle price series. The five markets are in the largest cattle feeding states (Colorado, Iowa-Southern Minnesota, Kansas, Nebraska, and Texas-Oklahoma). Cointegration was found for all pair-wise regional market relationships over about a 15-year period. However, the degree of integration changed. Following implementation of MPR, integration of price series for most regions strengthened. Thus, mandatory price reporting increased market integration as one might hypothesize from the pooled nature of mandatory reporting.

Timing Issue for Hog Pricing – To date, research has focused on fed cattle markets even though USDA statistics suggest that voluntary price reporting could be a bigger issue with hogs. We mentioned earlier that MPR eliminated some regional fed cattle market reports while increasing information on different packer procurement methods. This suggests a trade-off. A similar but potentially more serious trade-off was found by Grimes and Plain (2007).

Mandatory price reporting provided better market coverage and arguably more information for hog producers, but implementation appears to have opened the door to buyer behavior issues discussed by Wachenheim and DeVuyst (2001). The USDA releases three negotiated price reports daily under MPR. Grimes and Plain compared morning report prices to afternoon reports and prior day prices. Afternoon prices were greater than morning prices. Their explanation was that many marketing contract base prices are tied to the morning report, thereby giving packers an incentive to delay aggressive bidding for cash market hogs until after the morning report. Allegations have followed that producers and packers agree

[10] For example, the fifth and final U.S. Department of Justice – USDA Competition Workshop has the title, "Margins" on the Department of Justice website. Many of the presenters and panelist discussed farm-to-wholesale and farm-to-retail margins based on BLS data at the workshop. (See USDOJ-USDA December 2010).

on higher negotiated prices prior to the morning report data being submitted to USDA as long as the transactions were not reported until after the morning report data has been submitted.

Voluntary vs. Mandatory Reporting – Some states passed mandatory price reporting legislation before Congress passed the LMRA. Fausti, Diersen, and Qasmi (2007) and Fausti and Diersen (2004) examine spatial integration between a voluntary price reporting system (in Nebraska) and a mandatory system (in South Dakota). One part of their analysis addresses the question of whether the information content of the voluntary versus mandatory price reporting system was similar. They found no differences in the systems. A second part examined whether a thinning market adversely affected market competition. They found no evidence of anti-competitive practices, such as strategic price reporting in the voluntary system. The two markets were highly integrated and researchers conclude the voluntary system was providing adequate transparency. Thus, gains from MPR would appear minimal.

Vertical Price Transmission – In addition to Pendell and Schroeder's examination of spatial price relationships before and after MPR, Koontz (2007) examined the vertical relationship between the national fed cattle price and boxed beef cutout values. The work makes use of a standard price transmission models. These models are based on derived demand in that the value of fed cattle is largely determined by the value of beef animals in the meat. Fed cattle prices were modeled as a function of boxed beef prices, byproduct values, and live cattle futures prices.

Results suggest significantly different relationships between fed cattle prices and boxed beef cutout values before and after MPR. After MPR, boxed beef cutout values have a larger impact on fed cattle prices. A change in the boxed beef cutout value results in a larger change in fed cattle price and a faster adjustment to that new price. These results come from the regression coefficients. However, the regression error variances were also larger after MPR. Thus, while there is a stronger relationship between the two prices on average there is also more uncertainty. For example, a given boxed beef cutout value implies an expected fed cattle price but the confidence interval around the expected price was larger with MPR. These results are consistent with MPR providing increased transparency but also increased volatility.

Market and Welfare Effects – A theoretical model was developed by Njoroge et al. (2007) to account for both risk and collusive effects from increased transparency with MPR. They showed that increased information reduced the cost of uncertainty for packers generating social benefits, but enhanced collusive behavior, thus creating social costs. The net welfare effect depends on the magnitude of social benefits and costs. Njoroge et al. identify circumstances

which may result in either being larger and conclude that ultimately that this is an empirical question.

Grid Price Dispersion – Fausti et al. (2010) provide a unique contribution to the literature through examining the premiums and discounts priced into fed cattle marketed in the beef. The analysis was conducted with data prior to MPR and after MPR. The price premiums and discounts are referred to as grid pricing because the matrix that is used in most systems. Fed cattle are marketed not as liveweight but as beef carcasses and carcasses are graded across multiple criteria. Each criterion receives a specific premium or discount. USDA Quality Grade and Yield Grade premiums and discounts had been reported for years but generally show very little variation over time. Clearly, after MPR the variation in premiums and discounts were substantially larger. Therefore, MPR increased information on beef carcass price dispersion and substantially increased price transparency. This research showed this benefit of the MPR legislation.

Summary – There exists a growing number of studies on mandatory price reporting following implementation of the LMRA. Briefly, cattle feeders expressed some dissatisfaction with mandatory reporting initially, and there has been little change to the reporting policy once the initial problems were resolved. Research has clearly shown an increase in certain types of information, especially related to packer procurement methods. Research also shows an increased volatility in reported prices under the mandatory system. Increased volatility relates not to any theoretical issue between voluntary and mandatory systems, but is likely due to the role of market reporters in the voluntary and mandatory systems. Volatility may have increased, but so has spatial and vertical market integration, and price transparency of meat quality attributes. Grimes and Plain raise an interesting question about strategic behavior of packers in hog procurement following implementation of mandatory price reporting. On another subject, there is evidence mandatory price reporting that includes retail meat scanner data improved retail meat price reporting accuracy.

While post-MPR research to date is important, no research effectively answers some of the biggest questions. How did MPR impact price levels for cash market and non-cash market transactions? In particular, were cash market prices higher after MPR as supporters of the legislation contended? And how were quantities impacted? Price changes will usually result in quantity changes. The quantity of non-cash market transaction did decrease following MPR but was MPR the cause and was this change a new equilibrium? The ERS study said yes but evidence since then suggests that is doubtful. This remains an area of needed research and we look forward to seeing research that contributes to answering these questions.

6. Related Research on Market Impacts from Information

While some studies looked specifically at MPR, there is a wealth of other research on the impacts of information on market prices. It is worth examining some of that to look for parallels and generalizations that may apply to MPR.

The efficiency of a market in discovering price is affected by the information available to market participants. Grossman and Stiglitz (1980) find that an increase in the quality of information will increase the information content of prices. Early work by Stigler (1961) suggests that price dispersion can be a result of incomplete information on the part of market participants. Research of this type is in contrast to work on financial markets where efficiency was examined relative to different information sets where the most well-known is Fama (1970). The important conclusions were mainly that information acquisition was costly and that equilibrium was not guaranteed. Much price dispersion in livestock market is not researched and we think could use some explanation.

Research in agricultural markets suggests that information can affect price discovery and price variability. Colling and Irwin (1990) examined live hog futures prices and USDA Hogs and Pigs reports. Grunewald, McNulty, and Beire (1993) examined live cattle futures prices and USDA Cattle on Feed reports. Studies such as these aimed at testing the efficiency of the futures market in incorporating information from government reports. These examples and much of this body of research find that prices were impacted by unanticipated information and conclude the reports do contain important information and that these reports fulfill their public policy mission.

Anderson et al. (1998) examined how a reduction in public cash market information affected fed cattle markets. Reducing public information was found to increase price variance and decreased production efficiency. The research was an experimental economics application and the authors did not examine a structural change like MPR. The information changes considered were elimination of inventory-like reports provided by the USDA National Agricultural Statistics Service, specifically the Cattle on Feed report, and total elimination of USDA AMS-like price reporting.

Research in financial markets indicates that market transparency is important in market efficiency and price discovery. Bloomfield and O'Hara (1999) tested the effects of trade and quote disclosure on market efficiency using experimental laboratory currency markets. They concluded that trade disclosure increased informational efficiency of transaction prices. Flood et al. (1999) examined the effects of price disclosure in a continuous experimental multiple-dealer market. Public price queues were compared with bilateral quoting. The work concluded that higher search costs reduced trade volume and induced

aggressive pricing strategies that increased the speed of price discovery in markets with bilateral quotes. Pagano and Röell (1996) investigated differing levels of transparency in several market types. Their results suggest that greater transparency generated lower trading costs for uninformed traders. Overall, the above research indicates that increased information reduces risk or costs for market participants as they form price expectations and discover price.

Most research, as seen in the above examples, has focused on the efficiency of futures or stock prices when incorporating information rather than price impacts in markets without organized exchanges. Most research also does not consider the impacts of new information sources on markets but rather examines the impact of persistent information sources. Moreover, the studies were conducted on market structures that resemble purely, or highly, competitive markets. Livestock markets are such that cash trades occur through decentralized direct trade and in an overall market structure that is characterized by numerous sellers and few buyers. Given that livestock markets are not perfectly competitive then drawing conclusions from some of the above studies may be tenuous.

Imperfect information creates uncertainty when market participants discover price. The provision of additional and complete information like that through MPR should improve the public information set. Publicly reported information on terms of trade for non-cash transactions may do more than have a simple impact on price. The information could affect the timing of marketings and the weight and quality of animals, the volume of animals sold in the cash and forward markets, and the prices in these markets. Changing the public information set could result in substantial changes in cash and forward market behavior. As such, understanding how changing market information impacts imperfectly competitive markets is relevant.

Albæk, Møllgaard, and Overgaard (1997) investigated the impact of published firm-specific transactions prices for ready-mixed concrete in three regions of Denmark. Wachenheim and DeVuyst (2001), Azzam (2003), Njoroge (2003), and Njoroge et al (2007) represent similar thinking but without the empirical application. Albæk, Møllgaard, and Overgaard concluded that publication of these prices had the unintended consequences of allowing firms to reduce the intensity of oligopoly price competition, and this led to increased consumer prices for concrete rather than reduced prices as was intended by the regulatory agency. This work in part reveals at the extent to which changes in information can affect price discovery in markets that are not purely competitive.

7. Experimental Economics Research

As an alternative to analysis of secondary data on livestock and meat markets or drawing analogies from studies of financial markets in determining market

impacts of MPR, it is possible to consider the question in experimental settings. Most of the experimental economics literature treats prices similar to that in microeconomic textbooks. Prices are transparent. It is not common to have a price reporting function where participants report transaction prices to a market reporter and those transactions are summarized into a market price statistic. We find no experimental work which examines voluntary versus mandatory price reporting. But, a variety of experimental economics research addresses the other aspect of MPR: the reporting of non-cash market terms of trade. This research examines relative price levels between cash and forward market transactions. Much of this research has been conducted in an experimental economics laboratory at the University of Wyoming. The main conclusion of this body of work is that the specifics of production decisions and trading institutions matter – sometimes considerably. This research deserves some detailed discussion.

Menkhaus, Phillips and Bastain (2003) and Menkhaus, Phillips, Johnston, and Yakunina (2003) all found that forward contract prices were higher than cash market prices. This is opposite of what is observed in real world fed cattle markets. Krogmeier, Menkhaus, Phillips, and Schmitz (1997), Menkhaus, Bastain, Phillips, and O'Neill (1999 and 2000), and Phillips, Menkhaus, and Krogmeier (2001) found that forward prices were lower than cash market prices. This is what is observed in real world fed cattle markets. The difference between the two groups of experiments was that private negotiation between a buyer and a seller were used in the first whereas double auctions were used in the second group. A double auction is similar to private negotiation but there are more than a single buyer and a single seller.

There were also other changes in production and marketing rules across the second group of experiments. Menkhaus, Bastian, Phillips, and O'Neill (1999) allowed for endogenous choice between the forward and cash market. Or in other words, the seller chose to market production in the forward market or in the cash market. In most of the experiments, use of cash or forward market was imposed and the participants used only one market outlet. Menkhaus, Bastian, Phillips, and O'Neill (2000) also allowed endogenous market choice and imposed random supply and demand risk to impact the seller supply curve and buyer demand curve. This is similar to real-world agricultural commodity markets. In most other experiments, supply and demand curves were fixed and known. Within the endogenous market choice experiments, the forward market became the dominant market. Eighty to 90% of the trade volume occurred in the forward market and the cash market became a residual market.

Krogmeier, Menkhaus, Phillips, and Schmitz (1997) – also in the second group – attribute the difference between prices to the cash market supply being more inelastic than forward market. Sellers chose the quantity to place in inventory for potential cash market sale prior to trading. Sellers could transact no

more that what was produced and can carryover no inventory to the next trading round. This was as opposed to the forward market where the seller produced after the price and quantities were agreed to with the buyer. The seller could then use the cash market if agreements could not be reached in the forward market but if cash bargaining failed then the seller cannot go back and forward contract. Phillips, Menkhaus, and Krogmeier (2001) – in the second group – also linked the cash and forward markets and allowed endogenous choice between the cash and forward market. Sellers trade in the forward market first, and then chose a quantity to produce, and finally traded any remaining quantities in the cash market. There was again risk of stock-outs and inventory was not carried over.

In terms of relevance to the MPR question, none of the experiments reviewed here looked at the impact of providing and not providing information on forward market prices and quantities on forward and cash market trading. And this was a policy change between voluntary and mandatory price reporting. All information was provided in the experiments, thus there was complete transparency. But the endogenous forward and cash market experiments appear to be those from which to generalize to real-world livestock markets. Livestock sellers in the real world have the ability to sell in the forward market and then sell any remaining production in the cash market. The double auction market experiments may also be most relevant. Cash trades between cattle feeders and packer buyers in the real world are repeated negotiations between the same individuals through the week, and week-in and week-out, so they are likely similar to double auctions. Forward contracts are more likely private negotiations. Real-world forward contracts are delivered upon from 15 days to as far in the future that sellers and buyers are willing to trade. There is simply less liquidity for any potential delivery week in the 15-to-365-plus day marketing window than the 0-to-14 day marketing window.

Finally, given that small changes in production and marketing rules appear to be able to change the results, are there enough differences between the real world and the experiments so that the experiments cannot be generalized? Another experimental-like study perhaps provides some answers. Bastain, Koontz and Menkhaus (2007) perform an experimental simulation that looks directly at one aspect of MPR. The Fed Cattle Market Simulator (FCMS) developed at Oklahoma State University was used (see Hogan et al. 2003). The experiment was replicated so that the underlying supply and demand conditions were identical, where real-world complexities and uncertainties were abstracted from, and where only the information set was different.[11] The information set

[11] There is no structural change in red meat demand, no trade disruptions due to the discovery of BSE, no cyclical changes in cattle numbers (but there is a seasonal pattern), nor changes in the firm numbers, cost structure or products and services offered within the cattle feeding and packing industry. All of these issues must be modeled or accounted for when using real-world data to

change was that in five replications forward contract information was not provided and in five replications forward contract terms of trade details were reported.[12] An attractive feature of the FCMS is that it mimics many rules from the real-world fed cattle market. The simulator controls all but the buyer and seller negotiation. Thus, the market simulator has a specific commodity context similar to field experiments discussed by Harrison and List (2004). But the difficulties of generalizing generic experimental economics studies are not present and the difficulty of controlling for real world events are also not present.

Bastian, Koontz and Menkhaus found that with reported information on forward contracts that more forward contracting was conducted. There were significantly higher volumes of fed cattle forward contracted when MPR-like information was provided in the FCMS. There was a 30% increase in non-cash market transactions. This result was seen in the endogenous market choice experiments but it is likely not a conclusion that would be drawn with real world data. After the passage of the LMRA, average non-cash market volumes decreased sharply. But it is unlikely the decline was due to MPR as Perry et al. (2005) contend. The experimental simulation results were also robust. In every replication with MPR-like information provided on non-cash market terms of trade, there were time periods in the simulation where cattle transactions were almost entirely non-cash market.

Bastian, Koontz and Menkhaus also found interesting price impacts. Forward contract prices were below cash market prices – like in the real world. And there was also a spillover effect where the additional information on forward contracting resulted in lower cash market prices. The provision of MPR-like information resulted in more cattle being transacted in the forward market – at lower prices – and lower prices for the remaining cattle in the cash market. These findings are consistent with the negotiation model in Menkhaus, Bastain, Phillips, and O'Neill (1999 and 2000). Within this theoretical model, there were costs of the negotiation failing but the costs were asymmetric. The cost to a cattle feeder of not selling a pen was higher than the cost to a packer of not securing one additional pen. These costs depend on market conditions and are also influenced by the market structure. But we don't believe the results are what groups who advocated for MPR were hoping the market impact would be. The results also illustrate a well-known phenomenon: it is difficult to change policy and impact one thing. There are unintended consequences.

While prices were lower with MPR-like information and increased forward contracting, market efficiency improved. There was a reduction in price

---

examine the impacts of MPR on livestock and meat markets.

[12] Like the other experimental economic research that was reviewed, within the FCMS, all transactions are reported and there is no selective reporting. However, the experiment involved reporting terms of trade for any non-cash market transaction and this is the same as MPR.

risk with MPR, there was an improvement in production efficiency[13] with MPR, and there were less divergent expectations. This agrees with Azzam (2003) with respect to the efficiency and variability – but not the price level results. However, preliminary work by Koontz (2010) suggests, while cash market prices were lower and more transactions occur in the forward market with MPR, cattle producers were more profitable because of the improved efficiency. Profitability of packers was not impacted. Diversifying procurement sources works well when all sources provide but does not work as well when one important source becomes intermittent. Improving the price information set improved the functioning of the marketplace – but mainly the cattle feeder benefited.

The experimental simulation results were consistent with the second group of experimental economics works, those who found forward prices were lower than spot market prices. The lower prices likely demonstrated the risk premium sellers were willing to part with in order to secure a forward sale and were consistent with reducing advance-production risk in the negotiation model. But this lower cash market price was not consistent with Azzam (2003). The improved efficiency did not lead to improved cash market prices. The results of the experimental simulation support the conclusions of Grunewald, Schroeder, and Ward (2004) and Wachenheim and DeVuyst (2001). Why the difference between the experiments and Azzam? First, the market choice – cash versus forward – can affect market outcomes. Menkhaus, Phillips, and Bastian (2003) also explore this question. Second, given the information risks coupled with advance-production risk, the bargaining advantage appears to shift to buyers in private negotiation when forward contract information is provided. The Menkhaus, Yakunina, and Phillips (2001) results also indicate this.

It is our perception that this price result – lower cash market prices as a result of MPR – would be difficult to measure in real-world price data. There are likely too many other things impacting the supply and demand for fed cattle and beef that measuring the impact specific to MPR would be difficult. It is also our perception that this question could have been asked in an experimental setting prior to the institution of MPR. These are the kinds of questions where experimental economics is most useful (see Roth 1987). That said economic experiments are not without limitations. Small changes in production and marketing rules can result in large changes in experiment results. Thus, surprising results should be well-explained and viewed cautiously.

[13] Production efficiency was measured as production costs and does not include search costs or use of information costs and thus should be conservative.

8. Policy and Research Implications and Concluding Remarks

The Livestock Mandatory Reporting Act was due to terminate in December 2004 and was extended until September 2005. Congress did not agree on a further extension period after that date so the Act expired. Most packing firms voluntarily continued to provide data to AMS, despite the "mandatory" feature of the system having lapsed. However, some data were no longer available to AMS and were not reported – these were most notably the scanner retail prices. Most of the data collection is automated so the process is relatively inexpensive, given that the system is developed and there are no further development costs. But there was no mandate. What does this say about the packing industry's willingness to provide "voluntary-mandatory" market information as a public service?

The authors view the first need is for permanent renewal of the Act, authorizing price reporting without an ending date. The Act was reauthorized by Congress in January 2008 and rule making was completed in July 2008, but again, the legislation had a termination date which was September 2010 (see Becker 2006). MPR was reauthorized with legislation in June 2010 but there is again a sunset date of September 2015. Discussions with livestock industry members have revealed that the sunset clause is included to create an opportunity for regular formal industry input into what AMS collects and reports. However, it appears to us that the requirement for regular input could be included in the law instead of allowing the entire law to expire. Disruption of data and information is irreversible and can adversely impact market performance. Price reporting is important. The LMRA modifies the Agricultural Marketing Act of 1946. Unlike Farm Bills which revert to "permanent farm law" if the current law expires, MPR is within the permanent Act and there is no fall back legislation. The sunset provision is at odds with the long term need for price reporting. Further, it is not likely possible to return to the voluntary system. The voluntary system has largely been replaced by the mandatory system.

From a research standpoint, while cattle feeders expressed some dissatisfaction with mandatory reporting initially, no subsequent research is available across species to determine how effectively the mandatory system meets the needs of industry participants. Neither has research addressed how effective mandatory price reporting has been in increasing the confidence users have in reported prices. Also, there continues to be some missing information, missing price series, timing questions, extension to other meats (such as wholesale pork), that ask to be resolved and incorporated into the legislation.

An area of future research that is clearly in need has to do with the ability of MPR to improve noncompetitive behavior by the packing industry. This appears to be the largest concern found in the literature (e.g., Wachenheim and

DeVuyst 2001, Azzam 2003, and Njoroge 2003). A variety of empirical assessments of this concern are needed to see if this is indeed an unintended consequence of the policy.

There is evidence mandatory price reporting that includes retail meat scanner data can improve retail meat price reporting (e.g., Lensing and Purcell 2006). The importance of this result appears to need emphasis. Retail meat price data is a critical component of inflation estimates, farm-to-retail and wholesale-to-retail margins, and meat demand studies. The importance of accuracy in retail meat price reporting is evident to us, yet is not much discussed.

No effort has been made to estimate the cost of lost market reports. Little attention has been given to addressing the *a priori* questions of potential strategic behavioral changes with mandatory price reporting, other than the work by Grimes and Plain. Little research is available on hog prices and nothing has been done to the authors' knowledge regarding lamb prices. Little attention has been paid to wholesale meat prices in the mandatory system. MPR was a substantive policy change and asks for a serious and comprehensive cost/benefit analysis.

At this stage it appears that the change from voluntary to mandatory price reporting has had benefits and costs and unintended consequences. There is increased transparency and accuracy but there is evidence that these problems were small under the voluntary system, with the exception of beef grid price premiums and discounts. There has been a loss of information about regional markets. However, the evidence is that because of MPR the regional market integration has improved. There has been new information on non-cash terms of trade – forward contracts and marketing agreements. But the value of this new information is not clear. Finally, one valuable piece of MPR – the collecting of scanner retail prices – has not persisted in the reauthorized legislation. It may be appropriate to make the case that what was hoped for from the legislation was not correct and that the successes of the legislation were not its original intent.

Ultimately, the legislation, the policy change, and the adoption of MPR may be viewed as updating an old system and incorporation of technology and automation to replace price reporting personnel. This may be a good economic and administrative decision but the point that there was a lack of research that said this needed to be done remains. Further, there is no going back to the old system. To have MPR legislation on a sunset clause simply appears unwise.

Experimental economics research programs could have been used more to support the policy change discussion. Some relevant work existed prior to the passage of the LMRA and some of the real-world results could have been anticipated by this research. Mainly, it was unlikely that the proposed legislation would improve producer prices. Further, these research programs could have been asked to evaluate the potential outcome of proposed policy changes. While most of the relevant literature has appeared since the passage of the legislation, a

significant strength of experimental economics research is that it does not have to wait for the passage of time and collection of real-world data. Lastly, results from experimental economics research clearly show small changes in institutions can have large impacts on markets. Thus, the proposed policy change would have impacts on the market and impacts might be difficult to see in advance.

It is our perspective that economic and policy issues related to MPR are not resolved and present real and significant opportunities for the agricultural economics and industrial organization research communities.

References

Albæk, S., P. Møllgaard, and P.B. Overgaard. "Government-Assisted Oligopoly Coordination? A Concrete Case." *Journal of Industrial Economics* 65(1997):429-443.

Anderson, J.D., C.E. Ward, S.R. Koontz, D.S. Peel, and J.N. Trapp. "Experimental Simulation of Public Information Impacts on Price Discovery and Marketing Efficiency in the Fed Cattle Market." *Journal of Agricultural and Resource Economics* 23(1998):262-278.

Azzam, A.M. "Market Transparency and Market Structure: The Livestock Mandatory Reporting Act of 1999." *American Journal of Agricultural Economics* 85(2003):387-395.

Azzam, A.M. and S. Salvador. "Information Pooling and Collusion: An Empirical Analysis." *Information Economics and Policy* 16(2004):275-286.

Bastian, C.T., S.R. Koontz, and D.J. Menkhaus. "Impacts of Forward Contract Information on Market Pricing and Production Efficiency in a Simulated Fed Cattle Market Experiment." Working Paper, Department of Agricultural and Applied Economics, University of Wyoming, 2007.

Becker, G.S. "Livestock Price Reporting: Background." Congressional Research Service, Report for Congress, Order Code RS21994, Updated October 6, 2006.

Bloomfield, R., and M. O'Hara. "Market Transparency: Who Wins and Who Loses?" *Review of Financial Studies* 12(1999):5-35.

Bonnen, J.T. "Assessment of the Current Agricultural Data Base: An Information System Approach." In L.R. Martin, ed., *A Survey of Agricultural Economics Literature*, Volume 2. Minneapolis: University of Minnesota Press, 1977.

Colling, P.L., and S.H. Irwin. "The Reaction of Live Hogs Futures Prices to USDA 'Hogs and Pigs Reports.'" *American Journal of Agricultural Economics* 72(1990): 84-94.

Cotterill, R.W. (ed.). Competitive Strategy Analysis in the Food System. (Conference Proceedings, June 3-5, 1991, Alexandria, VA) Boulder, CO: Westview Press, 1993.

Caswell, J.A., and R.W. Cotterill. (eds.). Strategy and Policy in the Food System: Emerging Issues. (Conference Proceedings, June 20-21, 1996, Washington, D.C.) Storrs, CT: Food Marketing Policy Center, 1997.

Fama, E.F. "Efficient Capital Markets: A Review of Theory and Empirical Work." *Journal of Finance* 25(1970):383-417.

Fausti, S.W., M.A. Diersen, and B.A. Qasmi. "Public Price Reporting in the Cash Market for Live Cattle: A Spatial Market Approach." *Agricultural and Resource Economics Review* 36(2007):336-348.

Fausti, S.W., B.A. Qasmi, J. Li, and M.A. Dierson. "The Effect of the Livestock Mandatory Reporting Act on Market Transparency and Grid Price Dispersion." *Agricultural and Resource Economics Review* 39(2010):457-467.

Fausti, S.W., and M.A. Diersen. "The Voluntary Reporting System's Ability to Provide Price Transparency in the Cash Market for Dressed Steers: Evidence from South Dakota." *Journal of Agricultural and Resource Economics* 29(2004):553-566.

Flood, M.D., R. Huisman, K.G. Koedijk, and R.J. Mahieu. "Quote Disclosure and Price Discovery in Multiple-Dealer Financial Markets." *Review of Financial Studies* 12(1999):37-59.

Grimes, G. and R. Plain. "Analysis of USDA Mandatory Hog Price Data 2002-2006." Working Paper AEWP 2008-4, Department of Agricultural Economics, University of Missouri, 2007.

Grossman, S., and J.E. Stiglitz. "On the Impossibility of Informationally Efficient Markets." *American Economic Review* 70(1980):393-408.

Grunewald, O., M.S. McNulty and A.W. Biere. "Live Cattle Futures Response to 'Cattle on Feed Reports.'" *American Journal of Agricultural Economics* 75(1993):131-137.

Grunewald, S., T.C. Schroeder, and C.E. Ward. "Cattle Feeder Perceptions of Livestock Mandatory Price Reporting." *Review of Agricultural Economics* 26(2004):521-538.

Harrison, G. W., and J. A. List. "Field Experiments." *Journal of Economic Literature* 42(2004):1009-1055.

Hayenga, M.L. (ed.). Pricing Problems in the Food Industry (with Emphasis on Thin Markets). University of Wisconsin, North Central Regional Research Publication, NC-117 Monograph 7, February 1979.

Hayenga, M.L., A.C. Johnson, Jr., B.W. Marion (eds.). Market Information and Price Reporting in the Food and Agriculture Sector. University of Wisconsin, North Central Regional Research Publication, NC-117 Monograph 9, August 1980.

Helmberger, P., G.R. Campbell, and W.D. Dodson. "Organization and Performance in Agricutlrual Markets." In L.R. Martin, ed., A Survey of Agricultural Economics Literature, Volume 3. Minneapolis: University of Minnesota Press, 1981.

Heykoop, J. "Livestock Mandatory Price Reporting." Congressional Research Service, Report for Congress, Order Code RS20079, Updated August 15, 2001.

Hogan, R.J., Jr., C.E. Ward, J.N. Trapp, D.S. Peel, and S.R. Koontz. Economic Components of the Fed Cattle Market Simulator. Oklahoma Agricultural Experiment Station Bulletin B-817, Oklahoma State University, September 2003.

Jin, J.Y. "A Test for Information Sharing in Cournot Oligopoly." *Information Economics and Policy* 8(1996):75-86.

Koontz, S.R. "Accuracy of USDA Fed Cattle Price Reporting: Is Mandatory Price Reporting Needed?" Proceedings of the NCR-134 Conference on Applied Price Analysis, Forecasting, and Market Risk Management, Chicago, Illinois, April 1999.

Koontz, S.R. "Impacts of Mandatory Price Reporting on the Relationship Between Fed Cattle Prices and the USDA Boxed Beef Cutout Value." Working Paper, Department of Agricultural and Resource Economics, Colorado State University, 2007.

Koontz, S.R. "Impacts of Forward Contract Information and Captive Supplies on Cattle Feeding and Meat Packer Profitability: Results from an Economic Experiment." Working Paper, Department of Agricultural and Resource Economics, Colorado State University, 2010.

Krogmeier, J.L., D.J. Menkhaus, O.R. Phillips and J.D. Schmitz. "An Experimental Economics Approach to Analyzing Price Discovery in Forward and Spot Markets." *Journal of Agricultural and Applied Economics* 29(1997):327-336.

Lawrence, J.D., T.C. Schroeder, and M.L. Hayenga. "Evolving Producer-Packer-Customer Linkages in the Beef and Pork Industries." *Review of Agricultural Economics* 23(2001): 370-385.

Lensing, C. and W.D. Purcell. "Impact of Mandatory Price Reporting Requirements on Level, Variability, and Elasticity Parameter Estimations for Retail Beef Prices." *Review of Agricultural Economics* 28(2006):229-239.

LMPR Review Team. "Livestock Mandatory Price Reporting System – Report to the Secretary of Agriculture." Washington, D.C. July 2, 2001.

Marion, B.W. (ed.). Coordination and Exchange in Agricultural Subsectors. University of Wisconsin, North Central Regional Research Publication, NC-117 Monograph 2, January 1976.

McEowen, R. "Legal Perspective of Packer Ownership and Captive Supplies." Presentation at the Mississippi Farm Bureau Federation Beef Summer Commodity Conference, Jackson, MS, June 18, 2010.

Menkhaus, D.J., C.T. Bastian, O.R. Phillips and P.D. O'Neill. "Endogenous Choice of Institution Under Supply and Demand Risks in Laboratory Forward and Spot Markets." *Journal of Agricultural and Resource Economics* 32(1999):553-571.

Menkhaus, D.J., C.T. Bastian, O.R. Phillips and P.D. O'Neill. "Supply and Demand Risks in Laboratory Forward and Spot Markets: Implications for Agriculture." *Journal of Agricultural and Applied Economics* 32(2000):159-173.

Menkhaus, D.J., O.R. Phillips, and C.T. Bastian. "Impacts of Alternative Trading Institutions and Methods of Delivery on Laboratory Market Outcomes." *American Journal of Agricultural Economics* 85(2003):1323-1329.

Menkhaus, D.J., O.R. Phillips, A.F.M. Johnston, and A.V. Yakunina. "Price Discovery in Private Negotiation Trading with Forward and Spot Deliveries." *Review of Agricultural Economics* 25(2003):89-107.

Menkhaus, D.J., A.V. Yakunina, and O.R. Phillips. "Bilateral Trading and the Curse of Knowledge: An Experimental Economics Study." Selected Paper, Western Agricultural Economics Association Annual Meeting, Logan, Utah, July 2001. Abstract in *Journal of Agricultural and Resource Economics* 26(2001):557.

Murphy, R. "How Informa Economics Uses Mandatory Livestock Price Reporting Data." Presentation at the 2008 FAMPS Policy Conference Session, Washington, D.C., March 10, 2008.

Njoroge, K. "Information Pooling and Collusion: Implications for The Livestock Mandatory Reporting Act." *Journal of Agricultural & Food Industrial Organization* 1(2003): Article 14. Available at http://www.bepress.com/jafio/vol1/iss1/art14/.

Njoroge, K., A Yiannaka, K. Giannakas, and A.M. Azzam. "Market and Welfare Effects of the U.S. Livestock Mandatory Reporting Act." *Southern Economic Journal* 74(2007):290-311.

Padberg, D.I. (ed.). Food and Agricultural Marketing Issues for the 21st Century. College Station, TX: Food and Agricultural Marketing Consortium, FAMC 93-1, Texas A&M University, 1993.

Padberg, D.I. (ed.). Re-Engineering Marketing Policies for Food and Agriculture. College Station, TX: Food and Agricultural Marketing Consortium, FAMC 94-1, Texas A&M University, 1994.

Pagano, M., and A. Röell. "Transparency and Liquidity: A Comparison of Auction and Dealer Markets with Informed Trading." *Journal of Finance* 51(1996):579-611.

Pendell, D.L. and T.C. Schroeder. "Impact of Mandatory Price Reporting on Fed Cattle Market Integration." *Journal of Agricultural and Resource Economics* 31(2006):568-579.

Perry, J., J. MacDonald, K. Nelson, W. Hahn, C. Arnade, and G. 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.

Phillips, O.R., D.J. Menkhaus, and J.L. Krogmeier. "Production-to-order or Production-to-stock: the Endogenous Choice of Institution in Experimental Auction Markets." *Journal of Economic Behavior and Organization* 44(2001):333-345.

Purcell, W.D. (ed.). Structural Change in Livestock: Causes, Implications, and Alternatives. Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, 1990.

Purcell, W.D. (ed.). Pricing and Coordination in Consolidated Livestock Markets: Captive Supplies, Market Power, and IRS Hedging Policy. Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, 1992.

Purcell, W.D. "History, Current Status, and Emerging Issues in the Public Outlook Program." In D.I. Padberg, ed., Re-Engineering Marketing Polices for Food and Agriculture. College Station, TX: Food and Agricultural Marketing Association Consortium, FAMC 94-1, Texas A&M University, 1994.

Purcell, W.D. (ed.). Price Discovery in Concentrated Livestock Markets: Issues, Answers, and Future Directions. Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, 1997a.

Purcell, W.D. "The Role of Market Information in Price Discovery and Market Structure." In W.D Purcell, ed., Price Discovery in Concentrated Livestock Markets: Issues, Answers, and Future Directions. Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, 1997b.

Purcell, W.D. "A Primer on Beef Demand." Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, Research Bulletin 2-98, April 1998a.

Purcell, W.D. "Measures of Changes in Demand for Beef, Pork, and Chicken, 1975-1998." Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, Research Bulletin 3-98, October 1998b.

Purcell, W.D., and J.B. Rowsell (eds.). Key Issues in Livestock Pricing: A Perspective for the 1990s. Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, 1987.

R-CALF USA. "R-CALF USA Comments Concerning Proposed Federal Speculation Position Limits for References Energy Contracts and Associated Regulations." Comments to Commodity Futures Trading Commission, April 26, 2010.

Rojas, C., A. Andino, and W.D. Purcell. "Retailers' Response to Wholesale Price Changes: New Evidence from Scanner-Based Quality-Weighted Beef Prices." *Agribusiness: An International Journal* 24(2008):1-15.

Roth, A. "Laboratory Experimentation in Economics." In T. Bewley, ed., Advances in Economic Theory, Fifth World Congress. Cambridge: Cambridge University Press, 1987.

Schroeder, T.C., C.E. Ward, J. Mintert, and D.S. Peel. "Beef Industry Price Discovery: A Look Ahead." In W.D. Purcell, ed., Price Discovery in Concentrated Livestock Markets: Issues, Answers, and Future Directions. Blacksburg, VA: Research Institute on Livestock Pricing, Virginia Tech, 1997. (Also Research Bulletin 1-98, Research Institute on Livestock Pricing, Virginia Tech, March 1998.)

Stigler, G.J. "The Economics of Information." J*ournal of Political Economy* 69(1961):213-225.

Tomek, W.G., and K.L. Robinson. "Agricultural Price Analysis and Outlook." In L.R. Martin, ed., A Survey of Agricultural Economics Literature, Volume 1. Minneapolis: University of Minnesota Press, 1977.

U.S. 95th Congress, House of Representatives, Committee on Small Business, Subcommittee on SBA and SBIC Authority and General Small Business Problems. "Small Business Problems in the Marketing of Meat and Other Commodities (Parts 1-7)." Congressional Hearings, multiple dates, 1977 through 1980.

U.S. 95th Congress, House of Representatives, Committee on Small Business, Subcommittee on SBA and SBIC Authority and General Small Business Problems. "Small Business Problems in the Marketing of Meat and Other Commodities (Part 3 – Beef in America: An Industry in Crisis." Staff Report, 1980.

U.S. 101st Congress, U.S. Senate, Committee on Agriculture, Nutrition, and Forestry, Subcommittee on Nutrition and Investigations. "Economic Concentration in the Meatpacking Industry." Congressional Hearing, July 20, 1990.

U.S. 106th Congress, House of Representatives, Committee on Agriculture, Subcommittee on Livestock and Horticulture. "Mandatory Price Reporting for Livestock." Congressional Hearing, April 29, 1999.

U.S. Department of Agriculture. *Report of the Secretary's Meat Pricing Task Force*. Washington, D.C.: June 15, 1979a.

U.S. Department of Agriculture. *The Secretary's Actions to Improve Meat Pricing and Price Reporting*. Washington, D.C.: August 7, 1979b.

U.S. Department of Justice and U.S. Department of Agriculture. *Public Workshop Exploring Competition Issues in Agriculture: Livestock Workshop*. August 27, 2010. Transcript available at http://www.justice.gov/atr/public/workshops/ag2010/index.html.

U.S. Department of Justice and U.S. Department of Agriculture. *Workshop on Agriculture and Antitrust Enforcement Issues in Our 21st Century Economics*. December 8, 2010. Transcript available at http://www.justice.gov/atr/public/workshops/ag2010/index.html.

U.S. Government Accountability Office. *Livestock Market Reporting: USDA Has Taken Some Steps to Ensure Quality, but Additional Efforts Are Needed*. Washington, D.C.: GAO-06-202, December 2005.

U.S. National Commission on Food Marketing. *Food from Farmer to Consumer*. Washington D.C.: 1966.

Upchurch, M.L. "Developments in Agricultural Economic Data." In L.R. Martin, ed., A Survey of Agricultural Economics Literature, Volume 2. Minneapolis: University of Minnesota Press, 1977.

Wachenheim, C.J. and E.A. DeVuyst. "Strategic Response to Mandatory Price Reporting Legislation in the U.S. Livestock and Meat Industries: Are Collusive Opportunities Enhanced?" *Agribusiness: An International Journal* 17(2001):177-195.

Ward, C.E. "Captive Supply Trends since Mandatory Price Reporting." Oklahoma Cooperative Extension Fact Sheet F-597, November 2004a. Available at http://osuextra.okstate.edu/.

Ward, C.E. "Captive Supply Price Relationships and Impacts." Oklahoma Cooperative Extension Fact Sheet F-598, November 2004b. Available at http://osuextra.okstate.edu/.

Ward, C.E. "Beef, Pork, and Poultry Industry Coordination." Oklahoma Cooperative Extension Fact Sheet F-552, August 2009. Available at http://osuextra.okstate.edu/.