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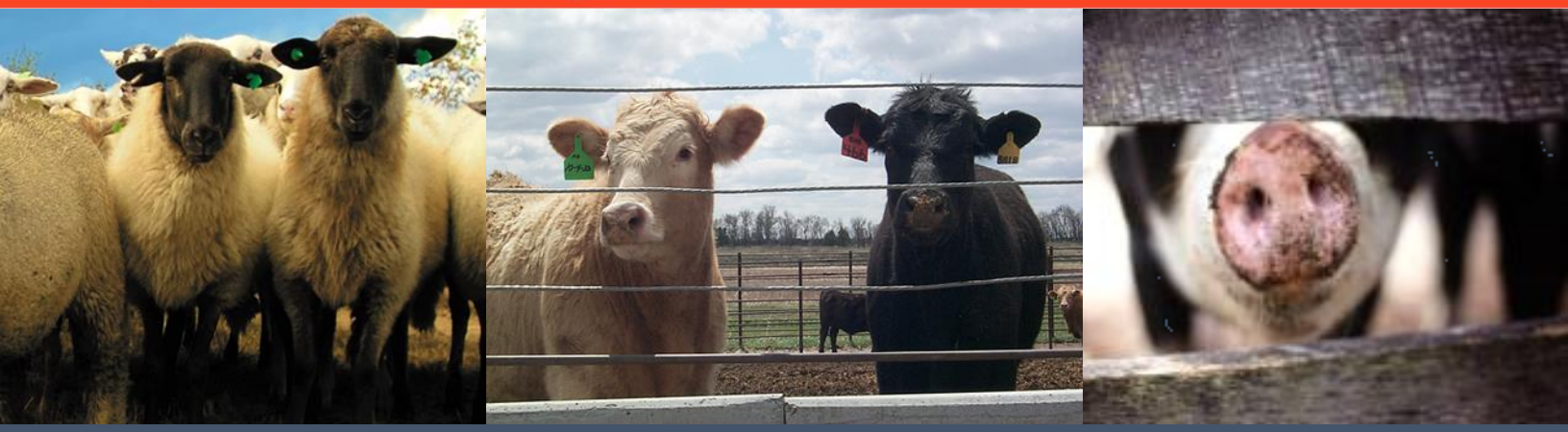

Report to Congress

LIVESTOCK MANDATORY REPORTING

2018

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Executive Summary

By providing timely and accurate price and supply reporting for slaughter cattle, swine, sheep, boxed beef, lamb, and wholesale pork, the U.S. Department of Agriculture's (USDA) Livestock Mandatory Reporting program (LMR) enables stakeholders to evaluate market conditions, identify trends, monitor price patterns, evaluate transportation needs, assess commodity movement, and, ultimately, make informed business decisions.

Consistent with the Agriculture Reauthorizations Act of 2015 (2015 Reauthorizations Act), the USDA's Agricultural Marketing Service (AMS):

- Analyzed current marketing practices in cattle, swine, and lamb markets;
- Elicited legislative and regulatory recommendations from cattle, swine, and lamb producers, packers, and other market participants; and
- Examined USDA's price and supply information reporting services for cattle, swine, and lamb.

To do this, AMS commissioned a baseline study of the industry and LMR (Appendix A).[1] AMS then convened a series of structured stakeholder meetings to discuss marketing methods, current challenges with market reporting, and potential future revisions to LMR.

Key Stakeholder Conclusions

LMR is an effective program, necessary for the efficient marketing of livestock and meat products. A coordinated effort by all stakeholders is necessary to provide the greatest level of transparency, both for today's marketplace and as the marketing of livestock and their products continues to evolve. To improve LMR, stakeholders recommended the following points to consider:

- For swine and pork reporting, Free On Board (FOB) Omaha and Negotiated Formula Purchase should be eliminated as reporting categories.
- For lamb reporting, the threshold for lamb packers should be considered and committed lambs should be defined and reported. Stakeholders also discussed whether custom-slaughtered lambs should be defined and reported; however, AMS can address this through regulatory amendments.
- Concerns remain that the declining quantity of negotiated transactions could lead to market vulnerabilities.
- Given consolidation in cattle, swine, and lamb industries, preserving confidentiality of contract parties in market reporting is essential and was thoroughly reviewed.

[1] www.ams.usda.gov/sites/default/files/media/BaselineStudyLivestockMeatMarketingTrendsLMR.PDF.

LMR Background

In the mid-1990s, concerns grew among industry and Congress over packer concentration as meat packing companies were consolidating and expanding. In the fall of 1998, the swine industry faced an oversupply situation, and negotiated slaughter hog prices fell to historically low levels. At the same time, some packers and hog producers were engaged in alternative formula contracts that did not decline in value as substantially as the negotiated purchases. This scenario, and the ongoing concentration concerns in the meat packing industry, prompted Congress to pass the Livestock Mandatory Reporting Act of 1999 (1999 Act) [Pub. L. 106-78, Title IX], as amended. The 1999 Act must be reauthorized by Congress every 5 years, and the most recent reauthorization was in 2015.

The 1999 Act established a program to provide information regarding the marketing of cattle, swine, lamb, and the products of such livestock that can be readily understood by producers; improves USDA's price and supply reporting services; and encourages competition in the marketplace for livestock and livestock products.

On April 2, 2001, AMS implemented the LMR program through issuing regulations (7 CFR Part 59). On August 22, 2012, AMS published a final rule adding mandatory reporting of wholesale pork cuts to LMR, which was implemented on January 7, 2013.[2] A complete regulatory history of LMR can be found on the AMS website.[3]

Since the establishment of LMR, AMS has worked closely with industry stakeholders to refine the overall effectiveness of the program by identifying packers and importers subject to LMR and assisting them with meeting the statutory and regulatory requirements of the 1999 Act, upholding the integrity of the program through the LMR compliance program, implementing regulatory changes directed by law, and improving administrative and reporting methods.

LMR provides the data on which thousands of business transactions depend upon every day. From the small producer looking to market a few head of cattle, to the large packer managing risk exposure, LMR data are invaluable resources. Each week, AMS issues nearly 300 market reports containing market information from LMR submitted data. These reports provide valuable information on price trends, supply and demand conditions, and the various purchase and sales methods used in the industry while protecting the confidentiality of proprietary transactions. Information contained in LMR reports is used for decisions ranging from day-to-day marketing of livestock and meat products to long-term investments, risk management products, and policy decisions.

[2] www.gpo.gov/fdsys/pkg/FR-2012-08-22/pdf/2012-20443.pdf.

[3] www.ams.usda.gov/sites/default/files/media/LivestockMandatoryReportingBackground.pdf.

Data Submission and Compliance

The 1999 Act, as amended under the 2015 Reauthorizations Act, requires federally inspected packing plants that annually slaughter or process an average of 125,000 cattle or 100,000 barrows and gilts; companies that slaughter or process 200,000 sows and boars; plants that slaughter or process an average of 35,000 lambs; and importers that annually import an average of 1,000 metric tons of lamb meat products to report information as described in the 1999 Act.

Packers are required to report the details of all transactions involving purchases of livestock (cattle, swine, and lambs) and the details of all transactions involving domestic and export sales of boxed beef cuts, wholesale pork, boxed lamb cuts, and lamb carcasses. Importers are required to report information concerning their domestic sales of imported boxed lamb cuts. Packers must submit information on the prices and quantities of livestock and livestock products on a daily and weekly basis. The 1999 Act mandates that USDA protect the identity of persons, parties to contracts, and proprietary business information.

The collected information is gathered into an electronic database where it is processed and aggregated for publication. AMS market reporters have 1 hour to import, review, and verify the submitted data. During this hour, AMS market reporters ensure all packers subject to LMR submitted information on time and apply confidentiality guidelines to the data. Reporters also use technical processes to flag data falling outside preset parameters and guidance. These data are then confirmed by reporters through direct correspondence with buyers and sellers before publication. Once prepared, AMS publishes the market reports through an electronic communication system and posts them on the AMS website at *www.ams.usda.gov*.

AMS estimates that LMR reports cover approximately 94 percent of the hog market, 93 percent of the boxed beef market, 87 percent of wholesale pork cuts, 78 percent of the cattle market, 43 percent of the sheep market, 43 percent of the boxed lamb market, and 27 percent of the carcass lamb market.

AMS conducts compliance audits at all federally inspected plants covered by LMR. LMR compliance auditors review each plant's supporting documentation to determine whether the LMR data are reported timely, accurately, and completely. Each plant is audited at least twice per fiscal year and is subject to additional audits if noncompliance issues are not corrected within the specified timeframe.

In 2016, AMS initiated an independent review of the LMR compliance program's core functions and processes to evaluate the effectiveness of the program's internal procedures in verifying the data reviewed by AMS market reporters. The review resulted in several improvements, including the development of an LMR training manual, revised policies to create a more efficient audit process, an improved database that provides more comprehensive tracking of compliance issues, more transparency with federally inspected plants so they better understand new processes, and the implementation of performance-based auditing that incentivizes companies to report data accurately. Overall, these improvements to the LMR compliance program uphold the

integrity of the data reported by AMS and help ensure the accuracy and reliability of vital market information consumed by a broad range of industry stakeholders and the public.

AMS maintains a webpage[4] dedicated to LMR compliance information that includes frequently asked questions, an audit process flowchart, auditing and compliance procedures, audit statistics, and additional compliance information.

The Value of LMR to Industry

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In theory, price determination is clean and unambiguous. The point of intersection on a supply-and-demand curve determines the equilibrium price and quantity, given that underlying assumptions hold true. In reality, the point becomes less clear, as the supply-and-demand curves are unobservable and reality diverges from the underlying assumptions. Thus, price discovery becomes critical, as each market participant has a different vantage point and views the market process through a different lens in order to focus in on what that participate perceives as the equilibrium point. The role of LMR is to bring clarity to the markets, providing freely available information to all market participants at the same time. This market transparency provides all market participants and analysts with a clearer picture of market supply-and-demand conditions, aiding price discovery.

The provision of market transparency is a critical public good as it helps identify markets of opportunity and facilitate more efficient markets. A 2013 Council on Food, Agricultural & Resource Economics (C-FARE) report[5] reviews the rationale for Government to provide a public good, in particular for USDA to provide market data. As a public data source collecting and disseminating information that is otherwise known only to parties directly involved in particular buy-and-sell transactions, LMR can homogenize expectations and provide all market participants with access to the same information set. This in turn can lessen the ability for large-market participants to take advantage of broader and deeper market knowledge due to being directly involved in a larger volume of transactions. Larger, better informed market participants can exploit arbitrage opportunities when other market participants are less informed.

In 2003, Azzeddine Azzam[6] reported that LMR may foster more competitive conduct in livestock procurement. He also defined transparency for livestock and meat markets as the degree to which price uncertainty is reduced as more information is available. In 2013, Boyer

[4] www.ams.usda.gov/rules-regulations/mmr/lmr/compliance.
[5] The Council on Food, Agricultural & Resource Economics (C-FARE). (2013, updated July 2016). Value of USDA Data Products. Washington, DC.
[6] Azzam, A. 2003. "Market Transparency and Market Structure: The Livestock Mandatory Reporting Act of 1999." *American Journal of Agricultural Economics* 85(2): 387-395.

and Brorsen[7] studied the effect of LMR on beef markets and reported that if price uncertainty is reduced for packers (buyers) or cattle feeders (sellers), cattle feeders will benefit from increased competition between the packers and from imposing more accurate reserve prices.

There are challenges in providing this transparency. LMR adapts to the market challenges in order to meet the needs of the industry. Market challenges within the livestock industry have been well documented by economists from academia and Government. As reviewed by Clem Ward[8] in 2006, key trends concerning major structure changes in livestock markets include more direct trading, fewer and more concentrated buyer markets, fewer spot market transactions, and more contracts and agreements. The decrease in spot market (negotiated) transactions corresponds with the increase in contracts and agreements (alternative marketing arrangements or AMAs).

LMR reports multiple types of livestock purchase and meat sale transactions: spot market trades, and AMAs including forward contracts, marketing agreements, procurement or marketing contracts, production contracts, packer ownership, custom feeding, and custom slaughter. (See Mathews, et al. (2015)[9] for a comprehensive description of AMAs being used in LMR.) Thinning livestock spot markets raise concerns about their role in price discovery as information reported on spot market trades may not be representative of the bulk of the market. Economic theory states prices are set by the prices at the margins; if supply is tight and demand is strong, then prices increase to clear the market. If the market is thin, with few trades, then observed prices and quantities may not represent the bulk of the trade and the underlying market supply-and-demand conditions. However, while thin negotiated markets are a concern, it does not necessarily mean the negotiated market prices are not representative of overall supply-and-demand conditions. As described in Mathews, et al. (2015), the volume of negotiated cash transactions has trended downward and the volume of AMAs have trended upward. Studies have shown that negotiated spot and alternative marketing arrangement prices move together.

In many ways, AMAs are driven by spot markets. Fundamental economic forces have driven the adoption of AMAs by industry, specifically to reduce the market transaction costs. Negotiation takes time and effort; two people haggling face-to-face over the price of a commodity is costly in price, time, and energy for everyone. Historically, livestock and meat markets have relied on negotiated spot markets for price discovery. But, through the freely available information provided to all market participants through LMR, AMAs can play a larger role in price discovery.

The theoretical problem that arises is that the process is cyclical; one transaction type priced off another can spiral out of control. However, in reality, analysis has shown that AMAs align with

[7] Boyer, C.N. and B.W. Brorsen. 2013. "Changes in Beef Packers' Market Power after the Livestock Mandatory Price Reporting Act: An Agent-based Auction." *American Journal of Agricultural Economics* 95: 859-876.
[8] Ward, C.E. 2006. "An Assessment of the Livestock Mandatory Reporting Act." Proceedings of the NCCC-134 Conference on Applied Commodity Price Analysis, Forecasting, and Market Risk Management. St. Louis, MO. [www.researchgate.net/publication/23513951_An_Assessment_of_the_Livestock_Mandatory_Reporting_Act].
[9] Mathews, Kenneth H, Jr., W. Brorsen, W.F. Hahn, C. Arnade, and E. Dohlman. September 2015. *Mandatory Price Reporting, Market Efficiency, and Price Discovery in Livestock Markets.* LDPM-25401, U.S. Department of Agriculture, Economic Research Service. www.ers.usda.gov/webdocs/publications/37626/53727_ldpm-254-01.pdf?v=42262 (accessed December 2017).

market conditions. For example, forward contract prices for cattle may differ slightly from that of other pricing types for a short period of time, but, over time, are neither consistently higher nor lower. This is because prices of forward-contracted cattle are set in advance of delivery; so, it is not surprising they track less closely with other prices that are set based on current market conditions. This type of relationship among the different types of prices reported is consistent with the results found in Perry et al. (2005).[10] Through the use of AMAs, market participants may not negotiate a price every day, but AMAs will align with market conditions over time. If AMAs became misaligned with market realities, then market participants would simply re-negotiate.

Although trends such as thinning markets will continue to challenge industry stakeholders and hinder price discovery, LMR continues to meet those challenges to provide valuable information and ensure that industry needs are met. LMR has effectively provided a census of transactions from those required to report, thereby avoiding problems of selective reporting and under-reporting. On a voluntary basis, market participants are generally not willing to report transactions beyond those traded on the spot market. LMR's value to industry is incomparable, as it is the sole source of information on AMAs and then reports that information alongside negotiated trades for comparison. Because LMR is supported by a rigorous compliance program, the effect of misreporting is minimized. LMR provides transparency of the livestock and meat markets the industry would not otherwise have. As observed during the early years of LMR by Matthew Diersen,[11] "The information available surpasses the scope that was accessible to producers before mandatory reporting."

The value of LMR is that it does more than simply report prices. LMR provides market information including quantity and quality, and time and location of trades, allowing a more complete picture of the marketplace. Industry recognizes this unique value of LMR, as Diersen also observed in his 2004 paper that LMR reports provide significant amounts of new non-price information useful for gauging short-term supply situations in cattle. Market participants working without complete market information hinders price discovery and market efficiency. LMR provides that information, and as there is no alternative to LMR, it is the best mechanism to provide market transparency and market efficiency.

While the value of LMR bringing transparency to livestock markets can be studied, discussed, and reviewed, the full value of LMR providing market information to the industry may be underestimated. Most studies do not consider the benefits of improved research, education, and public policy advice, and it can be difficult to identify all of the uses and users of data. Given the structure of the Federal Government, a single agency tasked with collecting data may not know how other agencies use the data. As recommended in the updated 2013 Council on Food,

[10] Perry, J., J. MacDonald, K. Nelson, W. Hahn, C. Arnade, and G. Plato. September 2005. *Did the Mandatory Requirement Aid the Market? Impact of the Livestock Mandatory Reporting Act*, LDPM-13501, U.S. Department of Agriculture, Economic Research Service. www.ers.usda.gov/publications/ldpm-livestock,-dairy,-and-poultry-outlook/ldpm135-01.aspx (accessed December 2017).

[11] Diersen, Matthew A. March 2004. "Observations from Cattle Mandatory Price Reporting." *Extension Extra.* Paper 176. http://openprairie.sdstate.edu/extension_extra/176 (accessed December 2017).

Agricultural & Resource Economics (C-FARE) report,[12] a better understanding of the interconnectedness of data products and the relative use within and across Federal agencies would provide a more complete picture of the data's value.

The strength of LMR is that it is industry driven. USDA continually works with market participants to educate and understand needs. It is important to recognize that while each component of LMR is important, it is critical that LMR is viewed as a whole. LMR brings clarity to the market and continues to be an effective tool providing valuable market information to help stakeholders conduct their business. USDA collects the information, aggregates it, and reports it, while preserving confidentiality. LMR is the only source for much of the market information, making it an invaluable aid to industry.

Baseline Study

As a first step in the process for this report, AMS commissioned a baseline study of the livestock and meat industry and LMR by Joe Parcell, Ted Schroeder, and Glynn Tonsor of Value Ag, LLC. This study (Appendix A)[13] explored changes occurring in livestock and meat markets that impact the design of the LMR program and market reporting.

Since enactment of the 1999 Act, major changes have occurred in the livestock and meat industry. Changes in the structure and ownership of reporting packers, how trade occurs in the industry, livestock production methods and technology, meat processing technology, product mix and form, importance of export markets, advances in information technology, and policy all impact the LMR program, data submission, and information reporting methods.

Livestock and meat are being marketed in dramatically different ways today than in the recent past. Negotiated trade has been rapidly replaced by formula pricing, forward markets, and longer term marketing agreements. Formula pricing, where a reference price from another published report is used as the base price for the transaction, is becoming more common. Much of formula pricing uses negotiated reported prices as the base in the formula. Thus, negotiated trade is being leveraged more heavily even as it declines in volume.

This baseline study identified evolving trends in how livestock and meat production and markets are changing to help inform the comprehensive review of LMR leading up to the 2020 reauthorization. Over the course of the study, the researchers conducted interviews with industry participants including producers, packers, processors, retailers, market analysts and researchers, and industry association representatives to gain insight into evolving market trends and implications for the LMR program. Additionally, the researchers utilized AMS historical data as well as published literature.

[12] The Council on Food, Agricultural & Resource Economics (C-FARE). (2013, updated July 2016). Value of USDA Data Products. Washington, DC.

[13] www.ams.usda.gov/sites/default/files/media/BaselineStudyLivestockMeatMarketingTrendsLMR.PDF.

Findings

- Over the past 15 years, major structural shifts have occurred in the cattle, swine, sheep, beef, pork, and lamb processing and meat packing sectors. In many instances, several packers increased in size and concentration, became vertically integrated operations, and made major investments and changes in processing to improve supply chain management. Many of these changes were in response to changing domestic and international customer and consumer demands. Producers are increasingly looking to vertical integration to remain competitive and solvent. Furthermore, the use of LMR information has expanded beyond pricing to include establishing insurance contracts, settling futures contracts, determining indemnity loss payments, and policy analysis.

- Changing domestic and global meat customer and consumer demands are driving the meat industry to be more responsive to consumer interests. This is leading to increased product differentiation and more vertical coordination and integration. Additionally, relative to when the 1999 Act was established, a much different product selection is being produced by packers required to report LMR information.

- Negotiated trade has been rapidly replaced by formula pricing, forward markets, and longer term marketing agreements. There is also an ongoing shift toward pricing livestock using meat values. Furthermore, traditional data providers are also increasingly LMR data users. This changes the form and role of LMR market reporting in that LMR has evolved from a price-discovery tool for producers to a price-determination tool for the packers submitting data.

- New methods for pricing livestock and meat products, such as internet-based auctions, are being introduced in industries that do not necessarily conform to traditional LMR practices. These types of marketing institutions will likely see continued interest to provide lower cost opportunities for producers, packers, processors, and others to participate in price discovery instead of direct negotiation.

Implications

- During the October 2013 Federal Government shutdown, the agricultural supply chain experienced an absence of LMR data. Industry was left without a benchmark to accurately evaluate markets. Wholesalers and retailers appeared more cautious in making purchases, having to negotiate contract terms without reliable data. Commodity traders slowed or halted trading and adjusted settlement terms. The CME Group temporarily suspended its feeder cattle and lean hog indexes. Industry trade organizations could not provide their members with economic analysis and forecasting, and market analysts were without the basic agricultural commodity data needed to conduct their work. The study found that the absence of LMR data during the 2013 Federal shutdown highlighted the importance of LMR to industry, domestic and international commerce, and to rural communities, and fears of another disruption to LMR information continue to resonate with data users and the industry.

- Structural changes in livestock and meat markets are testing the limits of the confidentiality guidelines in LMR reporting. The 1999 Act directs USDA to ensure that confidentiality is preserved through the LMR program regarding: "(1) the identity of persons, including parties

to a contract; and (2) proprietary business information." AMS meets this requirement through established confidentiality guidelines.[14] Confidentiality constraints are becoming a greater concern as markets become more vertically integrated, differentiated, and in many instances thin. There is a clear need to assess alternative ways to manage LMR reporting under such conditions to continue to provide the desired depth of market information the industry relies upon.

- Changes in products being produced by packers through value added, branding, and specialty programs challenge LMR reporting. This is an area that requires considerable assessment in future LMR design.

- The importance of international trade is elevating in meat markets. Continued efforts to provide timely market information related to products moving into and from international markets are worthwhile.

- Lastly, the study found that the capability for AMS to collaborate with industry to quickly assess new market developments in the livestock and meat sectors and to determine how to modify reporting accordingly will be an important dimension of the effectiveness of LMR in the future.

Industry Stakeholder Meetings

AMS brought industry members together in a series of structured stakeholder meetings to openly discuss marketing methods, the current challenges with reporting livestock and meat markets, and the needs of industry regarding future revisions to LMR. All meetings were facilitated by the Federal Mediation and Conciliation Service (FMCS). The goal of these meetings was to seek individual feedback and advice from the attendees on what the stakeholder organizations in each commodity area would like addressed or changed to improve the LMR program.

AMS held its first LMR stakeholder meeting on November 15-16, 2016. Industry organizations represented include: American Farm Bureau Federation (AFBF); American Sheep Industry (ASI); CME Group (CME, formerly known as the Chicago Mercantile Exchange); Livestock Marketing Association (LMA); Livestock Marketing Information Center (LMIC); National Cattlemen's Beef Association (NCBA); National Farmers Union (NFU); National Pork Producers Council (NPPC); North American Meat Institute (NAMI); Ranchers-Cattlemen Action Legal Fund, United Stockgrowers of America (R-CALF USA); Southwest Meat Association (SMA); Texas Cattle Feeders Association (TCFA); and United States Cattlemen's Association (USCA).

[14] AMS utilizes a 3/70/20 confidentiality guideline, which requires that the following conditions be met: (1) at least three reporting entities need to provide data at least 50 percent of the time over the most recent 60-day time period; (2) no single reporting entity may provide more than 70 percent of the data for a report over the most recent 60-day time period; and (3) no single reporting entity may be the sole reporting entity for an individual report more than 20 percent of the time over the most recent 60-day time period.

The initial meeting laid the groundwork for subsequent commodity-specific meetings that occurred throughout 2017 by clarifying the meeting goals and objectives. Meeting materials can be found on AMS' website.[15] The information gathered from these meetings, along with information from several studies, is a critical part of the basis for this report to promote an orderly reauthorization of LMR in 2020.

Through the stakeholder meetings, very few items were identified by industry for legislative or regulatory changes to the program. However, confidentiality was critically examined. Due to consolidation of the meat packing industry, protecting the identity of packers, parties to contracts, and proprietary business information has become increasingly difficult and was thoroughly discussed and analyzed.

Cattle Reporting

Under the 1999 Act, 39 packers submit transaction data for their cattle purchases and boxed beef sales. AMS reviews over 5,000 cattle transactions and 15,000 beef transactions daily. Utilizing this transaction data, AMS publishes 24 daily and 19 weekly cattle reports and 6 daily and 11 weekly beef reports.

LMR cattle reports primarily feature Choice quality cattle less than 30 months of age purchased from commercial feedlots. The information includes price, quantity (head count), and the classification category of livestock. LMR also requires packers covered by the 1999 Act to submit head count information to AMS when cattle are scheduled for delivery to the packer. The head count information is submitted once again when the cattle are unloaded at the plant for slaughter. Cattle purchased under conditional agreements, where the final price is dependent on carcass performance (e.g., grade and yield), are reported a final time after the carcass performance premiums and discounts have been applied and the final net price has been determined.

In accordance with the 1999 Act and LMR regulations, packers are required to submit information for all cattle purchase transactions in one of the following purchase type categories:

- *Negotiated purchase*, also known as a spot market purchase, is where the price is determined through buyer and seller interaction, and the cattle are scheduled to be delivered to the plant within 30 days of the agreement. The packer reports these purchases as scheduled for delivery in either 0-14 days or 15-30 days.

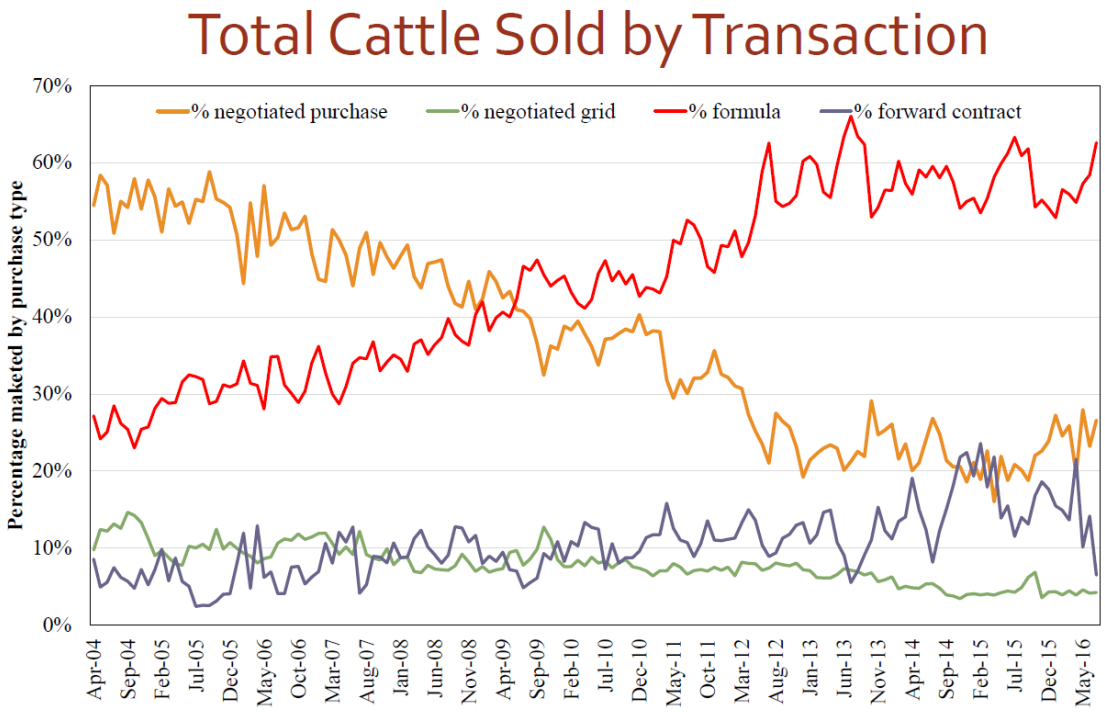
- *Forward Contract purchase* is an agreement for the purchase of cattle, executed in advance of slaughter, where the base price is established by reference to prices quoted on the CME.

[15] www.ams.usda.gov/rules-regulations/mmr/lmr/stakeholder-meetings.

- *Negotiated Grid purchase* is where the base price is negotiated between buyer and seller and is known at the time the agreement is made, and delivery is usually expected within 14 days. However, the final net price is determined by applying a series of premiums and discounts based on carcass performance after slaughter. The base price is submitted when established. The net price is submitted after slaughter and carcass grading has occurred.

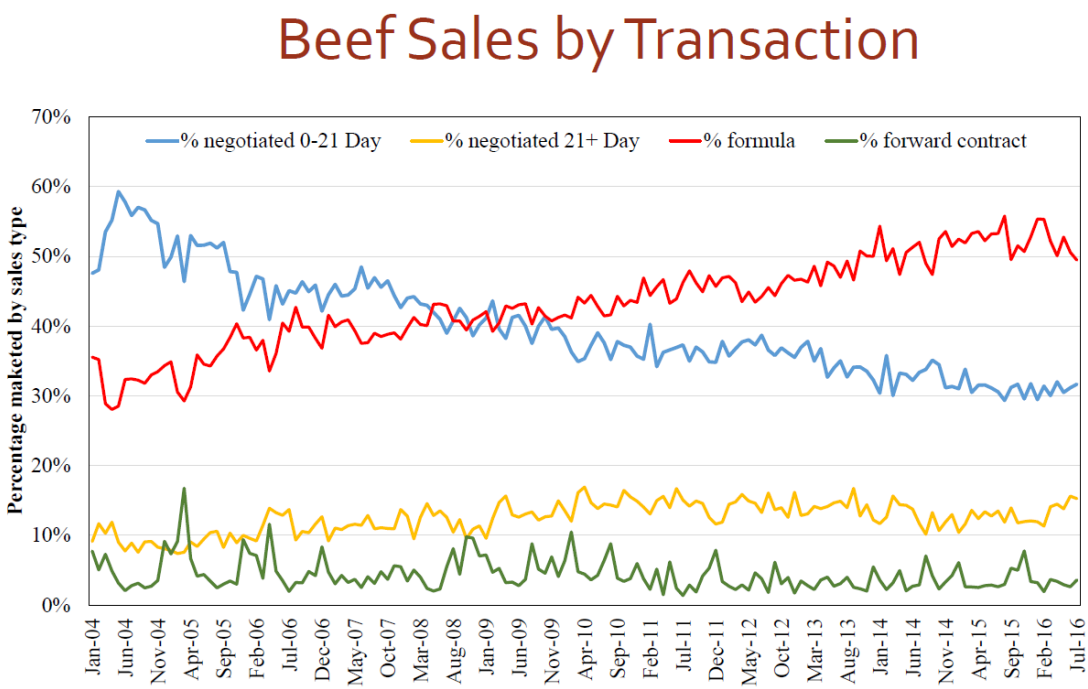
- *Formula purchase* is the advance commitment of cattle for slaughter by any means other than negotiated, negotiated grid, or forward contract. Formulas use a pricing mechanism where the price is often not known until a future date.

- *Packer-Owned* information represents cattle that a packer has owned for at least 14 days immediately before slaughter.



Cattle sold by transaction type: 2004-2016

Boxed beef reports focus on Choice and Select beef wholesale cuts, as well as ground beef and beef trimmings destined for further processing. The information reported includes price, quantity (pounds), and identity characteristics of each product sold.



Beef sold by transaction type: 2004-2016

The majority of LMR cattle and beef reports include quantity and price information and all transaction types. Historically, LMR data users focus on negotiated transactions where the buyer and seller agree on the actual sales price for near-term delivery because this reflects the most current established spot market information. Therefore, the most widely viewed LMR reports still concentrate on negotiated transactions. However, as marketing arrangements have evolved since the establishment of 1999 Act, other transaction types have become more common. As a result, AMS has increased its focus on publishing reports including alternative transaction types.

Cattle Industry Feedback

AMS held several meetings with cattle industry stakeholders to gather feedback for this report. The following organizations were represented at the stakeholder meetings: AFBF, CME, LMA, LMIC, NCBA, NFU, NAMI, R-CALF USA, SMA, TCFA, and USCA, as well as representatives from American Foods Group, Cargill, Greater Omaha, Tyson Foods, U.S. Premium Beef, and the Commodity Futures Trading Commission. Each organization was asked to submit topics or issues for discussion ahead of the initial meeting, which AMS posted on its website.[16]

Many of the issues brought forward by the cattle industry were addressed during the initial meeting through clarifications from AMS and group discussions. However, a common theme reinforced during the initial meeting was the thinness of the negotiated cattle market, an ongoing concern for industry. In the bellwether 5-area region, which comprises the Midwest and High

[16] www.ams.usda.gov/sites/default/files/media/LMRBeefCattleMeetingSummaryNotes.pdf.

Plains feeding regions and represents the central part of the United States, negotiated purchases have declined from 56 percent of all transactions in 2005 to 26 percent in 2016. This decline in negotiated purchases has been accompanied by or caused by a shift to alternative marketing arrangements such as formula purchases, which increased from 32 percent in 2005 to 59 percent in 2016. Stakeholders were in general agreement that formula-based purchases provide greater benefits, in terms of operational efficiency, for both packers and feedlots. However, the declining quantity of negotiated transactions, which are used as the pricing basis for the expanding volume of formula purchases, could lead to market vulnerabilities. These possible vulnerabilities include increased price volatility, decreased competition within the negotiated purchase type category, and possible suppression of negotiated price data by AMS due to confidentiality guidelines.

Regarding the confidentiality guidelines, cattle stakeholders concurred that no changes were warranted at this time. However, the topic generated significant interest and participants agreed that industry structural changes that occur in the future may trigger a need to revisit confidentiality.

Delivery periods. Another issue raised by stakeholders concerns the two delivery periods for the negotiated cattle purchase category, 0-14 days and 15-30 days. Ever since the 15-30 day delivery period was added as a reporting requirement in 2008, AMS has been unable to report this information as a separate category due to confidentiality guidelines. Therefore, AMS combined these transactions with the 0-14 day delivered cattle and reported the negotiated market for a 0-30 day delivery period.

At times, when the negotiated market trades lower, some industry members perceive that the lower prices were for the 15-30 day delivery period, which may not be reflective of the spot negotiated market in the 0-14 day delivery window. At the request of cattle industry, AMS Market News conducted a feasibility study[17] regarding reporting these prices as separate delivery periods:

- AMS reviewed the 5-Area region (5 Area Weekly Weighted Average Direct Slaughter Cattle report) data for 2016 to determine if the negotiated 15-30 day delivery period data would pass the confidentiality guidelines on a weekly basis. AMS also examined the last 12 weeks of 2015 because the confidentiality guidelines are based on 60 business days.

- AMS tracked these data throughout 2017. As trends and market participants changed, data analysis[18] showed the two negotiated delivery periods passed confidentiality on a national basis; therefore, the prices could be reported.

- Beginning November 14, 2017, the National Weekly Fed Cattle Comprehensive report includes weighted average negotiated cattle prices for 0-14 and 15-30 day delivery periods. A new section titled "Weekly Negotiated Avg. Price by Delivery Period" highlights negotiated prices and volumes for beef-type cattle sold on a national basis with live sales converted to dressed.

[17] www.ams.usda.gov/sites/default/files/media/NegotiatedDeliveryPeriodConfidentialityStudyHighlights.pdf.
[18] www.ams.usda.gov/sites/default/files/media/NegotiatedCattleDelPeriodReportUpdate.pdf.

Report updates and additions. During a June 2017 conference call, AMS shared an update to the National Weekly Direct Slaughter Cattle – Prior Week Slaughter and Contract Purchases report that allows negotiated cattle purchases delivering beyond 30 days from the date of agreement to remain differentiated from forward-contract purchase types. AMS initiated this update in response to industry confusion in identifying these purchase types. Additionally, AMS shared the new Weekly Fed Cattle Comprehensive report with stakeholders for feedback. The Weekly Fed Cattle Comprehensive report publishes a greater quantity of LMR information in a more concise, user-friendly report format. AMS began both the comprehensive report and the updated National Weekly Direct Slaughter Cattle – Prior Week Slaughter and Contract Purchases report on July 25, 2017.

Reporting of committed cattle. In response to an industry request for greater depth in reporting cattle delivery commitment information, AMS presented an overview of the 14-day scheduled delivery requirement for swine reporting. Every morning, swine packers submit the number of hogs scheduled to be delivered each day for the next 14 calendar days. This tool is used by the swine industry to project estimated slaughter numbers and packers' needs for hogs. Given the smaller population of the cattle industry and the sensitive nature of this kind of data, some stakeholders do not support this type of report for the cattle industry. Currently, for the committed and delivered reporting requirement, packers submit volumes for cattle scheduled for delivery in two windows, 0-7 days and 8-14 days. There was no agreement amongst stakeholders to move forward with this proposal.

The stakeholder group also discussed whether the reporting requirement for committed cattle should be revised to include cattle intended for delivery to a packer on a weekly basis. Some stakeholders expressed that having this information would lead to greater efficiency, while others believed that the information would be misleading, could be misinterpreted, and would lead to greater market volatility. There was no agreement to move forward with the proposal at the time.

Stakeholders reporting beef sales to AMS agreed to work through an industry trade association to provide additional detailed beef product specifications to assist AMS with successfully aggregating more products into published market reports.

Recommendations for Legislative Amendments

Throughout the stakeholder meetings and studies, cattle and beef stakeholders did not raise any statutory or reauthorization items for consideration. However, stakeholders did identify several recommendations to improve the overall LMR program and cattle and beef reporting specifically. As described above, AMS worked with industry and implemented most of these recommendations throughout 2017.

Swine Reporting

Under the 1999 Act, 24 packers submit transaction data for their pork and swine purchases. AMS reviews between 7,000-11,000 records each for swine and pork daily. Utilizing this

transaction data, AMS publishes 4 daily and 8 weekly pork reports, and 20 daily and 2 weekly swine reports.

AMS reports pricing and trade volumes for sales of wholesale pork cuts, subprimals, primals, trimmings, a few variety meats, and some pork enhanced cuts on wholesale pork reports. AMS also reports pricing, trade volumes, and slaughter data and carcass measurements for purchases of commodity market hogs, as well as sows and boars.

For pork reporting, packers covered by the 1999 Act submit data that include destination, sales code type, delivery period code, refrigeration, class code, product code, total product weight, FOB plant price, and FOB Omaha price, as well as other information.

In accordance with the 1999 Act and LMR regulations, packers are required to submit information for all pork sales transactions in one of the following purchase type categories with both FOB Plant and FOB Omaha prices:

- *Negotiated Sales* are wholesale pork trades made between a buyer and seller where the price is determined through interaction and scheduled for delivery not later than 14 days for boxed product and 10 days for combo product after the date of agreement.

- *Formula Marketing Arrangements* are agreements for the sale of wholesale pork where the price is established in reference to publicly available quoted prices.

- *Forward Sales* are wholesale pork trades made between a buyer and seller where the delivery period is beyond the timeframe of a negotiated sale and the price is determined by seller-buyer interaction and agreement.

- *Export Sales* include trading of pork cuts destined for delivery outside of the United States or overseas, not including any trading for delivery to Canada and Mexico.

For swine reporting, packers are required to submit purchase information three times per day. That information includes daily estimated and actual total purchases by purchase type and volume, base prices, and State of origin on a per lot basis. Swine packers also submit slaughter information on a lot basis, which includes base price, net price, carcass weight, sort loss, back fat, loin depth, and estimated lean percentage, as well as daily totals for all swine scheduled for delivery to a packer each day for the next 14 calendar days. Lastly, each week packers are required to report any non-carcass merit premiums offered for attributes such as for breed, delivery time, volume, as well as for production practices like antibiotic-free, organic, crate-free, or beta-agonist-free.

In accordance with the 1999 Act and LMR regulations, swine packers are required to submit information for all swine purchase transactions in one of the following purchase type categories:

- *Negotiated Purchases* include cash or spot market purchases made by a packer of livestock from a producer where the base price for the livestock is determined by seller-

buyer interaction and agreement on a delivery date for delivery within 14 days. These purchases are further broken down as producer- and packer-sold.

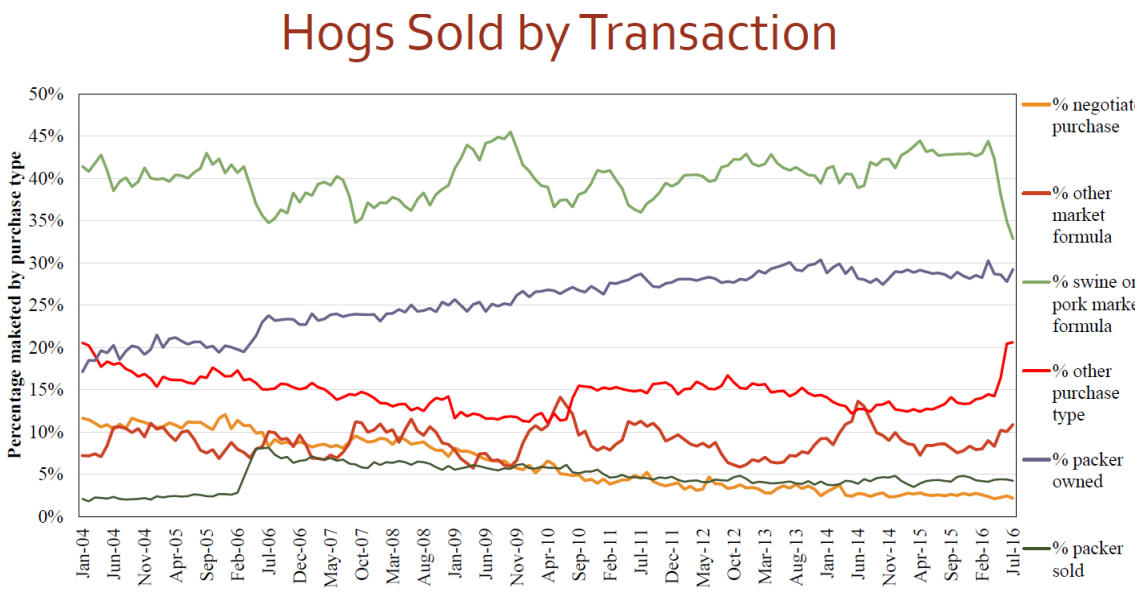
- *Other Market Formula Purchases* include purchases of swine by a packer where the pricing mechanism is a formula price based on one or more futures or option contracts. These purchases are further broken down as producer- and packer-sold.

- *Swine or Pork Market Formula Purchases* include purchases of swine by a packer where the pricing mechanism is a formula price based on a market for swine, pork, or a pork product, other than a future or option for swine, pork, or a pork product. These purchases are further broken down as producer- and packer-sold.

- *Other Purchase Arrangement Purchases* are purchases of swine by a packer that are not negotiated purchases, swine or pork market formula purchases, negotiated formula purchases, or other market formula purchases and do not involve packer-owned swine. These purchases are further broken down as producer- and packer-sold.

- *Negotiated Formula Purchases* are purchases of swine based off of the swine or pork market formula where the formula is determined by negotiation on a lot-by-lot basis and the swine are scheduled for delivery to the packer not later than 14 days after the date on which the formula is negotiated and swine are committed to the packer. These purchases are further broken down as producer- and packer-sold.

- *Packer-Owned Purchases* are purchases of swine that a packer, including a subsidiary or affiliate of the packer, owns for at least 14 days immediately before slaughter.



Hogs sold by transaction type: 2004-2016

Swine Industry Feedback

AMS held several meetings with swine industry stakeholders to gather feedback for this report. The following organizations were represented at the stakeholder meetings: CME, NPPC, NAMI, LMIC, AFBF, and NFU, as well as representatives from Fresh Mark, JBS, Seaboard Foods, Smithfield Foods, and Tyson Foods. Each organization was asked to submit topics or issues for discussion ahead of the initial meeting, which AMS posted on its website.[19]

The industry's overarching concern is with the thinness of the negotiated market, the need to mitigate and reverse this trend, and the necessity to report as much data as possible under the 1999 Act. With an increasing amount of formula-based purchases, negotiated purchases have continued to decrease. In 2016, negotiated purchases accounted for 2.53 percent of total purchase types compared to 14.65 percent in 2002. The declining quantity of negotiated transactions, which are used as the pricing basis for the expanding volume of formula purchases, could lead to market vulnerabilities and possible price discovery challenges in the future.

The industry is also concerned about the projected and significant increases in swine and pork production with five new swine packing plants opening in 2017-2018. Once all new plants are running at full capacity, the daily actual slaughter has the potential to increase about 9 percent. This would be an unprecedented increase, and the impact on the marketplace is yet unknown. However, this expansion is also an opportunity to increase the amount of daily purchase and slaughter market data reported through LMR.

Another area of industry focus is evolving consumer demand. Today, more alternative pork products are found in the marketplace, such as crate-free, beta-agonist-free, organic, and antibiotic-free. Consequently, production practices have evolved to meet these growing consumer demands and preferences. Industry is increasingly concerned about the rising number of attributes and associated premiums and how these market data are captured and reported under LMR. Industry would like greater access to this type of data, but not at the risk of diluting the commodity swine markets. Many stakeholders believe these attributes and associated premiums do not reflect the commodity swine market and asked AMS to explore alternative ways to ensure these data are reported separately and accurately through the LMR program.

Purchase-type reporting guidance. During the meetings, stakeholders requested that AMS issue new LMR reporting guidance to enhance the transparency of the negotiated and swine or pork market formula purchase categories that are utilized by the CME Group in its Daily Lean Hog Index. This index is an important risk management tool used by both producers and packers in the swine industry. AMS worked with industry to develop and implement new purchase-type reporting guidance. Effective July 3, 2017, all swine packing companies subject to LMR report their swine purchases under the following guidance:

[19] www.ams.usda.gov/sites/default/files/media/LMRSwineandPorkMeetingSummaryNotes2017.pdf.

Swine Purchases Based on the CME Lean Hog Index:

- All purchases of swine where the base price is based on the CME Lean Hog Index as the pricing mechanism should be reported as a Swine or Pork Market Formula Purchase. These hogs were reported as Other Market Formula Purchases.
- Any swine purchases formulated off of a future or option will continue to be reported as Other Market Formula Purchases. Following implementation, AMS updated the published reports by placing "Futures/Options" underneath the Other Market Formula label as a descriptor on the reports.

Formula Purchases Where the Base Price Is Known:

- Any formula-based purchases of swine where the pricing mechanism or base price is known at the completion of negotiation should be reported as a Negotiated Purchase.
- Any swine purchases using a formula price with an undetermined price at the completion of the negotiation will be reported as either a Negotiated Formula Purchase or a Swine or Pork Market Formula Purchase, depending on the terms and times associated with the purchase.

Other purchase arrangements. In addition, stakeholders expressed concerns about AMS' interpretation of other purchase arrangements, which include purchases that do not fit into other purchase types. For example, hogs raised under special production practices provide attributes (like antibiotic-free, beta-agonist-free, organic, crate-free, and breed programs) that differentiate them from commodity hogs. These purchases are reported as other purchase arrangements regardless of how the base price is determined because the unique production methods offer premium prices. Consequently, the net price for hogs with special attributes is significantly higher in most cases, which would skew the market information for commodity hogs if they were reported as negotiated or swine or pork market formula purchases.

In the industry's interest in maximizing the volume of hogs reported as swine or pork market formulas to provide robust data for the CME Lean Hog Index, stakeholders discussed packers reporting hogs with specific production attributes as swine or pork market formula purchases in the prior day slaughter information, but with the attribute premiums reported separately or not included in the net price. Several possible solutions were discussed, including amending the definition of "net price" and adding a definition for "attribute" premiums in the next reauthorization; however, no agreement was reached by stakeholders on this proposal.

Non-carcass merit premiums. During the discussion of attribute premiums, some stakeholders expressed the need for greater transparency regarding the premiums being paid and reported in the weekly non-carcass merit premium information. AMS has been unable to publish the premiums reported for some attribute categories because of confidentiality constraints. AMS reviewed all reported attributes for confidentiality issues to determine if any more attributes could be consistently reported on the National Weekly Direct Swine Non-Carcass Merit Premium report, or if this data could be reported using a 4-week rolling average. During its review, AMS found it is unable to expand premium or attribute reporting on an individual basis. However, effective August 7, 2017, AMS expanded the premium categories on the National Weekly Direct Swine Non-Carcass Merit Premium report by adding an "Other" category, which includes reported premiums not published on an individual basis due to confidentiality issues. A

list of all the premiums included in the "Other" category is published on the report. Initial items included in this category include: animal welfare, antibiotic-free, diet/feed, genetics, meat quality, Process Verified Program, sow housing, and weight.

Packer-sold purchases. To help increase the volume of data utilized by the CME Lean Hog Index, stakeholders also requested that AMS evaluate whether packer-sold purchase types would pass confidentiality. On the prior day slaughtered swine report, AMS can publish information for each of the producer-sold purchase types but cannot do the same for the packer-sold purchase types due to confidentiality constraints. Based on this analysis, AMS recommended either the continuation of current reporting practices or the combination of producer-sold and packer-sold data. AMS has requested feedback and direction from stakeholders on how to proceed with this request.

Formula purchases based on pork carcass cutout. Swine producers expressed the desire to have more information regarding the proportion or volume of swine purchases that are based on the meat market. They requested that packers identify their swine or pork market formula purchases that are based on the USDA pork carcass cutout. As this would be a new reporting requirement, statutory changes would be required in the next reauthorization. As a more immediate solution, AMS proposed collecting this information from packers voluntarily. However, no agreement has been reached on the need, frequency, or type of voluntary industry survey to collect this information.

Affiliate threshold. There was also discussion about the term "affiliate," which with respect to a packer, means: (1) a person who directly or indirectly owns, controls, or holds with power to vote, 5 percent or more of the outstanding voting securities of the packer; (2) a person 5 percent or more of whose outstanding voting securities are directly or indirectly owned, controlled, or held with power to vote, by the packer; and (3) a person who directly or indirectly controls, or is controlled by or under common control with, the packer. Given the recent proliferation of five new producer-owned pork plants, stakeholders discussed modifying the definition of affiliate to decrease the threshold to anything more than 0 percent; however, there was no agreement on this proposal. Since the term "affiliate" is defined in the 1999 Act, any revision to this definition would need to be addressed at reauthorization.

FOB Omaha basis. Packers are currently mandated to report price and volume information for all pork cuts and pork products on an FOB plant basis and an FOB Omaha basis. However, in the time since LMR pork was implemented in 2012, most of the pork packing industry adopted the FOB plant basis for their normal course of business. During the swine stakeholder meeting, packers conveyed that reporting both price series causes confusion in the market, is a burden to report, and the FOB Omaha basis has little value as the information is not as widely used. Stakeholders proposed removing this reporting requirement in the next reauthorization.

Revisions to pork cutout. Stakeholders also discussed AMS' process and procedures for maintaining the pork carcass cutout calculations. Packers voluntarily provide product yields and packaging and labor costs to AMS on an annual basis to ensure the daily cutout and primal values derived from the cuts reported are representative of current industry methods. Some stakeholders raised the issue of volatility in the reported cutout values during certain times of the

year. They asked AMS to assess whether this price volatility could be better managed if the cutout calculations were reprogrammed to utilize a 2-day rolling average instead of the current day's reported data. In addition, at the request of stakeholders, AMS enhanced the pork cutout by removing the 14-16 pound and 16-18 pound skin-on bellies from the belly primal, to better reflect current industry practices and provide a more accurate and reflective belly-primal value and overall pork cutout value.

Delivery periods. AMS was asked to analyze the impact of reporting different delivery periods on the National Weekly Forward reports and raising the minimum reported volume thresholds for reporting pork cuts and trimmings to evaluate confidentiality, data loss, and the effects of these changes on the weighted average prices, primal values, and the overall pork cutout values. While this review is ongoing, AMS has continued its current reporting procedures.

Recommendations for Legislative Amendments
As mentioned in the Executive Summary and above, swine and pork stakeholders proposed statutory changes to the LMR program including:

- Remove the negotiated formula purchase type definition and reporting requirement for swine. This definition and reporting requirement was added to LMR in the 2015 Reauthorizations Act. However, during the time since this requirement was implemented, AMS has been unable to publish information for this purchase type because it does not pass the confidentiality guidelines;

- Amend the definition of non-carcass merit premium to more clearly differentiate the reporting requirements from premiums offered for carcass merit;

- Define and report swine attributes, specifically addressing how attribute premiums, base prices, and net prices are reported by purchase type;

- Amend the definitions of affiliate to lower the threshold of ownership or control to anything greater than 0 percent;

- Add the reporting of volume of swine or pork market formula hogs that are priced based on the pork carcass cutout as a requirement, and;

- Remove the requirement for reporting wholesale pork on an FOB Omaha basis since this information is not widely used in the industry.

Lamb Reporting

Under the 1999 Act, 18 packers and processors submit transaction data for their domestic live lamb purchases, lamb carcass sales, and boxed lamb meat sales. In addition, the legislation requires importers that annually import an average of 1,000 metric tons of lamb meat products to report certain information. AMS reviews over 2,000 lamb transactions daily.

LMR lamb meat and carcass reports publish both quantity and price information. LMR lamb purchase reports primarily feature Choice quality lambs. With lamb purchase reports, the quantity and/or price may be suppressed to preserve confidentiality. The domestic boxed lamb report focuses on Choice and Prime lamb wholesale cuts, while the lamb carcass sale reports feature Choice and Prime carcasses. The imported lamb report includes wholesale meat cuts from Australia and New Zealand.

Packers, processors, and importers submit boxed lamb meat sale transactions and lamb carcass sale and purchase transactions to AMS at the time orders are priced. The information includes the price, quantity delivered (pounds), and identity characteristics of the product sold. Live lamb purchase transactions are also submitted to AMS when the agreements are priced. The information includes price, quantity (head counts), and classification category of livestock. Lamb purchase reporting also requires packers to submit a net price for transactions under alternative market arrangements, where premiums and discounts may apply to carcass performance.

In accordance with the 1999 Act and LMR regulations, packers are required to submit information for all live lamb purchases and lamb meat sales transactions in one of the following purchase type categories:

- *Negotiated Purchases* are cash or spot market purchases of sheep by a packer from a producer where the price is determined by buyer-seller interaction and agreement on delivery terms. This final price does not change and is not dependent upon any other conditions.

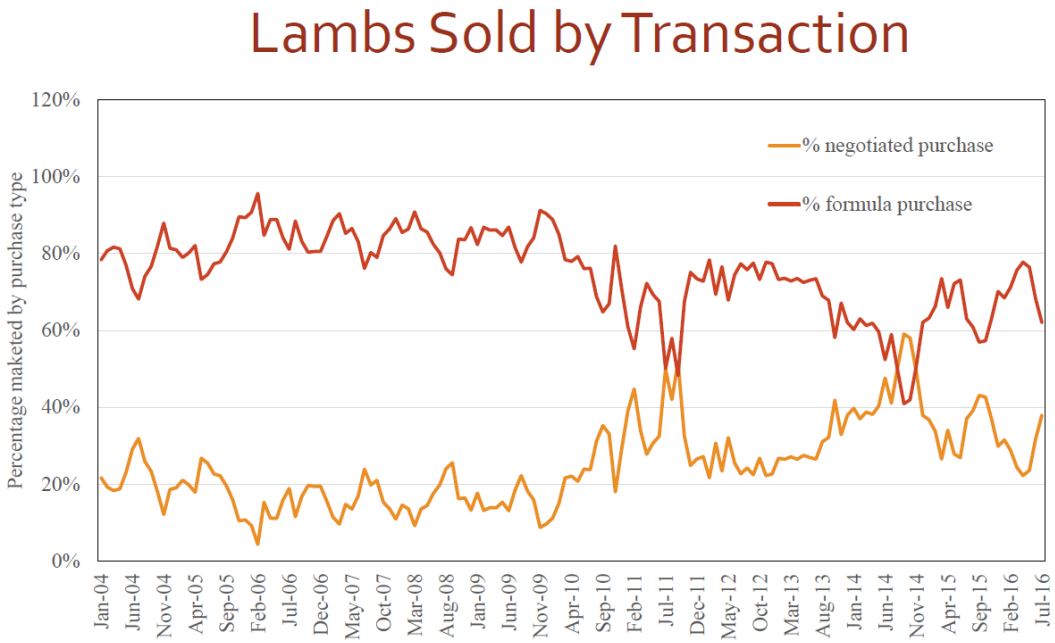
- *Formula Marketing Arrangement Purchases* are the advance commitment of lambs for slaughter using a method or calculation to determine the price where the price is frequently determined at a future date.

- *Packer-Owned Purchases* involve lambs that a packer owns for at least 28 days immediately before slaughter.

- A *Negotiated Sale* is a sale of boxed lamb by a packer to a buyer, under which the price is determined by seller/buyer interaction and agreement.

- A *Formula Sale* is the advance commitment of boxed lamb by any means other than through a negotiated purchase or forward contract, using a method for calculating price where the price is determined at a future date.

- A *Forward Sale* is the agreement for the sale of boxed lamb, executed in advance of manufacture, under which the base price is established by reference to publicly available quoted prices.



Lambs sold by transaction: 2004-2016

Historically, LMR data users focus on negotiated transactions because this reflects the most current established market price. Therefore, the most widely viewed AMS reports concentrate on negotiated transactions. However, as marketing arrangements have evolved since the beginning of LMR, other types of transactions have become more common. As a result, AMS has increased its focus on publishing reports including these alternative transaction types.

The U.S. sheep and lamb industry has been shrinking for decades, as has the lamb packing industry, with the most recent consolidation of the lamb packing industry in January 2016. In the months immediately following this consolidation until March 2017, AMS was unable to publish live slaughter lamb formula-purchase prices within its National Weekly Lamb and National Weekly Slaughter Sheep Review reports. Not enough companies purchased a sufficient volume of lambs on a formula basis to provide AMS with data on this specific purchase type to pass the confidentiality guidelines.

Consequently, in the absence of weekly AMS-published formula lamb market data on the National Weekly Slaughter Sheep Review report, the American Sheep Industry Association (ASI) was unable to offer Livestock Risk Protection (LRP) insurance for lamb producers. The weekly formula information published by AMS is one of the required components used to determine coverage amounts in the administration of this insurance product.

To resolve this issue, AMS proposed several reporting options with lamb industry stakeholders. The proposed changes included adding packer-owned lamb information to the reported purchase data to add depth to the reports, suppressing the reported total volume of formula lambs to preserve the identities of participants, and aggregate all negotiated and formula purchases submitted to AMS into a new comprehensive value. After consulting with lamb industry stakeholders, AMS implemented these changes:

- First, by suppressing the volume of formula lambs, AMS resumed publishing the weekly formula lamb information on the National Weekly Slaughter Sheep Review report in March 2017. Shortly after this reporting change, ASI could once again offer risk protection insurance to U.S. lamb producers.

- Secondly, the newly added comprehensive information provided enhanced transparency in the slaughter lamb market by showing a combined value for all purchase types slaughtered in the past week.

Confidentiality study. At the request of the lamb industry, AMS engaged Value Ag, LLC, to conduct a study to examine alternative methods to report LMR lamb data while still preserving confidentiality requirements (Appendix B).[20]

LMR confidentiality guidelines were established based on the premise of AMS "printing" a weighted average price along with the volume of transactions. The researchers assessed the viability of relaxing the LMR confidentiality guidelines and developing alternative price reporting calculations that would (1) maintain the integrity of the "printed" price as a result of price discovery between supply and demand; (2) ensure minimal infringement of private company information; and (3) not facilitate the act of market collusion.

Findings
Ultimately, the study found that relaxing the LMR confidentiality guidelines would not be feasible. However, the study did explore other alternative methods for aggregating data to enable reporting lamb market information while still preserving confidentiality requirements.

- AMS currently publishes comprehensive information that includes all negotiated and formula lamb data submitted each week on the National Weekly Slaughter Sheep Review report. The study found the AMS comprehensive price information to be a viable price series for industry use.

- The study found that a standardized pricing approach is worth industry and AMS consideration should the comprehensive price not be sufficient to meet industry needs. This approach relies upon price relationships from the two most recently completed market weeks as well as the proportion of transactions containing attributes of interest (FOB, formula, etc.) for the reported week. The study noted that this process is conceptually transparent and appealing given existing reporting challenges.

- In general, the study findings for live lamb also hold for lamb products. For boxed lamb product prices that are associated with data submitted by more than one plant but are not reported by AMS due to confidentiality requirements, the study discussed three potential price reporting alternatives. The study showed that the impact of any one, or

[20] www.ams.usda.gov/sites/default/files/media/AMSLPS201746StudyLiveLambandLambProductsConfidentialityStudy.pdf.

combination, of these alternatives would lead to a marginal improvement in AMS' ability to report five or six of the lamb product price series. The three potential alternatives are:

- Merging data submitted for fresh lamb product and frozen lamb product, with stipulations;
- Increasing the number of days used in the rolling-average period; and
- Applying a standardized pricing model to individual lamb products.

Lamb Industry Feedback

AMS held several meetings and site visits with lamb industry stakeholders to gather feedback for this report. The following organizations were represented at the stakeholder meetings: AFBF, ASI, LMA, LMIC, NAMI, and the Meat Import Council of America, as well as representatives from Mountain States Lamb Cooperative/Mountain States Rosen Company and Superior Farms. Value Ag, LLC was also in attendance as a resource during the confidentiality study discussion.

Confidentiality and weekly slaughter sheep report. The most pressing issue for the lamb industry regarding LMR continues to be the inability for AMS to report prices due to confidentiality guidelines. After reviewing industry feedback and carefully examining mathematical considerations regarding confidentiality, AMS initiated significant changes to its reports:

- Suppression of formula purchase head count information in all LMR lamb reports. This data suppression allows AMS to publish formula purchase price information on the National Weekly Slaughter Sheep Review report more frequently;

- Addition of a comprehensive section on the National Weekly Slaughter Sheep Review report with all lamb purchase type transactions aggregated into one dressed price. This aggregation made the comprehensive price derived through more packers; therefore, data suppression is less likely, and confidentiality is strengthened;

- Expansion of the comprehensive section on the National Weekly Slaughter Sheep Review report to include cooperative member transactions; and

- Initiation of new methodologies to improve the Estimated National Lamb Carcass Cutout report by including a larger representation of products used in its calculation.

Confidentiality guidelines. During the stakeholder meetings, participants discussed the lamb confidentiality study (Appendix B).[21] While discussing the confidentiality study, some participants questioned whether the confidentiality guidelines for lamb should be reinvented. Participants expressed that using the same guidelines as those used for cattle and swine reporting

[21] www.ams.usda.gov/sites/default/files/media/AMSLPS201746StudyLiveLambandLambProductsConfidentialityStudy.pdf.

is not feasible given the concentration of the lamb packing industry. All participants agreed that the industry needs robust market reporting to ensure that the marketplace has the information needed and that buyers and sellers are equally informed. As a conclusion to the discussion on confidentiality, participants agreed that AMS should continue to study and explore modifications to the current confidentiality guidelines and to explore new guidelines specifically tailored to meet the needs of the lamb industry.

Cooperative member-owned lambs. Another topic of discussion was the appropriate reporting of cooperative member-owned lambs. In consultation with the USDA Grain Inspection, Packers and Stockyards Administration and the USDA Office of the General Counsel, AMS determined that livestock procured by producer-owned or cooperative member-owned packing plants from their own producers should be reported as packer-owned livestock. There is only one cooperative member-owned plant that reports its live lamb purchases and boxed lamb sales to AMS, and nearly all this information is included in Market News reports.

As this facet of the lamb industry was studied further, AMS recognized that cooperative members receive a check for their lambs after slaughter, as opposed to livestock owned by a packing company. Considering this nuance, in November 2017, AMS added price and carcass weight information for cooperative member-owned lambs to the comprehensive section on the National Weekly Slaughter Sheep Review report, and included cooperative lambs priced on a formula basis in the formula purchases section.

Custom-slaughter lambs. During meetings with lamb stakeholders, the subject of reporting "custom-slaughter" lambs/carcasses through LMR was also discussed. In the livestock industry, custom slaughtering takes place when an entity or person contracts with a processing plant to have his or her livestock slaughtered on a per head fee basis. The ownership of the livestock does not change hands in this process, so there is no livestock purchase transaction to be reported. Currently, since there is no transaction, the reporting of custom-slaughtered livestock is not required through LMR.

However, in the lamb industry, the entity owning the livestock can sell the carcasses to processors for fabrication. There is concern among industry stakeholders that these carcasses are not reported to AMS by the seller because they do not fit the current definition of a packer in the 1999 Act. In response to this concern, AMS reviewed the lamb carcass purchase information submitted by processors buying lamb carcasses to distinguish any lots of lamb carcasses purchased from a custom slaughter operation or any other facility not already included in LMR. If identified, AMS will include these carcasses with the weekly lamb carcasses already reported.

Purchase type volumes. During the meetings with lamb stakeholders, AMS received feedback on other reporting topics. First, participants discussed purchase type volumes, specifically suppressing volume to allow the publishing of price information. There was some concern amongst participants that with a low number of packers submitting data in a thin market, confidentiality still might not be thoroughly protected if volume is suppressed. Others were concerned that if market prices are lagged, the information is no longer helpful for the marketplace, although it could be helpful for market research purposes. Another suggestion was for a quarterly or annual report of purchase-type volumes rather than weekly; however, no

agreement was reached by stakeholders on this proposal. AMS plans to publish purchase type volumes on an annual basis.

Committed lambs. Participants discussed the best way to report committed lambs. Committed lambs were covered under LMR and reported until 2008, when this requirement was eliminated from the regulations.[22] AMS asked stakeholders if the definition of committed lambs would be clearer if limited to 30 days and whether industry would support such a change. To that point, a participant stated concern with sharing information about the number of lambs being delivered every week that would be publicly available to international competitors. No agreement was reached by stakeholders on this proposal.

Pelts. Reporting lamb pelts was also a topic of discussion. Pelts are currently reported by AMS on a voluntary basis and included on a single report that covers the prices paid by packers to producers for raw pelts. However, some industry stakeholders were unfamiliar with pelt reporting and the information available. Following the last reauthorization, AMS proposed adding pelts to the regulations but did not implement this change. During the comment period, AMS received negative comments on this proposed requirement citing the increased reporting burden on packers and the possible negative implications on U.S. trade within domestic and international markets. AMS agreed to provide additional industry education as to what is reported and provide greater clarity on this issue; however, industry may still address this topic during the next reauthorization.

Recommendations for Legislative Amendments

As mentioned in the Executive Summary, some lamb producers proposed statutory changes to the LMR program. Overall, producers expressed that these changes would improve the program, alleviate some confidentiality concerns by including additional packers in the program, and ensure more robust reporting and data. Suggestions include the following:

- Lower the reporting threshold for lamb packers from 35,000 head per year on average to 20,000 head per year on average. The 2015 Reauthorizations Act lowered the reporting threshold for lamb packers from 75,000 head per year on average to 35,000 head per year. (AMS' analysis showed that this threshold had no measurable impact on the LMR program or the data being reported.)

- Define and require reporting of custom slaughtered lambs. (AMS could make this regulatory change and is currently reviewing carcass purchase data to determine whether it can distinguish lamb carcasses purchased from a custom slaughter operation or any other facility not already included in LMR.)

- Define and require reporting of committed lambs. (Some producers expressed interest in having more information on the number of lambs committed for delivery to packers.)

[22] www.gpo.gov/fdsys/pkg/FR-2008-05-16/pdf/E8-10185.pdf.

Conclusion

LMR facilitates efficient markets by supplying critical market information on a daily and weekly basis to more than a million livestock producers, hundreds of meat processors and exporters, approximately 37,000 retail food outlets, more than a million restaurants, and industries that provide support and services to the livestock and meat industry.

Since enactment of the 1999 Act, major structural changes have occurred in the livestock and meat industry. Changes in the structure and ownership of federally inspected packers, how trade occurs in the industry, production methods and technology, meat processing technology, product differentiation, the importance of export markets, advances in information technology, and policy all impact the LMR program.

The baseline study and stakeholder meetings provided AMS and industry representatives the opportunity to critically examine the LMR program, bringing together a diverse group of industry participants. Throughout the study and stakeholder meetings, industry shared its support for the LMR program, stating that the efficient marketing of livestock and meat products depends on the unbiased and reliable data provided through LMR. The importance of LMR to industry, domestic and international commerce, and to rural communities was made apparent by the absence of LMR data during the 2013 Federal Government shutdown. Stakeholders stressed the essentiality of LMR data and how critical these data are to their ability to effectively and efficiently compete in the evolving global marketplace in a letter to Congress (Appendix C).

The most pressing issue facing the livestock and meat industry is how to access the most data while still protecting the confidentiality of proprietary transactions. Due to consolidation of packers within the livestock and meat industry, preserving the identity of packers, parties to a contract, and proprietary business information becomes increasingly difficult. This is especially true for the lamb industry.

Another common theme expressed by the cattle and swine industries was the ongoing concern about the thinness of the negotiated market. Negotiated trade has been rapidly replaced by formula pricing, forward markets, and longer term marketing agreements. Stakeholders were in general agreement that formula-based purchases provide greater benefits, in terms of operational efficiency, for both packers and feedlots. However, stakeholders expressed concern that the declining quantity of negotiated transactions could lead to market vulnerabilities.

For LMR to remain an effective and relevant tool, AMS and industry, in concert with congressional direction, must quickly and continually assess new market developments to determine the best ways to improve market reporting. AMS remains committed to responding dynamically to industry needs by addressing critical issues while providing market transparency and preserving the confidentiality of market participants.

Appendix

Appendix A

Baseline Study of Livestock and Meat Marketing Trends and Implications for LMR

August 2016

BASELINE STUDY OF LIVESTOCK AND MEAT MARKETING TRENDS AND IMPLICATIONS FOR LIVESTOCK MANDATORY REPORTING

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Research Commissioned by the:

Agricultural Marketing Service
United States Department of Agriculture

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Acknowledgements

We gratefully acknowledge industry stakeholders providing observations relevant to Livestock Mandatory Reporting. Their valuable input led to the recommendations presented here. We also extend our appreciation to Agricultural Marketing Service staff in the Des Moines, Iowa, and St. Joseph, Missouri, offices for providing background information, data, contacts, and clarity of processes.

About the Principal Investigators

Joe Parcell, PhD, is a Professor in the Department of Agricultural and Applied Economics at the University of Missouri. He has been on faculty at the University of Missouri since 1998. He received his M.S. and Ph.D. in agricultural economics and BA in mathematics, respectively. His research involves value chain demand drivers, price analysis, and marketing. He has extensive knowledge of supply and value chain issues through his research and practical experience with producer agricultural ventures. His over 200 scholarly publications, proceedings, book chapters, and extension publications relate to marketing, pricing, strategy, and value added. He is co-author of the textbook titled The Agricultural Marketing System. He is founder of Value Ag., LLC. Value Ag, LLC, headquartered in Columbia, Missouri, is an economic consultancy group committed to "Analyzing Innovative Ideas for Tomorrow's Agriculture."

Ted C. Schroeder, PhD, is a University Distinguished Professor of Agricultural Economics at Kansas State University. He has a B.S. from the University of Nebraska and Ph.D. from Iowa State University. He has been on the Agricultural Economics faculty at Kansas State University since 1986. He teaches and conducts research. He is director of the Center for Risk Management Education and Research. Ted has done extensive research in livestock market risk management, meat demand, meat and livestock marketing, and price discovery and has more than 100 published journal articles and numerous other publications. He has worked as a consultant on numerous meat and livestock value-added projects, and he has been the principal investigator on a large number of external grants.

Glynn T. Tonsor, PhD, is a Professor at Kansas State University in the Department of Agricultural Economics. He obtained a B.S. from Missouri State University and Ph.D. from Kansas State University. He was a faculty member at Michigan State University from May 2006 to March 2010 and then joined the Kansas State University faculty. Through active research, engaged outreach with industry, and first-hand knowledge with livestock production, Glynn has economic expertise in an array of topics important to stakeholders throughout the meat and livestock supply chain. Glynn's integrated research and extension program has resulted in more than 60 published journal articles, numerous other publications, a multitude of outreach contributions, and projects with more than $2 million in cumulative funding.

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EXECUTIVE SUMMARY

The Livestock Mandatory Reporting (LMR) Act of 1999 was enacted to increase transparency in market transactions for swine, cattle, sheep, beef, and lamb. In 2012, coverage of pork transactions was added to the Act. LMR is scheduled for reauthorization in 2020. The 2015 authorization of the Act requires a comprehensive review of LMR by 2018. The purpose of this study is to help inform the 2018 comprehensive review. This study provides information regarding changes occurring in livestock and meat markets that will impact LMR design and associated market reporting.

USDA-AMS is responsible for implementation of the Act. Market information provided by USDA-AMS through LMR facilitates more efficient markets by informing more than a million livestock producers, hundreds of meat processors, some 37,000 retail food outlets, more than 1 million restaurants, as well as meat exporters, and the many industries that provide inputs, support, and service to the livestock and meat industry with important market information on a daily basis. Information contained in USDA-AMS livestock and meat market reports is used for decisions ranging from day-to-day marketing of livestock and meat products to long-term investments and policy.

Since enactment of the 1999 Act, major changes have occurred in the livestock and meat industry. Changes in the structure and ownership of reporting packers; how trade occurs in the industry; livestock production methods and technology; meat processing technology; product mix; product form; importance of export markets; and policy that all impact LMR design, data collection, and information reporting methods. Advances in information technology are also noteworthy.

This study identified evolving trends in how livestock and meat production and markets are changing to help inform the comprehensive LMR 2018 review. We conducted interviews with numerous industry participants including producers; packers; processors; retailers; market analysts and researchers; and industry association representatives to gain insight into evolving industry market trends and implications for LMR. We also utilized USDA-AMS historical data as well as published literature in completing this study.

Key Findings

1. Major structural shifts have occurred over the past 15 years in the meat packing and processing sectors in cattle, swine, sheep, beef, pork, and lamb. Packing firms have increased size, in many instances increased concentration, vertically integrated, and made major investments and changes in processing to improve supply chain management to respond to changing domestic and international customer and consumer demands. Producers are increasingly looking to vertical integration as a means to remain competitive and solvent. Furthermore, the use of LMR information has expanded beyond pricing to include establishing insurance contracts, futures contract settlement, indemnity loss payment determination, and for policy analysis.

2. Changing domestic and global meat customer and consumer demands are driving the meat industry to be more responsive to consumer interests. This is leading to increased

product differentiation, more vertical coordination and integration, and relative to when the Act was established generally a much different product mix is being produced by meat packers who report information to USDA-AMS under LMR.

3. Livestock and meat are being marketed in dramatically different ways today than in the recent past. Negotiated trade has been rapidly replaced by formula pricing, forward markets, and longer term marketing agreements. There is also an ongoing shift towards pricing livestock using meat values. Furthermore, traditional data providers are also increasingly LMR data users. This changes the form and role of LMR and USDA-AMS market reporting.

4. New methods for pricing livestock and meat products, such as internet based auctions, are being launched in industries that do not necessarily conform to traditional LMR or USDA-AMS practices. These types of marketing institutions will likely see continued interest as a way to provide lower cost opportunities for producers, packers, processors, and others to participate in price discovery instead of direct negotiation.

Key Implications

1. The importance of LMR to the livestock industry, domestic and international commerce, and to rural communities was made most obvious by the shutdown of LMR during the October 2013 federal government shutdown. Fears of another disruption to LMR information continues to resonate with data users.

2. Structural changes in livestock and meat markets are testing confidentiality structures in market information reporting. This issue has always been a concern, but it is becoming a greater concern as markets become more vertically integrated, differentiated, and in many instances thin. There is clear need to assess alternative ways to manage price reporting under such conditions to continue to provide the desired depth of market information the industry relies upon.

3. Changes in products being produced by packers through value added, branding, specialty programs, and other differentiation challenges market information reporting. This is an area that requires considerable assessment in future price reporting design.

4. The importance of international trade is elevating in meat markets. Continued efforts to provide timely market information related to products moving into and from international markets is a worthwhile endeavor.

5. Capability for USDA-AMS together with industry to quickly assess new market developments in the livestock and meat sectors and to determine how to modify reporting accordingly will be an important dimension of the effectiveness of LMR in the future.

CHAPTER 1: INTRODUCTION

Background

Public price reporting has immense value. A classic study on the value of price information is Stigler's 1961 "Economics of Information." He argues that "ascertainment of market price" (p. 213) is one of the most important dimensions of economic information.

The intent of price reporting is to reduce asymmetric information among market participants, which helps to achieve more efficient market outcomes and level the playing field and counterbalance possible market power. Price information signals resource allocation, production, processing, and marketing decisions. Price data from different market levels such as farm, wholesale, and retail are used to calculate marketing margins, which can help reveal changes in marketing costs among vertical industry sectors. The broad private and public importance of price information makes reliable, accessible, timely, and accurate price reporting a valuable activity worthy of public investment. This sentiment has been a major impetus to public support for USDA-AMS market reporting and was part of the initial motivation for mandating livestock and meat price reporting.

The Livestock Mandatory Reporting (LMR) Act of 1999 was enacted in 2000 and implemented in 2001 following the call by livestock industry participants for increased transparency in swine, cattle, sheep, boxed beef, and carcass and boxed lamb transactions. In 2012, wholesale pork was added as a mandatory reported product under the LMR Act. The Agricultural Marketing Service (AMS) of the United States Department of Agriculture oversees implementing and carrying out the secure collection of processor data and aggregating data into reports that mask confidential information. Many industry participants refer to LMR as mandatory price reporting (MPR). We use the acronym LMR to capture the breadth of the Act requirements to include both price and volume data.

During the past 15 years, the methods of commerce used by the livestock industry and the livestock industry's structure have changed considerably. Although the original intent of LMR was price transparency, LMR information has over time become the primary price discovery tool for the lamb, pork, and beef industries. Much attention is given to the role of reported prices within LMR, but LMR also mandates reporting of volume (i.e., head, loads, pounds) information, which is important to industry participants as well. Furthermore, over time the distinction between data users and data providers has blurred as processors required to report under LMR increasingly are also heavy users of resulting LMR reports. Approximately every five years, LMR is up for reauthorization. Significant historical dates relevant to the Act include statutory authority for LMR lapsing in 2005, the final rule of 2008 that re-established and revised LRM, 2010 reauthorization, which added wholesale reporting of pork, and 2015 reauthorization.

The 2015 reauthorization language requires completing a comprehensive review of LMR and delivering it to Congress by March 2018. In 2015, AMS leadership sought a precursor assessment of LMR to serve as a white paper for prioritizing topics important for further focused assessment as part of the mandated 2018 congressional report. AMS contracted with Value Ag, LLC to conduct the precursor study.

Objectives and Procedure

The purpose of this study is to identify and document changes occurring in livestock and meat markets that may impact LMR now or in the future. The objective is to determine current marketing trends for cattle, swine, sheep, beef, pork, and lamb that may influence LMR design, price reporting and transparency.

To complete the study three major sources of information were analyzed. First, information contained in public USDA-AMS reports and other publications were used to identify recent trends in livestock and meat markets. Second, scholarly literature was used to document important market changes. Third, the project researchers conducted extensive phone, email and in-person interviews with representatives from the pork, beef, and lamb industries. These contacts included producers, livestock and meat associations, data providers, industry and academic data users, AMS market reporters and administration, retailers, and various other entities within the meat protein value chain. Industry support and feedback for this report was strong; no entity, or individual, who was contacted refused to provide comment. To ensure confidentiality of those providing comments, the names of individuals and organizations are not reported. Although it is impossible to capture comments from every value chain participant, the report reflects sentiments from a broad array of these industry stakeholders.

Every industry participant we interviewed applauded AMS for taking the initiative to commission this study in preparation for the 2020 reauthorization and the separate 2018 report required by Congress. Participants thanked us for providing them with the opportunity to proactively consider livestock and meat marketing trends that may impact LMR data reporting and the use of LMR information provided by AMS. In many ways the active discussions we had with participants was viewed as the first in a multi-step process towards assessing LMR issues and carefully assessing ways to keep LMR concurrent with industry needs and trends.

CHAPTER 2: LIVESTOCK AND MEAT MARKET TRENDS

This project includes sheep, lamb, swine, pork, cattle and beef as covered by LMR. These six industries are unique in structure and scope (Table 1) and changed since the inception of LMR in 2001 (Table 2). These industries totaled retail equivalent sales of nearly $200 billion in 2015 and indirectly impacted the US economy several times this level. More than 1 million livestock producers, 29,000 feedlot operators, hundreds of processors, a significant number of importers/exporters, 37,000 grocery stores, and over 1 million restaurants combine efforts to meet the demands of over 320 million domestic consumers and a growing base of foreign consumers (Table 3). LMR reports directly and indirectly provide market information, and serve as a source of price discovery, for participants across all of these sectors.

Table 1. Snapshot of LMR-Covered Livestock Industries of Cattle, Lamb and Swine (2015, except for GIPSA 2012)

	Cattle	Sheep	Swine
Metric Tons Produced Domestically (ERS)	10,752,178	68,239	11,116,742
Retail equivalent value (ERS)	$105B	$1.7B[1]	$73B
Number of Producers (NASS)	915,000	50,012	63,246
Number of Processors (GIPSA)	168	81	157
Number of Processors Contributing to LMR (AMS)	33/42*	5*	47/46*
Per Capita Consumption, Pounds per Capita (ERS)	53.9	0.7	49.8
Percent of Exports to Domestic Meat Production (ERS)	10%	3%	20%
Percent of Imports to Domestic Meat Production (ERS)	14%	142%	4%

*The first number represents live animal processors and the second number represents meat and cull processors. Since boxed lamb and carcass lamb reporting includes importers, and the number of qualifying importers changes, no processor number is presented here for lamb.

1. Source: American Sheep Industry Association, 2011, https://www.sheepusa.org/ResearchEducation_Publications_EconomicImpactAnalysis

Table 2. Snapshot of LMR-Covered Livestock Industries of Cattle, Lamb and Swine (2000)

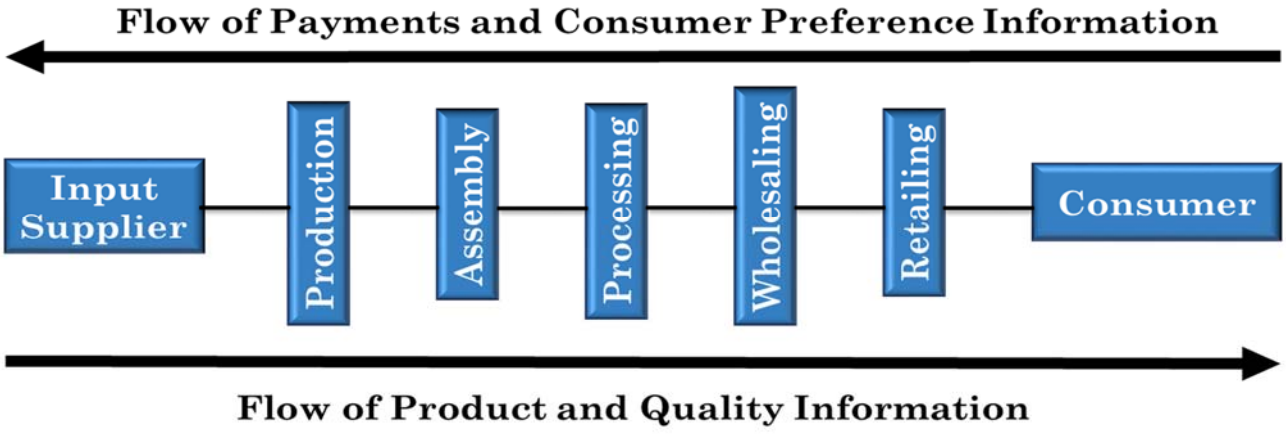
	Cattle	Sheep	Swine
Metric Tons Produced Domestically (ERS)	12,161,525	104,355	8,642,922
Number of Producers (NASS)	1.075M	66,100	86,360
Number of Processors (GIPSA)	189	62	186
Per Capita Consumption, Pounds per Capita (ERS)	67.8	0.8	51.2
Percent of Exports to Domestic Meat Production (ERS)	17%	2%	7%
Percent of Imports to Domestic Meat Production (ERS)	11%	56%	5%

Table 3. Snapshot of Entities impacted by LMR (2015)

	Cattle	Sheep	Swine
Number of Beef/Cattle Producers (NASS)	915,000	50,000	63,000
Feedlots	29,200		
Processors	168	81	157
Supermarket Stores (2013, FMI)	←	37,000	→
Restaurants (National Restaurant Association)	←	1M+	→

Barkema, Drabenstott, and Welch (1993) were among the first to document the consumer revolution and the food system offering a more discriminating consumer greater choice in food purchases. Since the inception of LMR, the US food industry has undergone significant change to provide consumers with greater choices. The changes in consumer preferences have been well documented (for example, see Okrent and Kumcu 2016). Show in Figure 1 is the flow of payments, preferences, and product quality and quantity information for the food, fiber, and fuel value chain. These supply chain activities are important for efficient commerce that leads to consumers with a variety of product offerings at the lowest cost. Parcell and Tonsor (2012) provide a summary of the importance of information for efficient market transactions between parties in the agricultural value chain. They offered suggestions for keeping public information relevant in face of increased industry consolidation/coordination, product proliferation, and global trade. As consumer preferences change, the food system has responded with change. While LMR has evolved into an important tool to facilitate efficient transactions, simultaneously other segments of the livestock supply chain have changed in response to the new consumer. All of these changes have become endogenous to each other because of the increased level of coordination in the red meat value chain.

Figure 1. The Food, Fiber, and Fuel Value Chain and Flows



Source: Rhoades, Dauve, and Parcell (2015)

The transformation of the meat supply chain over the past 15 years has significant implications for LMR:

1. The concept behind the LMR Act of 1999 originated from livestock producers seeking greater transparency in the marketing of live animals. The addition of meat to LMR was, at least compared to live animal reporting, an after-thought addition to the original Act. Over time, the growing importance of consumer preference, reorganization and diversification of the supply chain, and changes in the methods of commerce enhanced the importance of meat market reporting. The addition of mandatory wholesale pork price reporting of 2012 is an example of the growing importance of meat trade and of a major enhancement to LMR. Because of the growing coordination of the meat supply chain progressively more participants are dependent on LMR than just livestock producers.

2. As evidence of the expanded use of LMR information beyond a reflection or "mirror" of the market as intended by establishing the Act in 1999, there are multiple examples of unintended consequences that could arise when enhancements are proposed and resulting LMR information changes. For example LMR information is used by the CME Group for settling futures contracts; the sheep industry price protection insurance products rely on LMR data for indemnity payment calculation; the USDA Risk Management Agency established livestock indemnity program payments based on LMR data; and long-term USDA baseline forecasts which directly influence farm program policy utilize LMR data.

2.1 Structural Change in Livestock Production

Structural change at the farm level has been well documented (e.g., Jones, 2004; Key and McBride, 2007; McGrann, 2007; O'Donoghue et al., 2011; Parcell, Schroeder and Tonsor, 2009; Parcell and Schroeder 2014; Taylor, 2007) and the data (e.g., Ball et al., 2016; Hoppe and Newton, 2016; Key, 2016) corroborate these findings. The trend in structural change is not expected to slow. And, these trends have given rise to competing supply chains in the livestock and meat industry that are similar to supply chain differences in other highly concentrated industries (see Woolverton and Parcell, 2008).

Competing supply chain models have been the cause for the diverse livestock production systems typical in 2016 that result in divergent use and user preferences for LMR information. The primary supply chain model is commodity focused realizing economies of size where bigger, and fewer, operations continue to get larger. In this system processors add value to base meat commodity products. The supply chain model with the greatest growing consumer interest is referred to as a value chain system where producers produce a specific trait, or set of traits, targeting a specific consumer group. In this system the identity of the highly valued trait is preserved from producer to consumer. Characteristics of these systems are:

Economies of size supply chain characteristics at the production level:

1) Continued growth, focused on revenues.
2) Traditional (local) financing no longer sufficient to serve financial needs.
3) Increased need to manage the "profit margin" and "revenue risk" through contracting inputs and outputs.

4) Increased capacity to access and analyze information and translate information for decision making.
5) Emphasize genetics to deliver a more quality consistent commodity (see for example Martinez and Zering, 2004).
6) Increased coordination between supply chain segments to respond to consumer preferences and to coordinates supplies.
7) Increased incentive to vertically integrate to better leverage information, management, and volume.

Value added supply chain characteristics at the production level:

1) Smaller size focused on trading technology for labor.
2) Greater profit margin potential, higher costs, and more production and financial risk.
3) Coordinated value chain to preserve quality characteristic identity.
4) Served by specialized processors able to maintain quality identity.
5) Increased coordination between supply chain segments to secure flow of payments from retailers and quality from producers.
6) Specific genetics to deliver necessary characteristics or enable a specific production system.

Both production systems, for different reasons, have evolved in their need for public information such as LMR. Producers are seeking better access to information that resides closer to the consumer and end-product they are ultimately selling.

Structural change at the production level is important to LMR and USDA-AMS for several reasons:

1. There will continue to be lower negotiated trading volume at the live animal level (see for example Grimes and Plain 2009). Large scale producers will continue to consolidate and rely heavily on alternative marketing arrangements. Niche value-added producers face substantial financial risk if not involved with an alternative marketing arrangement guaranteeing a price level and/or market outlet. There will be increased use of meat prices to establish the base price of live animals. This will magnify the scrutiny of calculations like composite and cutout values, as many producers will lack the knowledge of processing and fabrication costs, yields, and processes.

2. Producers focused on an economies of size supply chain system will increasingly look to vertical integration to maintain competitiveness. A positive externality of vertical integration will be increased producer access to meat values, yields, and processing and fabrication costs. Producers aligned in vertical business partnerships will be better equipped to use a meat value to establish value for their own live animals.

3. Quality attributes will continue to change to reflect adjusting consumer preferences (see for example Marsh and McDonnell, 2006). At the farm-level these changes will occur relatively slower because of biology and fixed investments in animals and production facilities. Economic theory reveals if the economic incentives are large enough, a niche attribute will transition to a commodity attribute over time. Because historical information

facilitates forecasting, data users will increasingly need to be cognizant that the commodity of the future may not be the same as the commodity of the past. Identifying correlations between old and new information will be important for users of LMR information.

4. To enhance strategic planning, producers will increasingly look to LMR information to shed light on forward trends in volume and prices. Producers who regularly market livestock will increasingly look to LMR information as they develop near-term price expectations. Forecasting is important aspect of operational and strategic planning (Armstrong, 1985; Armstrong and Brodie, 1999; and Armstrong, Brodie, and McIntyre, 1987).

2.2 Structural Change in Livestock Packers and Meat Processors

Similar to studies of structural change at the farm-level, considerable research has been conducted on structural change between the farm level and consumers (e.g., MacDonald et al, 2000; Ollinger et al, 2006; Nguyen and Ollinger, 2009). Such structural change has been heavily studied for implications on pricing behavior by processors (e.g., Azzam and Salvador, 2004; Perloff and Rauser, 1983; Lawrence, Muth, Taylor and Koontz, 2007; Njoroge, 2003).[1] The use of alternative marketing arrangements to negotiated trade in the food industry was first noted by Hayenga et al. 1979. Structural change has brought about change in how the industry conducts commerce.

Immense structural change has occurred in the cattle, sheep, and swine processing sectors since the LMR Act of 1999 became law. To highlight this change, three timelines were created to show the mergers and acquisitions in the livestock packing and meat processing industry by species (Figures 2-4). Structural change has had the following impacts

Structural change and changes in commerce

1) Entities closer to the consumer are more dependent on fewer processors.
2) Publically traded versus privately owned allows different access to capital.
3) Constant expectation of growth.
4) Sustained growth requires either new markets or the acquisition of competitors.
5) Maintaining demand growth requires dedicated supply.
6) Increased need to manage the "profit margin" and "revenue risk" through contracting inputs and outputs.
7) Need for product innovation to sustain, or gain, market share.
8) Increased dependence on other partners in the supply chain increases information sharing.
9) Fewer individuals needed to conduct purchases and sales between entities.

Because of the changes that occur with commerce, the past, present, and future mergers and acquisitions are important for LMR and USDA-AMS for several reasons:

[1] Research by Albaek, Mollgaard, and Overgaard (1997) and then Stuhmeier (2015) offer empirical evidence and theoretical motivation for how collusive behavior can develop and for why mandatory price reporting can lead to higher expected market prices.

1. The composition of companies that are reporting regular market information and data to USDA-AMS under LMR guidelines has changed significantly over time. This brings changes in volumes of products represented by individual companies and proliferation in the forms and types of products being produced and marketed by individual companies. For example, when a pork processor merges with a large hog producer, the result is a major shift from producer-marketed hogs to packer-owned hogs. Or when a packer acquires a branded food processor, the packer suddenly has a new set of branded product lines under its domain that may divert meat products from commodity markets to intra-firm transfers to more branded product lines. These types of events, occurring at a rapid pace in the livestock and meat industry, are having substantive impacts on the quantity, type, and form of information available for USDA-AMS reporting. Adapting LMR accordingly has been, and will continue to be, a major challenge.

2. Increased consolidation directly affects confidentiality concerns in market price reporting. For example, when two LMR reporting packers merge, there is an immediate increase in the probability that existing USDA-AMS price reporting categories for meat or livestock may not be reportable because of the existing confidentiality guideline. Beef, pork, and lamb industries are all experiencing consolidation directly affecting current price reporting confidentiality restrictions. The same confidentiality guideline is applied across all three species (swine, cattle, and sheep) and associated meat sectors. With markedly different industry structure and industry evolution, this is an issue many voiced as worthy of further consideration by LMR and USDA in the future.

3. Larger firms have increased incentives to better vertically coordinate their supply chain. As such alternative marketing arrangements for both inputs and outputs, inter- and intra-firm transfers, and partnering has become more commonplace. Such activities directly impact the form of information that becomes available to USDA-AMS for price reporting. Negotiated markets become more thinly traded and reported and the types and nature of alternative marketing arrangements become increasingly important to design more effective price reporting protocols.

4. As negotiated live animal trade thins, price discovery for live animals is more heavily tied to meat trade. While the impetus for the 1999 LMR Act was live animal trade, future enhancements to LMR will have more emphasis on meat trade.

5. As value added production systems develop medium-size meat processors are becoming more involved with identity preservation of the value added commodity attributes. Understanding the marketing mix of medium-size meat processors is important to know whether they are able to add volume to meat LMR or if their products are subject to confidentiality exclusion.

All such structural changes lead to changes in how livestock and meat marketing occurs impacting the structure and effectiveness of LMR.

The LMR Act of 1999 was intended to be flexible to meet evolving industry needs. The AMS has been responsive to needed changes. For example significant changes in LMR during the first couple of years when the Act took effect included adjusting confidentiality rules in August 2001,

just five months after inception, from the original "3/60" confidentiality guideline to the "3/70/20" rule.[2] Furthermore, adjustments to price reports are frequently made by AMS to make reports more reflective of current industry practices. With the changes occurring in the livestock and meat industries, LMR and USDA-AMS will need to continue to be vigilant in making adjustments to reporting procedures to optimize relevance and value for market participants.

[2] The 3/70/20 confidentiality rule followed by USDA for mandatory price reporting states: "The guideline consists of three requirements: (1) At least three reporting entities need to provide data at least 50 percent of the time over the most recent 60-day time period, (2) no single reporting entity may provide more than 70 percent of the data for a report over the most recent 60-day time period, and (3) no single reporting entity may be the sole reporting entity for an individual report more than 20 percent of the time over the most recent 60-day time period." Federal Register, May 16, 2008 (p. 28,618)

Figure 2. Beef Industry Mergers & Acquisitions

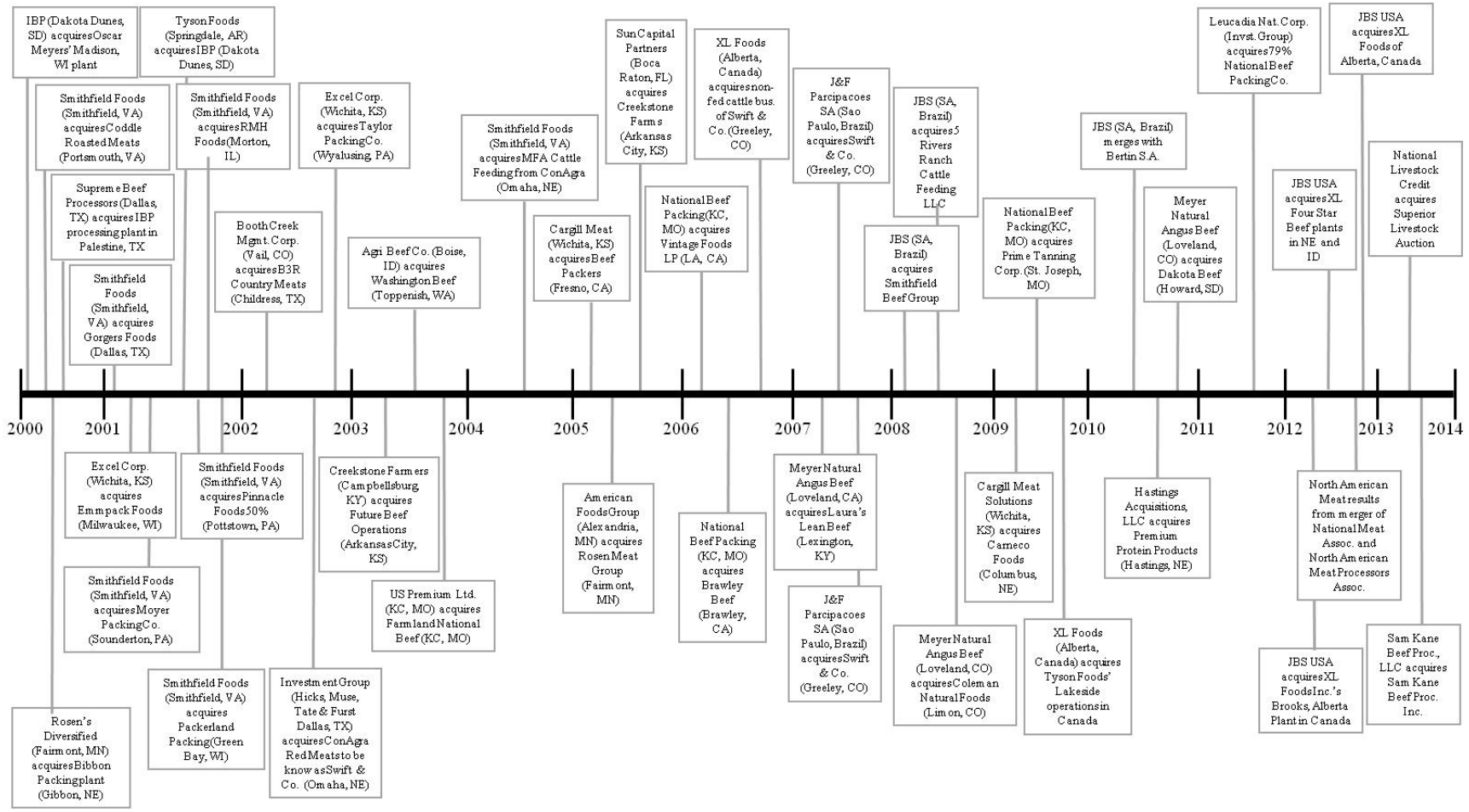


Figure 3. Lamb Industry Merger & Acquisitions

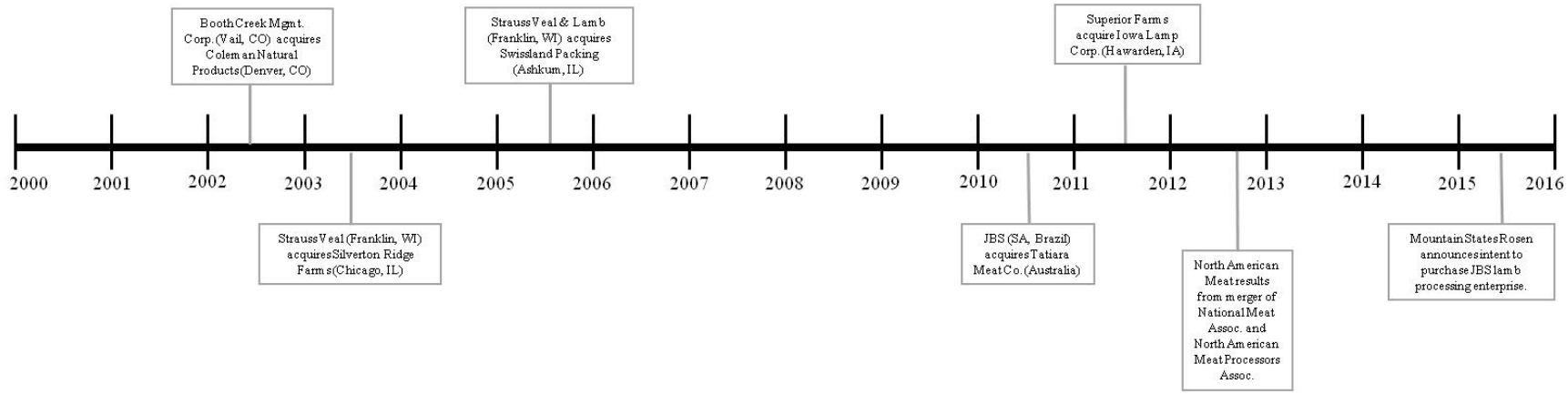
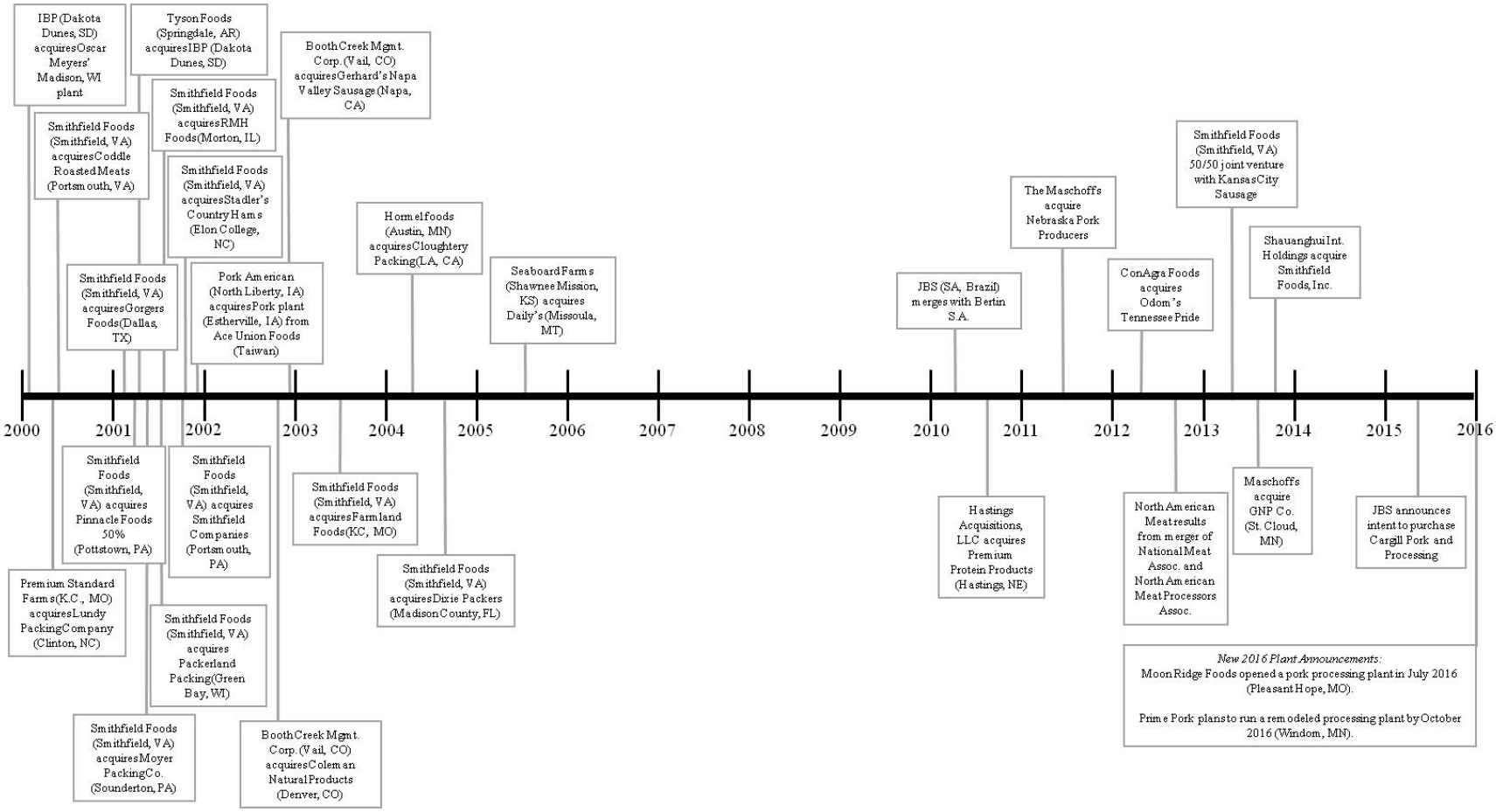


Figure 4. Swine Industry Mergers & Acquisitions



2.3 Changes in Livestock and Meat Marketing

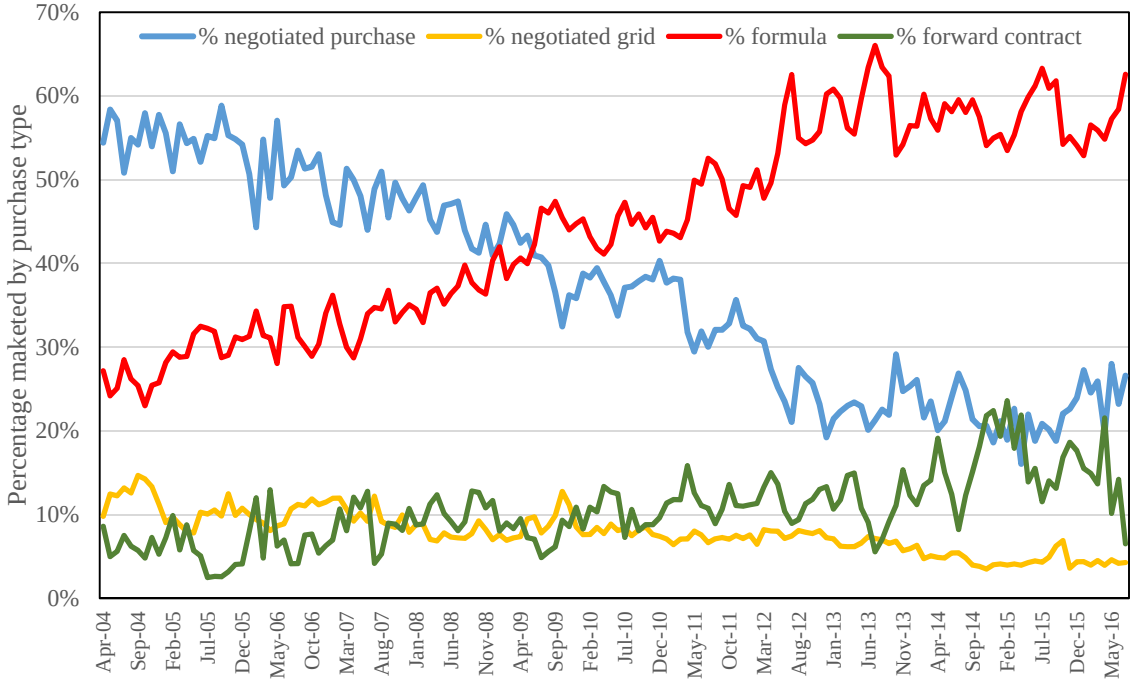
A number of authors have documented the impacts on livestock markets associated with LMR (e.g., Anderson et. al, 1998; Azzam, 2003; Bastian, Koontz, and Menkhaus; 2001; Koontz, 1999; Njoroge et al., 2007; Pendell and Schroeder, 2006; Perry et al., 2005; Schroeder, Grunewald, and Ward, 2002; and Wachenheim and DeVuyst, 2001). Koontz and Ward (2011) review and synthesize all of the research up until 2011 that involve mandatory price reporting.

Livestock and meat products have experienced major shifts over time in how commerce occurs. Figures 5, 6, and 7 summarize changes in relative volumes of fed cattle, market hog and lamb sales methods over time. These trends are also summarized by the recent work of Adjemian et al. (2016a, b), while Purcell (1992) was the first to point out pricing and coordination issues as livestock market coordinate. Apparent in these charts is that what USDA-AMS categorizes as negotiated trade, has declined precipitously over the past 10-15 years. For example, negotiated fed cattle sales represented between 50-60% of volume in 2004 and dropped to 20-30% over the last couple of years. In contrast, formula trade went from about 30% to 60% of volume during this same time period. Market hogs went from 15% negotiated to less than 5% as packer-owned hogs nearly doubled from about 15% to 30%. Compounding the issue for both beef and lamb is that the volume of transactions has declined over time as beef production has declined and as imports of lamb have increasingly replaced domestic lamb production.

Boxed beef is also realizing significant changes in pricing methods (Figure 8). Negotiated 0-21 day sales have gone from about 50% of trade in 2002-03 to about 20% in 2016. Formula trade has increased from about 30% to 50% or more over the same time period. Longer term trends in relative pricing methods for wholesale pork are not readily available since LMR on wholesale pork is only available since July 2013 and boxed lamb pricing methods have not been regularly reported.

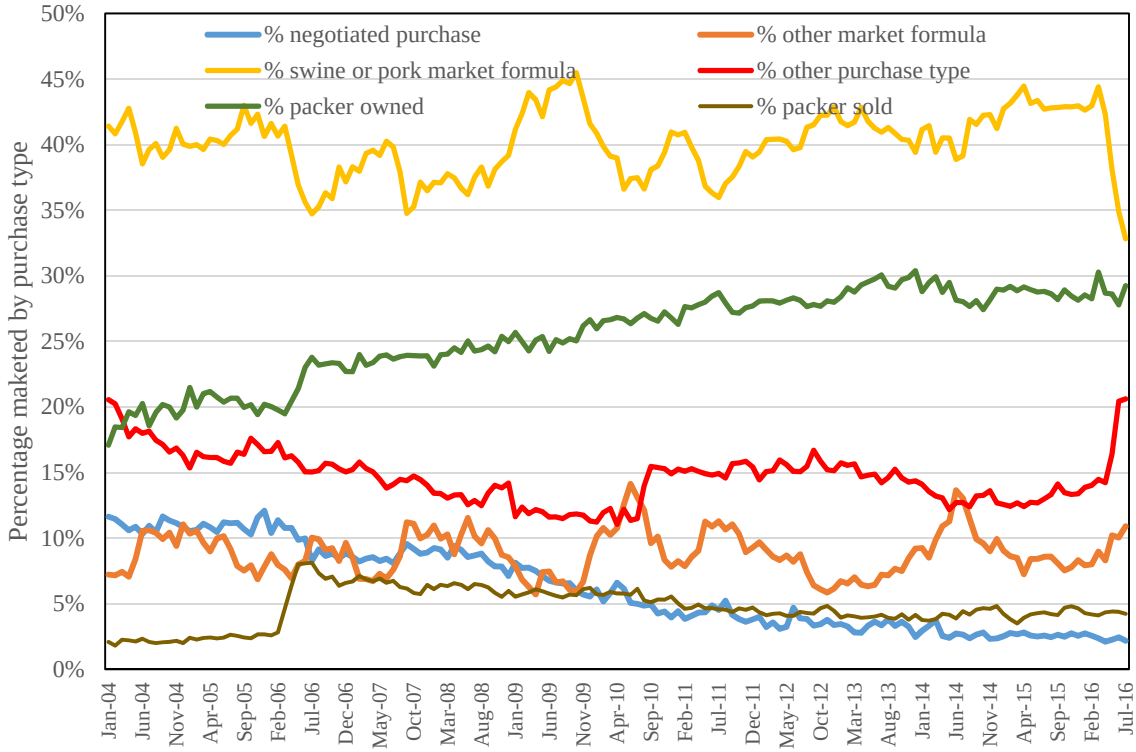
Note, in each of Figures 5 through 8 the outlier volume level in October 13 signifies the loss of transactions due to the government shutdown.

Figure 5. Total Cattle Sold by Transaction, Monthly April 2004 through July 2016.



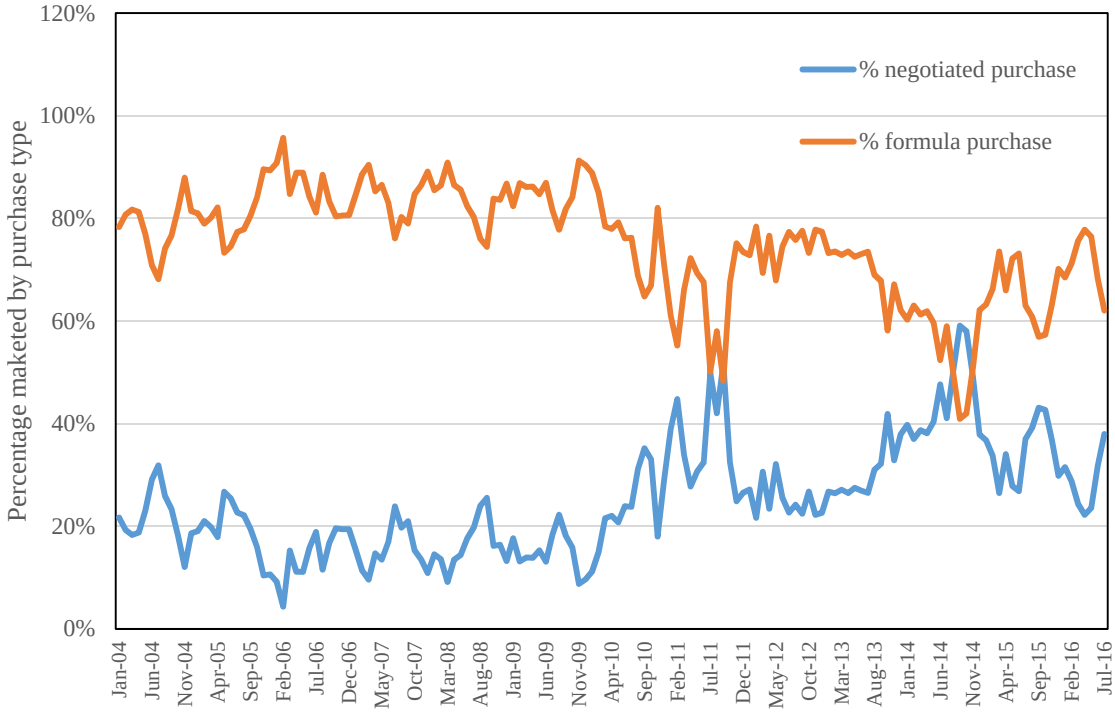
Data Source: USDA-AMS

Figure 6. U.S. Hogs Sold by Transaction and Total Head Transacted, Monthly 2004 through July 2016.



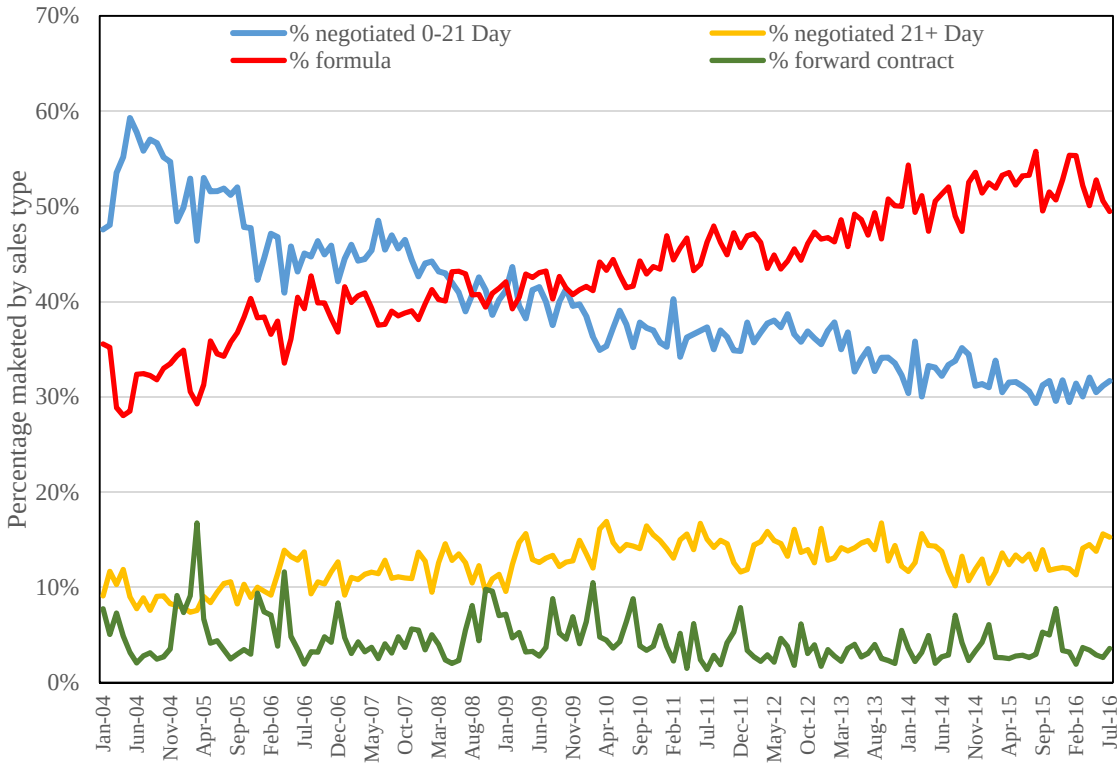
Data Source: USDA-AMS

Figure 7. U.S. Lambs Sold by Transaction, Monthly 2004 through July 2016.



Data Source: USDA-AMS

Figure 8. U.S. Beef Sales by Transaction, Monthly 2004 through July 2016.



Data Source: USDA-AMS

In our discussion with industry participants, consensus suggested trends toward less negotiated individual transactions and more forward contracts, marketing agreements, formula pricing, and packer-intra-firm transfers will continue for the foreseeable future. This is occurring because of several longer term business management strategies and, as such, recent trends will continue.

The trends in changing livestock and meat procurement methods have several implications for LMR:

1. Negotiated trade is thinning with fewer transactions across every sector being represented in this category (e.g., Nelson and Turner, 1995). Formula pricing is becoming more common. Much of formula pricing uses negotiated reported prices as the base in the formula. Thus, negotiated trade is being leveraged more heavily even as it declines in volume. This has shifted the role of LMR for negotiated prices more to price discovery in addition to price reporting. Any changes in LMR rules or USDA-AMS reporting protocols for negotiated prices directly impact many formula trades. This certainly increases the sensitivity to, and magnitude of, impact of adjustments to negotiated trade reporting protocols by AMS. Industry must carefully weigh the cost versus the benefit of a change before recommending adjustments to AMS or the LMR Act.

2. Because of the importance of negotiated price reports for a variety of industry concerns, there is considerable interest in maintaining reliable negotiated price reports. However, with thinning markets several challenges arise in accomplishing this goal:

    a. The livestock industries represented here realize that thin markets will be subject to elevated confidentiality concerns making reporting more sporadic especially for disaggregated products reported more frequently (e.g. daily) or regionally (rather than nationally). Consideration and assessment for more product aggregation across time (e.g., daily to weekly reports), as multi-day rolling averages, across product form (e.g., composites as opposed to individual products), or across locations is needed. But this all has tradeoffs that must be assessed – the next three points illustrate such tradeoffs.

    b. Aggregate or composite price reporting is one way to deal with thinning markets, but aggregation brings with it several issues. Based on our conversations with industry stakeholders, an increasing number of both livestock and meat alternative marketing arrangements are using USDA-AMS composite prices yet doing so with partially accurate understanding.

    c. One way USDA-AMS might deal with thinning negotiated markets is to increase the length of time included in a specific report. Based on our conversations with industry stakeholders an increasing number of both livestock and meat alternative marketing arrangements are using USDA-AMS published weekly/rolling averages or are computing rolling averages for their own use in commerce and decision making. This can work during periods of stable markets, but when markets are moving up or down rapidly, increasing the length of time included in a report greatly reduces the value of the report. Industry stakeholders have differing perspectives on what time period constitutes establishing a market price. This is to be expected, as at the live

animal level the marketing patterns of hog producers and cattle and lamb producers differ due to the flow of production. This is a tradeoff that needs to be assessed industry-by-industry for implications.

d. Because of the changes in which marketing and procurement is occurring through alternative marketing arrangements there is greater emphasis on looking forward. For example, the regulation was amended in 2008 to accommodate a change in negotiated cattle trade and include 15- to 30-day delivery transactions. Live cattle forms and reports now include both one- to 14-day and 15- to 30-day delivery windows. There will be increased demand for USDA-AMS to report forward looking information. However, this requires packers to increasingly report intentions rather than just what they have paid for livestock. This is addressed further in the next comment.

e. The issue of reporting packer intentions in MPR has raised concerns about the original intent of MPR. Intentions and plans for scheduled slaughter delivery by packers goes beyond being a mirror of what prices have been paid for livestock and associated volume in these transactions. This overall issue is one that deserves on-going assessment since this information on intentions of packers has largely been collected through discretionary interpretation of LMR and may not be in the Act itself.

3. Thin negotiated markets are bringing new forms of pricing into the array of price discovery institutions and platforms. The Fed Cattle Exchange, an electronic, web-based fed cattle market is one such example. There was considerable debate as this exchange was developed whether the prices from this market would, or even could legally, be included in LMR. This electronic market was launched by Superior Livestock Auctions as one way to increase the number of cash fed cattle transactions in the thinning negotiated fed cattle market. This market recently closed because of technical problems with software, but is reschedule to start trading again. The transactions that occurred in this market, as far as we understand, were not included in USDA LMR reports. This specific example simply illustrates the types of transactions that are likely to evolve. In this era of electronic commerce, more electronic livestock and meat markets are likely to evolve. AMS will continue to face these types of requests going forward.

4. Several participants mentioned a desire to potentially include negotiated transactions from intra-company transfers in AMS reports. There was support for including these transactions when it is determined that the transaction occurred through negotiation (for background see Parcell, Brees and Giddens, 2003). Some participants went further and suggested that one party to the transaction be an independent producer, i.e., exclude packer intra-company transactions. Precedent exists for including intra-company trade when independent producers are involved. Farmland Industries, a cooperative, supplied hog data to LMR and included transactions where the independent producer was a cooperative patron. Similarly, US Premium Beef (USPB) farmer-owners contributed cattle to the former USPB majority-owned National Beef processing plants. USPB was organized initially as a cooperative and later as an LLC. With a number of farmer-owned swine processing plants planned to open, a large farmer-owned sheep processing plant operating as a major player in sheep processing, and interest in farmer-owned beef

processing, the potential exists to capture sufficient volume that would garner including these transactions. One concern is that intra-company transactions may not be market-determined. We highlight the issue here as one that AMS will be faced with again in the future.

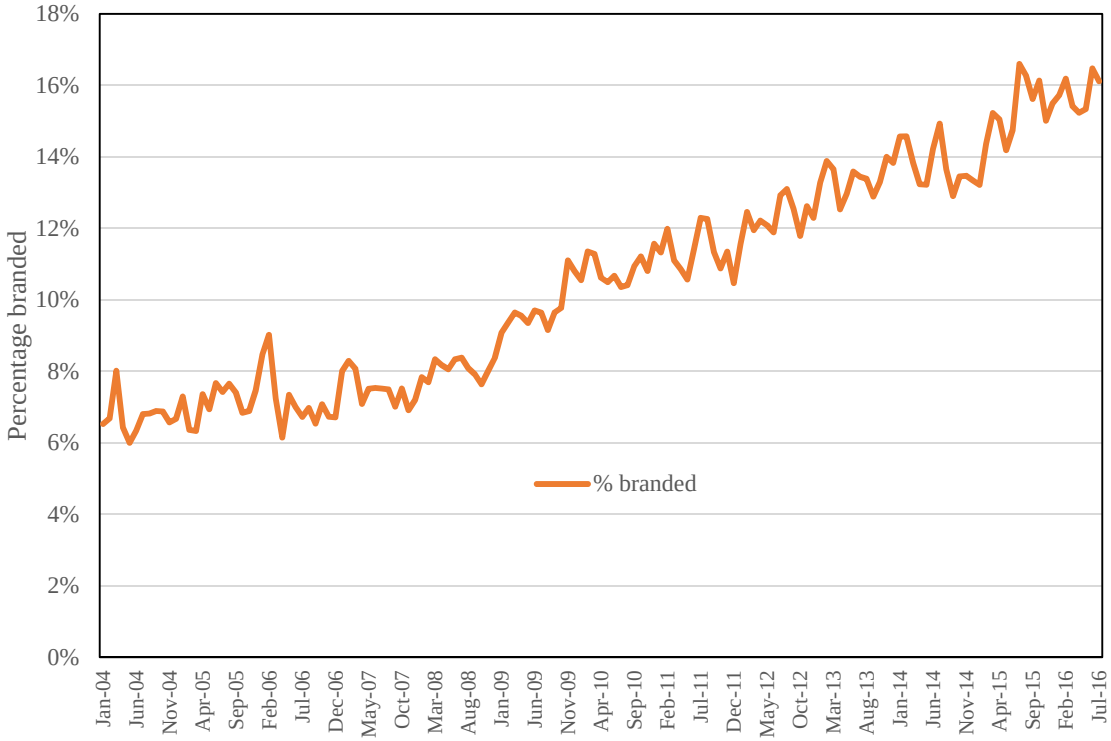
2.4 Product Proliferation and Price Reporting Standardization

There is considerable product proliferation occurring in meat markets. Increased case-ready product, specialty trimmed cuts, branded products and other forms of differentiation (naturally raised, etc.) are adding to a large array of meat products being marketed by reporting packers. Boxed lamb, pork, and boxed beef market participants consistently referenced product differentiation and proliferation reducing negotiated trade volume on commodity products as a significant current and future concern. Several researchers have documented the proliferation in retail-level branding efforts (e.g. Parcell and Schroeder, 2007; Schulz, Schroeder, and White, 2012; and Ward, Lusk, and Dutton, 2007). For example in the LMR data, Figure 9 summarizes the % of boxed beef indicated as being branded product relative to the total volume of boxed beef trade. Two common concerns surfaced regarding product differentiation. First, participants shared concern that product differentiation has increased use of alternative marketing arrangements in meat trade. Although using alternative marketing arrangements more frequently has reduced the volume of negotiated transactions, alternative marketing arrangement use is the reality of a more coordinated value chain driven by diverse consumer preferences. We expect use of alternative marketing arrangements to continue to increase and further erode negotiated meat trade volume.

The second concern is that of product differentiation whereby processors offering more case-ready product invokes the 3/70/20 confidentiality restriction. This is leading to new meat products that do not fit the IMPS code categories for either lamb or beef or lead to new product specification sheets for wholesale pork. As a result, either the product is only sold by one processor, or the product creates an entirely new product category that rarely trades. Furthermore, the niche primal categories take away trade volume from other primal categories and force these categories closer to the 3/70/20 confidentiality restriction.

Overall, this is an area that we heard a lot of discussion with industry participants. Many also provided general recommendations for addressing these concerns going forward. Without doubt, this is a major topic with need for substantive assessment as LMR and USDA-AMS contemplate meat price reporting in the future.

Figure 9. Branded Beef Sales, Monthly 2004 through July 2016.



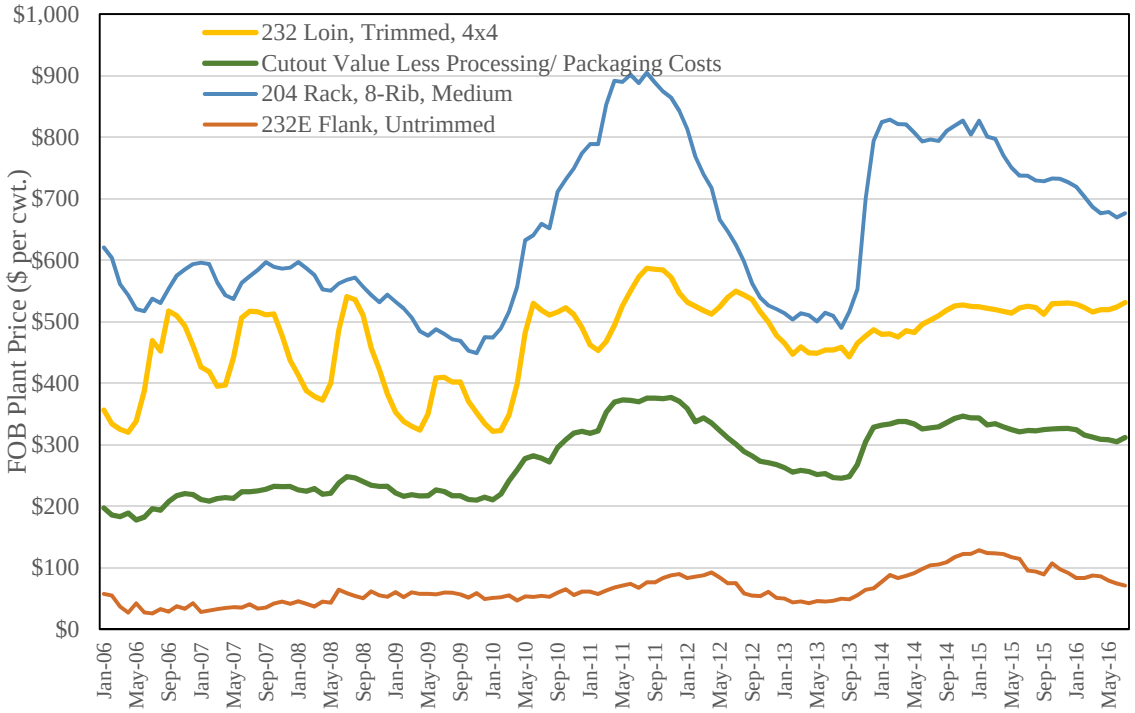
Data Source: USDA-AMS

2.5 Composite and Primal Calculations

Composite and primal value calculations are increasingly being used as the base price for meat alternative marketing arrangements (AMAs). An increasing number of live animal transactions also use the cutout value, or carcass, composite to establish base prices. Composite calculations were voluntarily offered by AMS in response to industry interest in tracking overall value proposition. Composite calculations were not intended for price discovery purposes. However, industry participants found comfort in composite calculations, and they adopted them into alternative marketing arrangements and used them for business decision making. Across the beef, lamb, and pork industries, the value of these composite calculations is increasing and will most likely continue to increase in use.

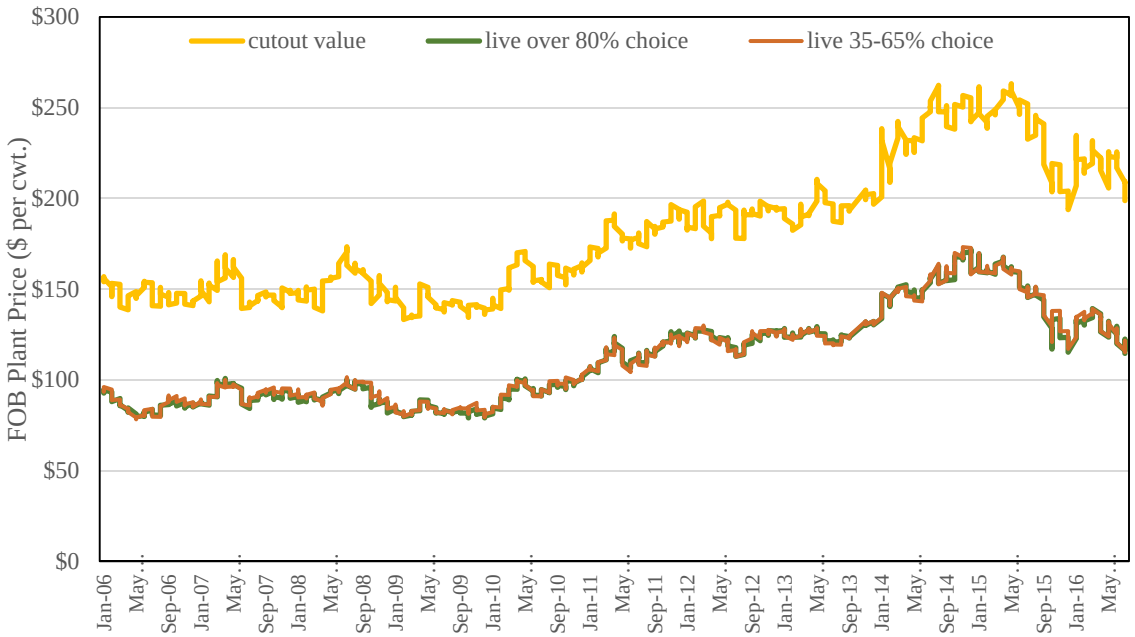
Both Tomek (198) and Franke, Parcell, and Tonsor (2011) show the importance of the number of transactions to the confidence in the price level. As certain markets thin, data users will look to alternative markets. Motivation for adoption of composite calculations is the high degree of correlation between the primal or cutout has to the underlying commodity, or product, being priced off. Also, data users are more comfortable with the series' because of the greater frequency of a price being reported. For example, Figure 10 is a summary of the consistency and low variability for certain lamb primals and lamb cutout. And, Figure 11 is the example of the correlation in movement between the choice boxed beef cutout and two negotiated live cattle price series.

Figure 10. Lamb Primal and Cutout Prices, Monthly 2006 through July 2016.



Data Source: USDA-AMS

Figure 11. Choice Beef Cutout and Selected Choice Live Cattle Prices, Weekly 2006 through July 2016.



Data Source: USDA-AMS

2.6 International Trade

Trade is immensely important to the US livestock and meat industry and this will continue into the foreseeable future. This is an area all industry participants agreed upon. There were also sentiments strongly supporting more reporting of especially North American trade -- specifically, inclusion of Canada and Mexico -- in beef LMR. Some participants expressed reservation that including North American trade would not sufficiently add to negotiated trade liquidity and justify the costs of submitting data, auditing, and adjusting the AMS reporting system. The percent of total US beef exports to domestic US production is 10% in 2015 (see Table). Approximately 1/3 of total US beef exports is to either Canada or Mexico. With increased importance of international trade in livestock and meat markets, there is desire by industry for consideration of incorporating similar muscle cut specification North American trade in with domestic trade price reporting.

CHAPTER 3: LMR IN A DYNAMIC INDUSTRY

The nature, magnitude, and velocity of changes occurring in livestock and meat markets indicates LMR and USDA-MPR will face regular changes in how commerce occurs, in structural issues with reporting firms, and in product changes over time. Nearly every interview we conducted pointed to immense value that could be gained from coordinated regular communication with USDA between reauthorization periods.

Interview participants provided a number of anecdotes about significant industry change being a factor that would bring value to regularly scheduled meetings open to LMR data providers and LMR data users. Some industry changes occurred relatively quickly, and AMS was able to implement an adjustment because of strong industry advocacy and awareness, e.g., prevalence in use of basis contracts and adding this as a transaction category. Some changes have been completely unforeseen, e.g., the current trend away from processors trimming grind at the plant instead of retail due to FSIS ruling that retail trimming presents a food safety concern. Or, when there is a situation of how to report products and into what bucket differentiated products are being reported, e.g., country of origin labeling law with exemptions (see Tonsor, Schroeder, and Parcell 2015) and subsequent repeal of the law. Or, when there are longer term industry issues like thinning markets and the need for broad-based prioritization and study of means by which to sustain negotiated trade. The area of continued communication with industry and USDA-AMS is a fruitful area for additional effort. Ultimately any efforts by USDA-AMS to expand communication with the industry must be reciprocated by industry representatives to be successful.

Some interviewed stakeholders acknowledged the AMS development of the MPR Data Mart portal as providing both better access and enhanced transparency of LMR data. Some stakeholders without access to analytical resources, however, still seem to have trouble knowing what to do with the immense amount of information available through the MPR Data Mart portal

Every industry participant we visited with said USDA-AMS is approachable, responsive, and willing to help address issues that arise. Despite this willingness to help, our multiple discussions with stakeholders from each industry, made it apparent that confusion exists about the information contained in various price reports and especially in composite values such as cutout and primal values. Several comments indicated a desire for additional transparency and documentation of underlying processes used in deriving composite values. In short, the net social value of LMR could expand if additional documentation were provided. Industry in turn could enhance social value by more regularly providing updated yield and cost information for composite calculations by USDA-AMS.

Beyond coordinated communication, all parties involved would be well served by a systematic process by which proposed adjustments to LMR are empirically assessed both for direct and indirect implications *before* being implemented. Given the dynamic and diverse nature of the livestock and meat industry as synthesized in this report the need for an empirical assessment of candidate changes only grows over time. In many cases, but not all, this will require engagement of third-party experts with appropriate skills and unbiased roles in assessing proposed changes.

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Appendix B

Live Lamb and Lamb Products Confidentiality Study

Live Lamb and Lamb Products Confidentiality Study

August 2017

Prepared for: Agricultural Marketing Service

By:

Joe Parcell and Glynn Tonsor

Table of Contents

1. Executive Summary

LMR confidentiality guidelines were established based on the premise of AMS "printing" a weighted average price along with the volume of transactions. We assessed the viability of alternative price reporting calculations that would: 1) maintain the integrity of the "printed" price as a result of price discovery between supply and demand; 2) ensure minimal infringement of private company information; and 3) not facilitate the act of market collusion. We used the period of one week for this study as the base period, which is consistent with most current AMS reporting for lamb.

Because of the lack of transaction volume in this market, we took great care to maintain the confidential integrity of the data. We also made an effort to provide meaningful information related to all alternatives. In most cases we masked the identity of an individual data series, and in most cases we used a proxy for the LMR's 3/70/20 confidentiality threshold. We were careful to note that any alternative price calculation deemed viable in this report will need to be further vetted by AMS. Our analysis of alternatives did not include a comprehensive review into any particular alternative price calculation.

We spent considerably less effort analyzing lamb product cuts. Our premise is that our findings at the level of live trade is generally applicable to the lamb product cuts report. For lamb product cuts, the need for an alternative reporting metric is hit-and-miss across different cuts. This makes offering a general recommendation difficult. As would be expected, lamb product firms tend to be in-and-out of the market regularly to replenish, or to move, inventories. For some cuts one firm may have such a large market share there is no viable alternative price reporting metric to consider.

We looked into the case of how long price information remains in the market. We determined that period to be no more than three weeks, with the exception of seasonal tendencies. However, caution must be taken in consideration of reporting historical prices without consideration of confidentiality. A key proprietary business detail is the margin, and firm-level margins tend to remain constant over time. Because the lamb and lamb products industries are fairly consolidated, we have a concern that firm-level margin information could be exposed with the release of historical information.

A concise summary of our findings for live lamb is as follows:

Relaxing 3/70/20 thresholds
- Relax "3" ..... infeasible
- Relax "70" ..... infeasible
- Relax "20" ..... infeasible

Apply 3/70/20 to plants instead of firms ..... infeasible

Consolidate weight categories
- Lighter weight categories ..... infeasible

Heavier weight categories .....feasible, but subject to being infeasible

Consolidate transactions across weeks .....infeasible

Use the comprehensive price ..... feasible, with slight caveat

Include cooperative lambs into formula .....infeasible

Include cooperative lambs into comprehensive ..... feasible, adds volume

Price off the net cutout ..... generally infeasible

Supplement LMR with voluntary data .....potentially feasible, AMS to look at auction slaughter lamb data

Move to a voluntary system ..... most likely infeasible

Price Index ..... generally feasible, with caveat of using subjective judgement

Rounding .....infeasible

Olympic averaging .....infeasible

Simple average .....infeasible

Removing the tails ..... generally infeasible

Standardized pricing ..... feasible, with caveat “black box” approach

Summary: live lamb

Ultimately, we believe the AMS comprehensive price to be a good price series for industry to use. The standardized pricing approach is worth consideration by USDA AMS and industry for implementation, should the comprehensive price not be sufficient to meet industry need. This approach relies upon price relationships from the two most recently completed market weeks as well as the proportion of transactions containing attributes of interest (FOB, formula, etc.) for the reported week. Accordingly, this process is conceptually transparent and reasonably appealing given existing reporting challenges faced by AMS and frustrations expressed by the lamb industry. If ultimately implemented, we would recommend USDA AMS periodically re-examine this process as any substantial change in transaction types could be important to further consider. Furthermore, we recommend USDA AMS not publically report actual relationships used in the price calculation process. While additional transparency in concept is appealing, reporting actual coefficients would reveal important information that may present confidentiality concerns.

Summary: lamb products

Because of the inclusion of imported lamb products, we generally found more firms contributing information. In general, the findings for live lamb hold for lamb products. For the lamb product cut prices associated with more than one firm reporting and now unreportable, there are three potential price reporting alternatives. The impact of any one, or combination, of these alternatives will lead to a marginal improvement in reporting of 5 or 6 price series. First, consideration should be given to merging fresh and frozen product with a rule for eliminating frozen product outlier data points. Second, AMS could look at a longer rolling-average period. However, we do not believe this alternative will consistently solve the confidentiality issue. The second option, which we view as viable, is applying the standardized pricing model when a specific cut no longer consistently conforms to 3/70/20 threshold and for which there is more than one firm reporting.

2. Project Overview and Study Objectives

Livestock and meat are being marketed in dramatically different ways today than in the recent past. Negotiated trade has been rapidly replaced by formula pricing, forward markets, and longer term marketing agreements. Changing domestic and global meat customer and consumer demands are driving the meat industry to be more responsive to consumer interests. This is leading to more vertical coordination and integration, and, relative to when the Livestock Mandatory Reporting Act (LMR) was enacted in April 2001, generally different terms of trade, e.g., contracts, is used by meat packers who report information to USDA-AMS under LMR.

This issue has long been a concern, but it is becoming a greater concern as markets become more vertically integrated, coordinated, differentiated, and in many instances thinly traded. The use of LMR information has expanded beyond price discovery and determination to include establishing insurance contracts, futures contract settlement, indemnity loss payment determination, market research, and for policy analysis. Capability for USDA-AMS together with industry to quickly assess new market developments in the livestock and meat sectors and to determine how to modify reporting accordingly, will be an important dimension of the effectiveness of LMR in the future.

The U.S. sheep and lamb industry has undergone considerable change over the past one-half century, and over the prior 15 years this change continues. In particular, the lamb meat market became a global marketplace beginning in the 1970's and continues to today. Over a fifteen year period alone the percentage of imports in relation to domestic meat production has risen from 56% in 2000 to 142% in 2015. U.S. imports of lamb carcasses and lamb meat has reduced today's domestic production to 20% of production levels fifty years ago (exhibit 2.1). Domestic production today is one-half of production to when the Livestock Mandatory Reporting Act (LMR) was enacted in April 2001. This decline in domestic production at the farm-level has the up value-chain effect of a declining need for feeders and initial processors.

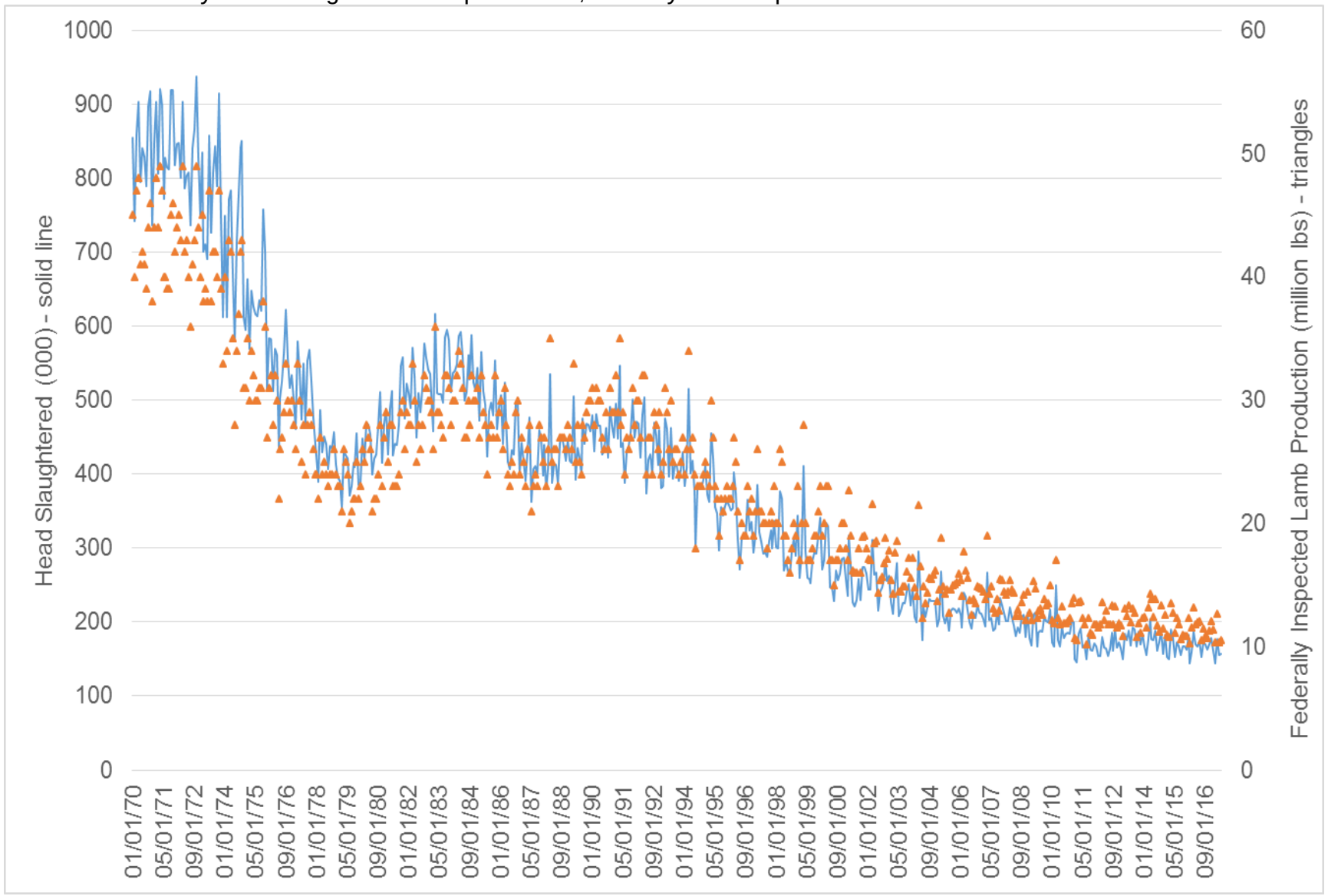
Using live and carcass transaction level data over the 2012 through March 2017 period and lamb products transaction level data over the 2016 through March 2017 period, we examined various alternatives to the currently reported weighted average price. Specifically, the objectives of this study were:

- Examine LMR transaction data for alternative confidentiality consideration of reporting entities while maintaining information integrity and consideration of the needs of producers and industry.

- Explore alternative ways to aggregate reported data to enable AMS to publish market information while preserving the confidentiality of the market participants.

- Examine the period of time that data remains relevant to establishing the current market price.

Exhibit 2.1. Weekly head slaughtered and production, January 1970 to present.



Source: Livestock Marketing Information Center and Agricultural Marketing Service.

3. Consideration of Alternatives to using the Weighted Average Price

This section of the report describes alternative aggregation schemes to achieve the 30/70/20 confidentiality guidelines used by AMS in deciding information to "print" a weighted average price.

Because of the few numbers of firms reporting during a given week, we sought a method to convey market shares without disclosing confidential information. There is no exact replacement for a 3/70/20 threshold or for alternative threshold considerations. We apply the Herfindahl Index to the LMR transaction data to approximate the confidentiality threshold. The Herfindahl Index is computed as:

$$H = \sum_{i}^{n} \left(S_i^{\,2} \right)$$

Where s_i equals the market share of the i^{th} firm in the market of n firms. While the Herfindahl Index does not have a time dimension, i.e., measure over a 60-day period, we suggest a Herfindahl Index value of at least 0.60 is a decent approximation of the 3/70/20 threshold. Herfindahl Index values above 0.60 indicate an increasing level of difficulty in meeting any relaxed confidentiality threshold.

IMPORTANT

It is IMPORTANT to note that the Herfindahl Index reported here is relevant only to data reported through LMR and NOT the entire market. Thus, we refer to a LMR Herfindahl Index or the LMR H-index.

The 30/70/20 guidelines must be understood. The 3/70/20 confidentiality guideline requires the following three conditions (Source: https://www.ams.usda.gov/sites/default/files/media/ConfidentialityGuidelines.pdf):

1. At least three reporting entities need to provide data at least 50 percent of the time over the most recent 60-day time period.

2. NO single reporting entity may provide more than 70 percent of the data for a report over the most recent 60-day time period.

3. NO single reporting entity may be the sole reporting entity for an individual report more than 20 percent of the time over the most recent 60-day time period.

Following AMS guidelines, an entity is equal to a firm. There are two important reasons why preserving confidentiality is a priority. First, the foundation of a free enterprise economy allows firms to maintain a degree of privacy to protect their firm-level knowledge. Second, the Sherman Antitrust Act severely penalizes firms and persons that engage in collusive activities. If a government agency were to report information that potentially infringes on proprietary business, then the government would be a

facilitator of an industry unfairly sharing information. If the agency reported transaction data for a small number of firms, then each firm could "back out" their own information to arrive at the competitor's information. The 3 threshold protects against any two entities consistently reporting. Even for three or more firms, there is the concern of collusion if one or two of the firms represent a significant percentage of the market share, during a given time period. The 70 and 20 thresholds are in place to protect against such situations where one or two entities dominate over many smaller entities. If the thresholds of 70 and 20 are relaxed too much, e.g., 80 and 10, then the 3 threshold would need to increase to ensure the information is not used in a collusive manner.

3.1 Relaxing the 3/70/20 thresholds

We examined the impacts of relaxing each of the 3/70/20 thresholds now used with in LMR. To preserve the confidentiality of the actual data we report approximation computations to publicly show reasoning for concern, or lack of impact, over relaxing either of the 3, 70, or 20 thresholds.

Increasing the "3" threshold

- Readers will see by Exhibit 3.1.1 that relaxing the 3 threshold will have little impact because many weeks 3 or fewer firms are reporting [note: one may average across weeks to get the average number of firms reporting during a 60-day window].

- Keep in mind the volume of formula trade dominates over the volume of negotiated trade by a ratio of between 2:1 and 3:1.

Relaxing the "70" threshold

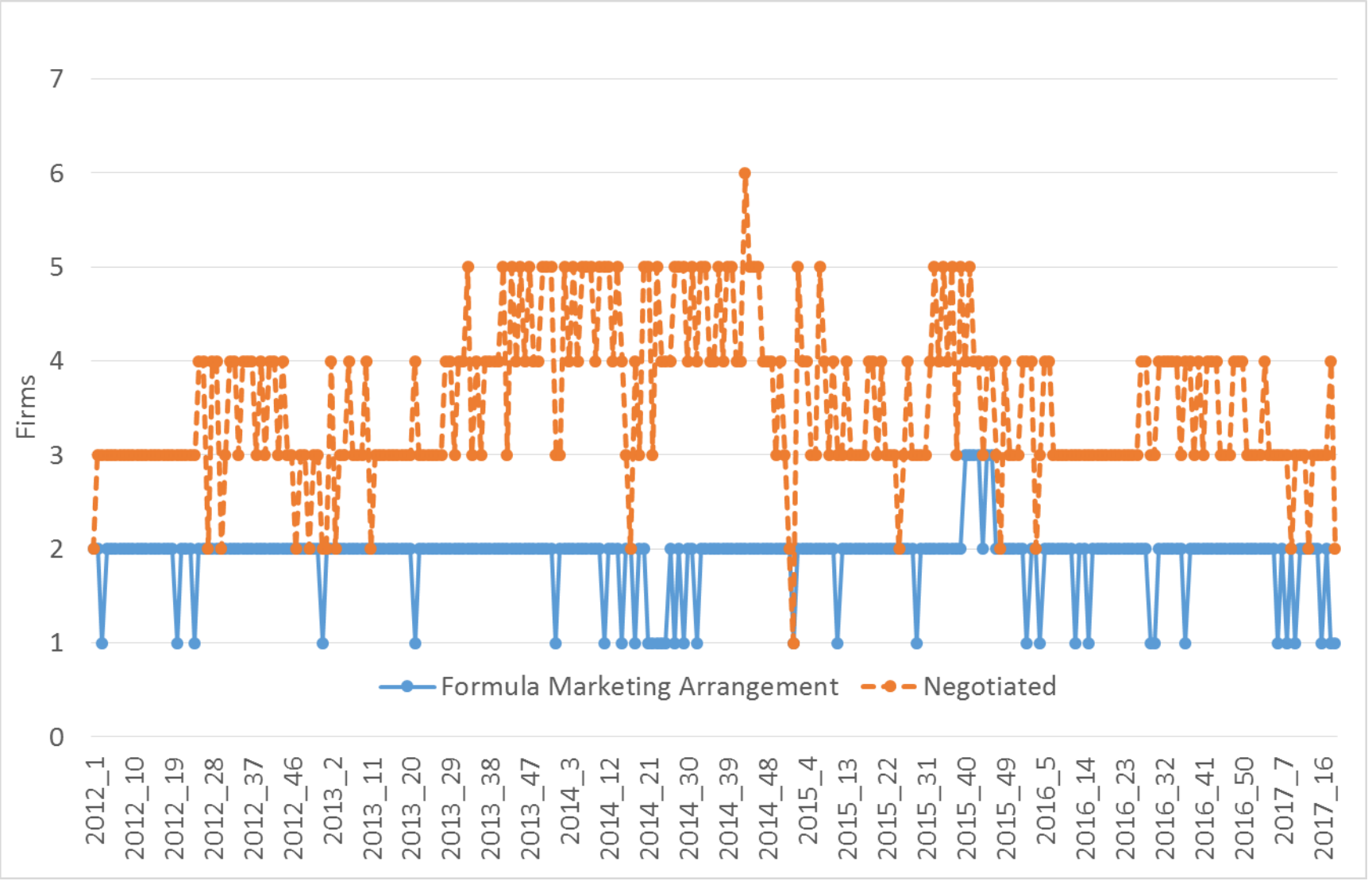
- Readers will see by Exhibit 3.1.2 that the percentage of weeks when one entity is above the 70 threshold is considerably high.

- Relaxing this threshold will have little impact on the number of reportable transactions.

Relaxing the "20" threshold

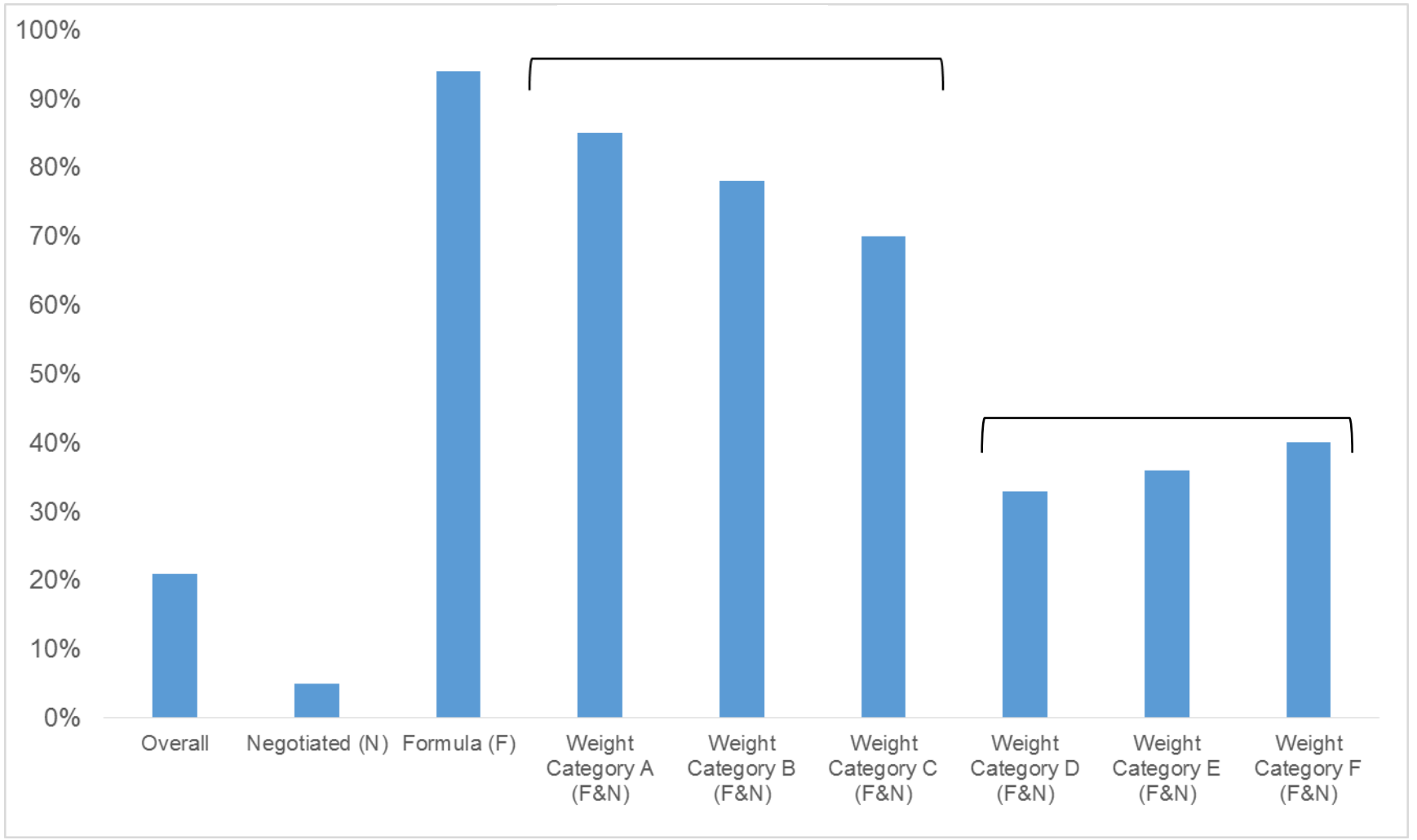
- Because of the similarity in how the 20 and 70 thresholds are reviewed, readers can again examine Exhibit 3.1.2 to envision why relaxing the 70 threshold will have little impact on the ability of AMS to report more information.

Exhibit 3.1.1. Number of firms participating by market, January 2012 - March 2017



Source: Agricultural Marketing Service.
Note: This figure represents the number of firms and not volume of trade by the firms.

Exhibit 3.1.2. Percent of observations with a single entity having over a 70% market share in a given week, January 2012 – March 2017.



Source: Agricultural Marketing Service.
Note: F = Formula & N = Negotiated

3.2 Apply the 3/70/20 threshold to plants instead of firms

Readers will see through information in Exhibit 3.2.1, and comparison to Exhibit 3.1.1, there is minimal change in the number of entities reporting transactions.

- Due to confidentiality we report no price or headcount information here.
- Our review found that firms with multiple plants use similar procurement methods.
- Based on our review of the data this change would impede on business freedoms and potentially facilitate collusive behavior.

3.3 Consolidating weight categories

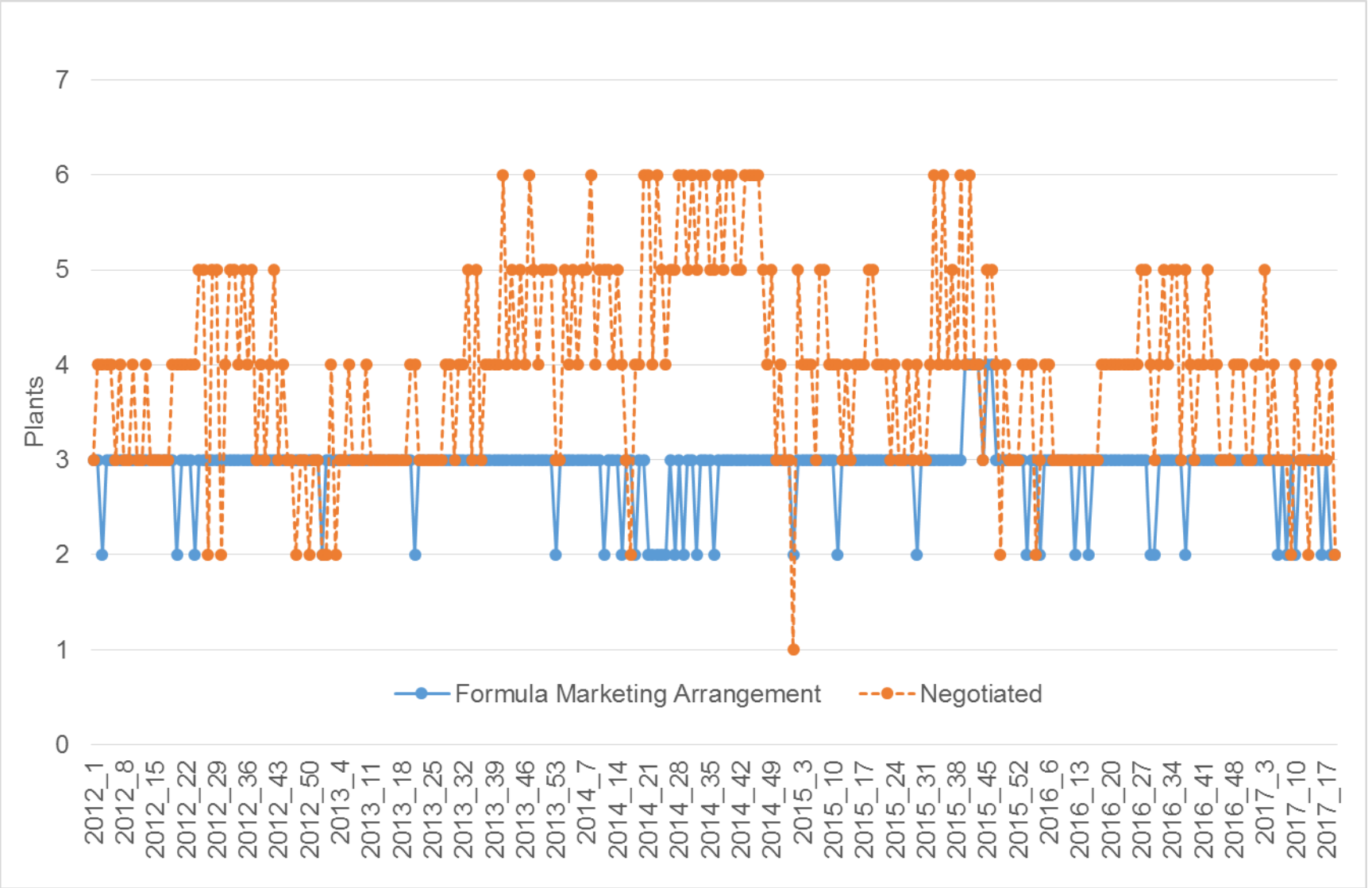
In visiting with industry stakeholders, their preference is to NOT combine weight categories unless absolutely necessary to meet the confidentiality threshold. We examined two example scenarios for the lowest three weight categories. The baseline inflects current categories. The percentage of weeks with no submitting transactions or single entity submitting transaction is reported. The LMR Herfidahl index (H-index) is also reported in each of the three sampled weight categories where the H-index is above 0.60. There is evidence that combining weight categories allow for access to more regularly available data, however, the measure of meeting the confidentiality threshold remains a strong concern.

Exhibit 3.3.1. Percentage of no transactions submitted or single entity reporting during a given week, for lighter weight categories.

Weight Category	Category i	Category ii	Category iii
Baseline	97.18%	98.18%	75.56%
	H-Index: >0.60 for each baseline category		
Combining weight categories	73.93%		
	H-Index: > 0.60		

- For the lighter weight categories, there is a very low probability of finding an alternative method for maintaining confidentiality.
  - Discontinuing reporting lighter weight categories should be considered.
- For the heaver weight categories, combining weight categories seems unnecessary given the feasibility of other aggregation alternatives reported in this report.

Exhibit 3.2.1. Number of plants participating by market, January 2012 - March 2017.



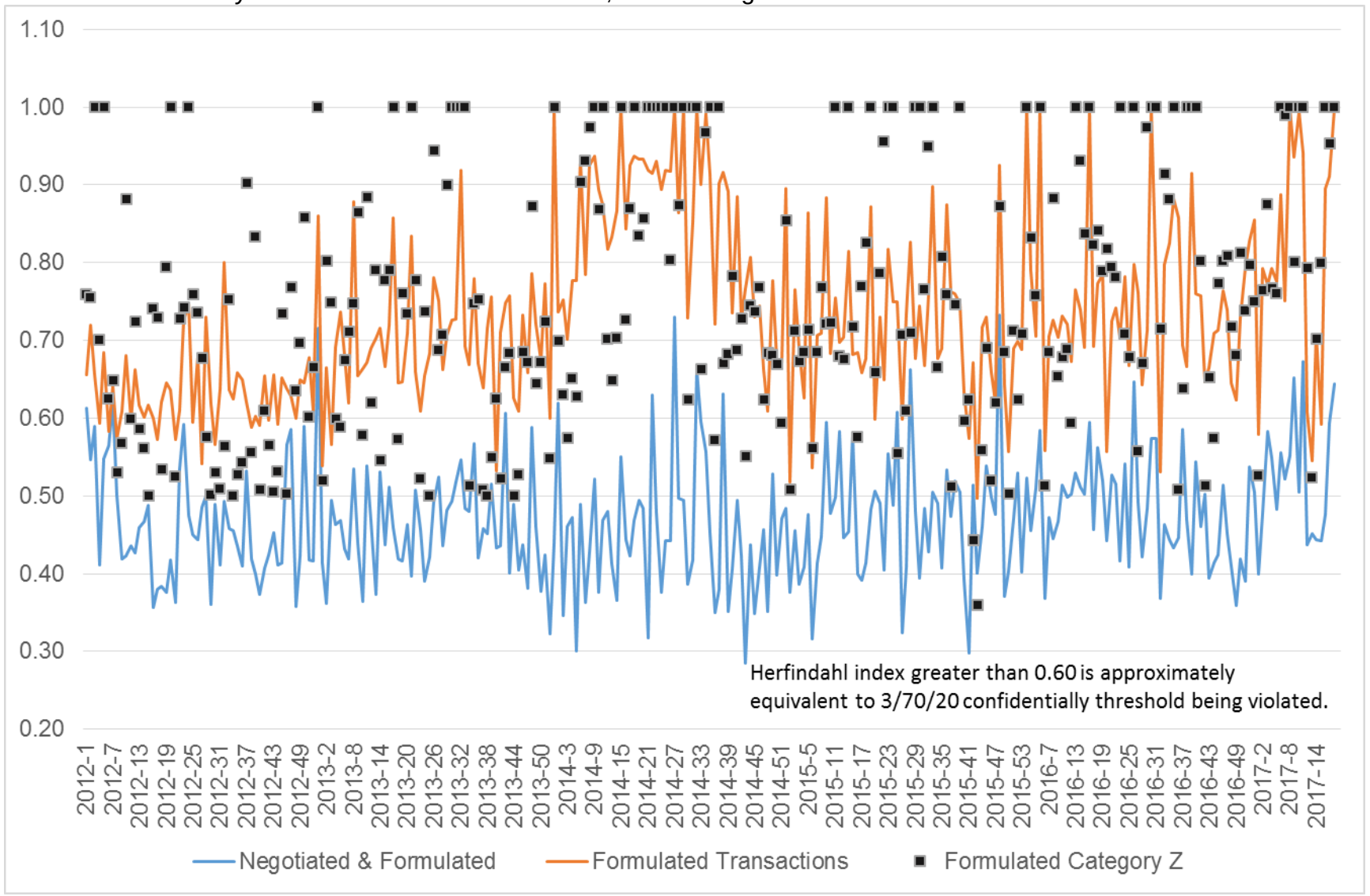
Source: Agricultural Marketing Service.
Note: This figure represents the number of firms and not volume of trade by the firms.

3.4 Consolidating transactions across weeks

We considered alternative aggregating strategies across time. Using knowledge summarized in section 5 that “the market” encompasses two weeks, we examined aggregating data across two weeks. First, the baseline is established by computing the weekly LMR H-index for negotiated formulated transactions. The AMS moving to a comprehensive reported price was the only sustainable way to continue reporting a price.

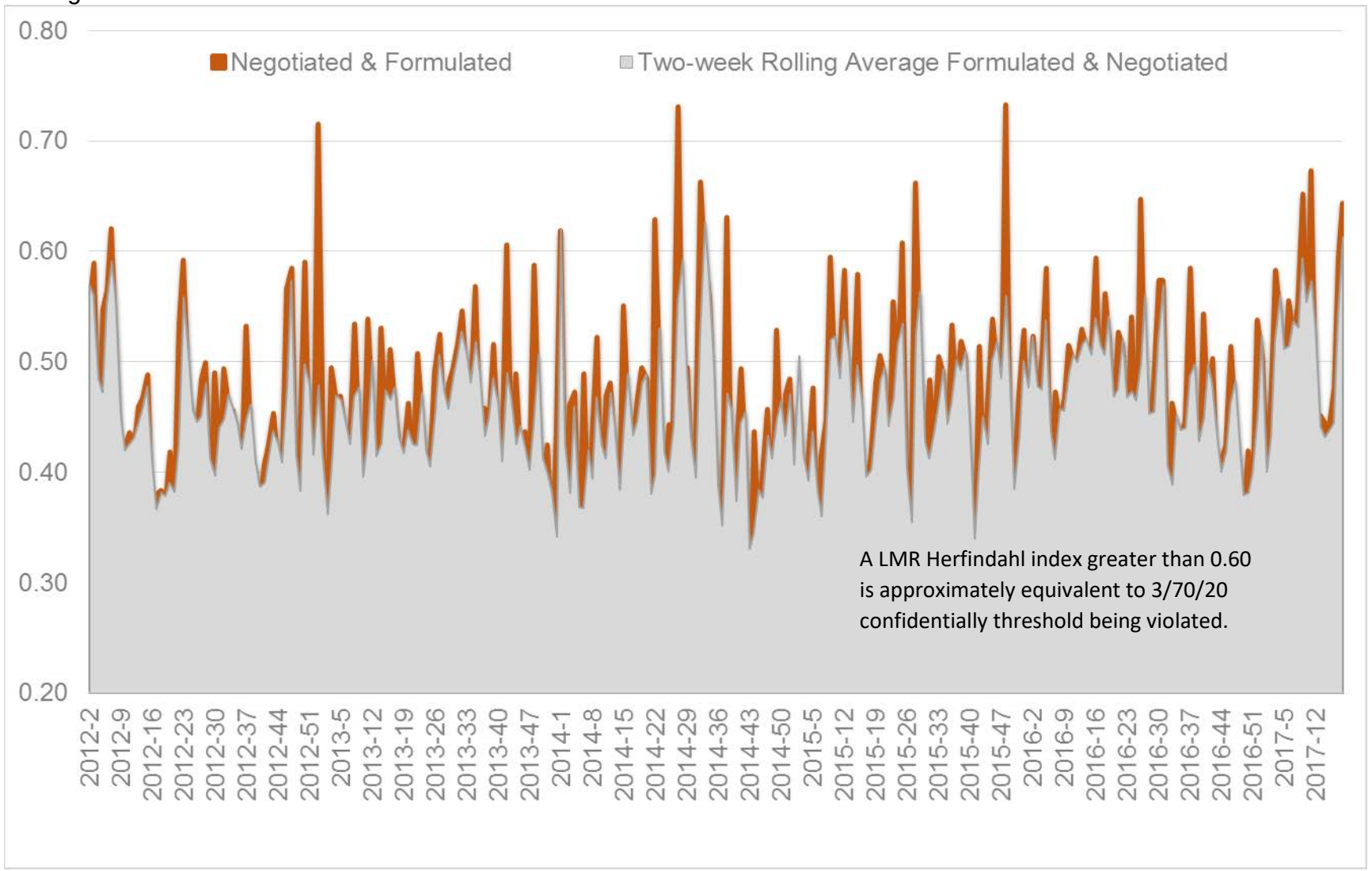
Any significant change in LMR H-index by aggregating across weeks would be observed in the comprehension data, leading to a deeper study of more specific data Exhibit 3.4.2 issued to show the LMR H-index for a single week and two-week moving average. Obviously, the two week moving average LMR H-index is only minimally lower than the single week. Aggregating transactions across a two-week period is not sufficient to avoid collusive concerns.

Exhibit 3.4.1. Weekly live lamb LMR Herfindahl Index, 2012 through March 2017



Source: Agricultural Marketing Service.

Exhibit 3.4.2. Weekly live lamb LMR Herfindahl Index, 2012 through March 2017, for actual week and two week rolling average.



Source: Agricultural Marketing Service.

4. Alternative Confidentiality Considerations

This section follows closely on section 3, but delves more into alternative scenarios of market price reporting that go beyond AMS current use of the weighted average price.

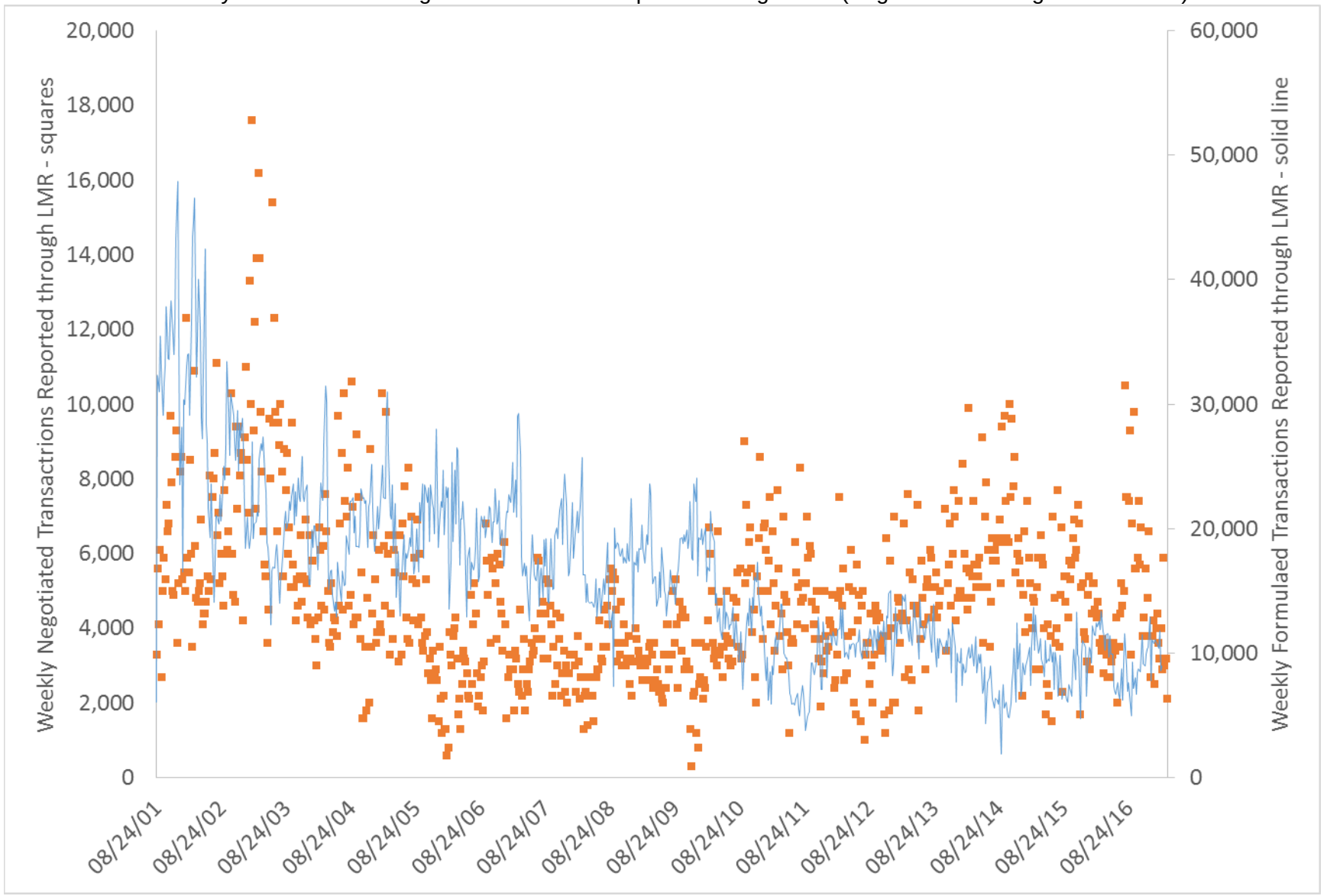
4.1. Comprehensive price report

An obvious option to consider is AMS's recently created comprehensive report. We provide only facts here, based on historical information. Exhibits 4.1.1 and 4.1.2 show secondary data trends, for negotiated and formulated transactions, over the life of LMR. Exhibits 4.1.3 and 4.1.4 are scatter plots showing how well different price series track against each other. Clusters closer to the black line show the two price series track better with each other. Overall, combining negotiated and formulated transactions into a comprehensive price tracks the formula price well (see Exhibit 4.1.4).

We went one step further to examine outliers shown in Exhibit 4.1.4. A rule was created that if the comprehensive price is outside of a range +/- $5 of the formulated, then only the formula price transactions are used to compute the reported price on the given day. The rule was enacted 138 (17.5%) of the 788 weeks. While this significantly improved the clustering of prices, going forward AMS would need to avoid announcing dates when only the formula transactions are utilized. This would ensure firm-level confidentiality.

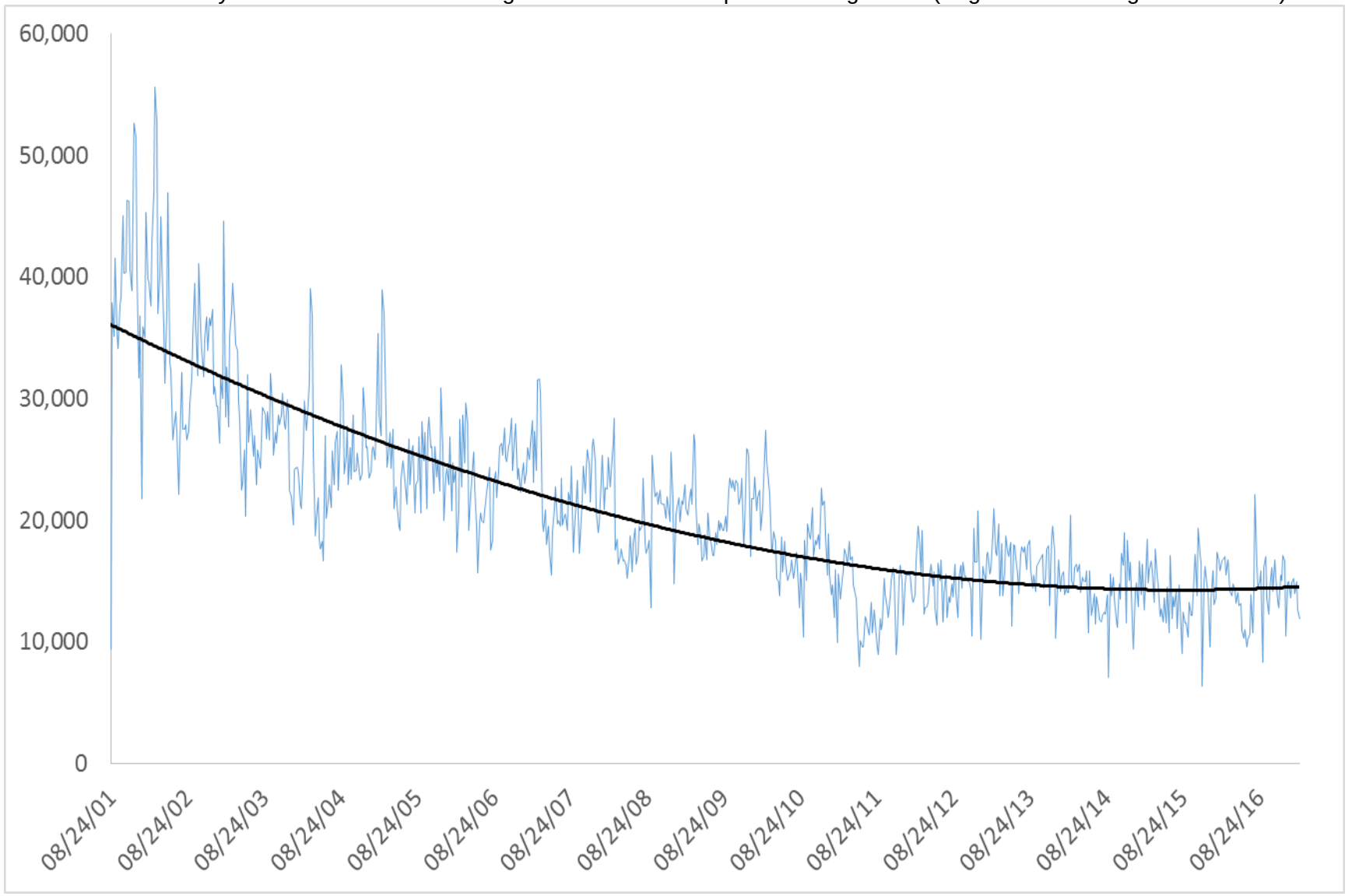
The comprehensive price now reported by AMS is a feasible option for the time being, as long as firms continue to report a sufficient number of transactions within both purchase types of negotiated trade and of formula trade. Note, there are two firms reporting formula transactions (see Exhibit 3.1.1), which is lower than the "3" threshold of 3/70/20.

Exhibit 4.1.1. Weekly formulated and negotiated lamb head reported through LMR (August 2001 through March 2017)



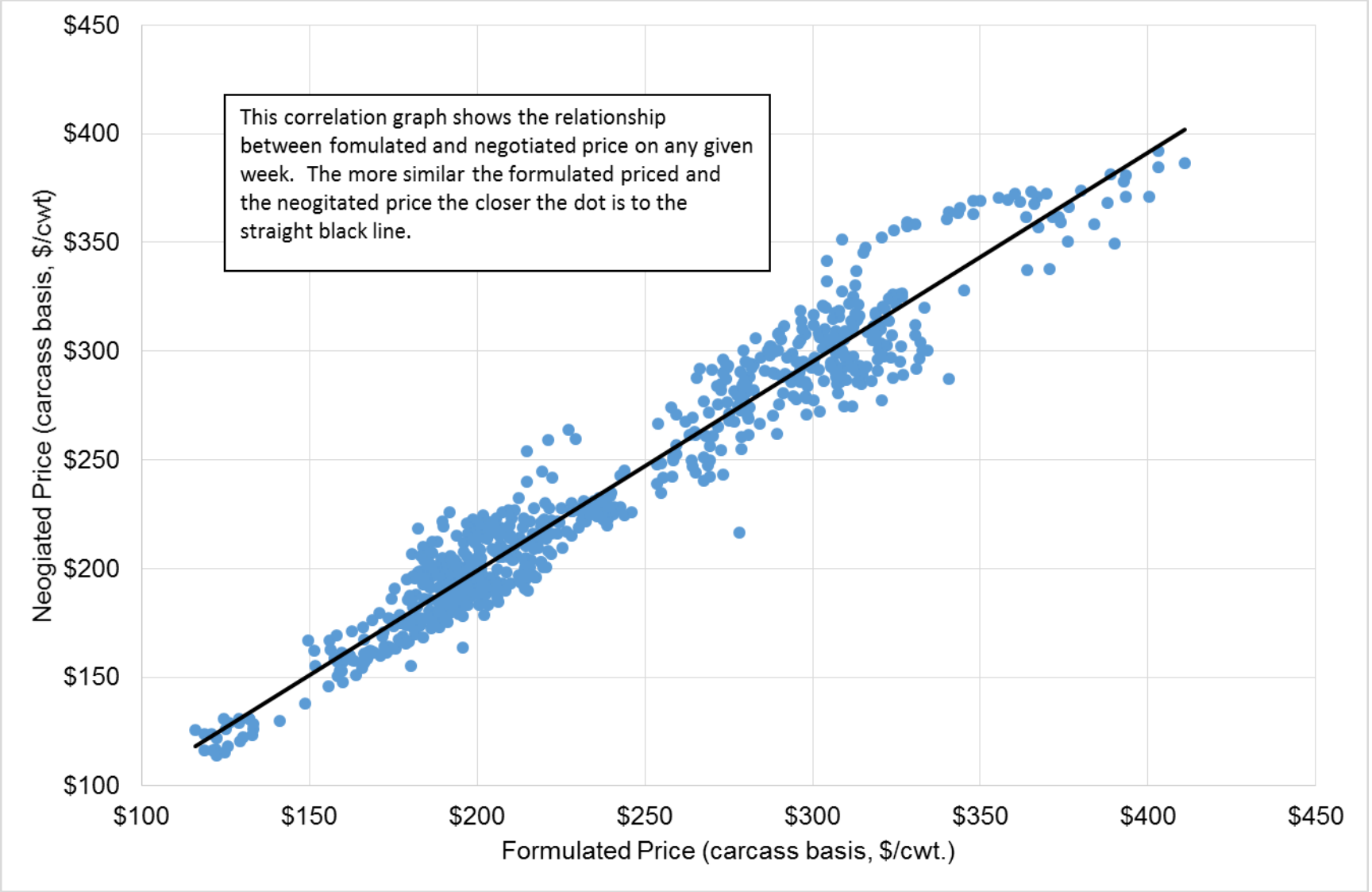
Source: Livestock Marketing Information Center and Agricultural Marketing Service.

Exhibit 4.1.2. Weekly combined formulated & negotiated lamb head reported through LMR (August 2001 through March 2017)



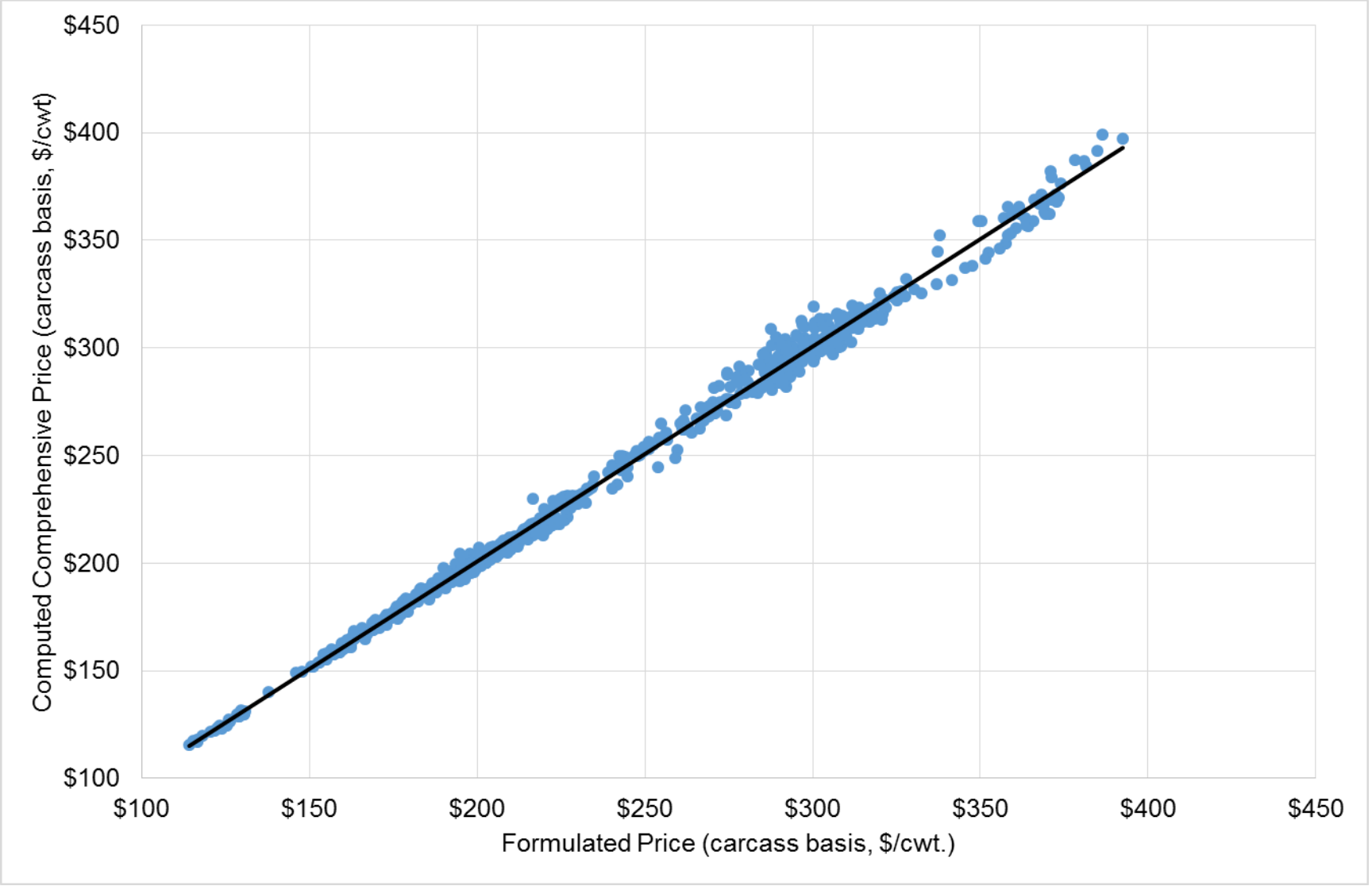
Source: Livestock Marketing Information Center and Agricultural Marketing Service.

Exhibit 4.1.3. Relationship between the weekly carcass basis reported formulated weighted average price and reported negotiated weighted average price (January 2002 through February 2017)



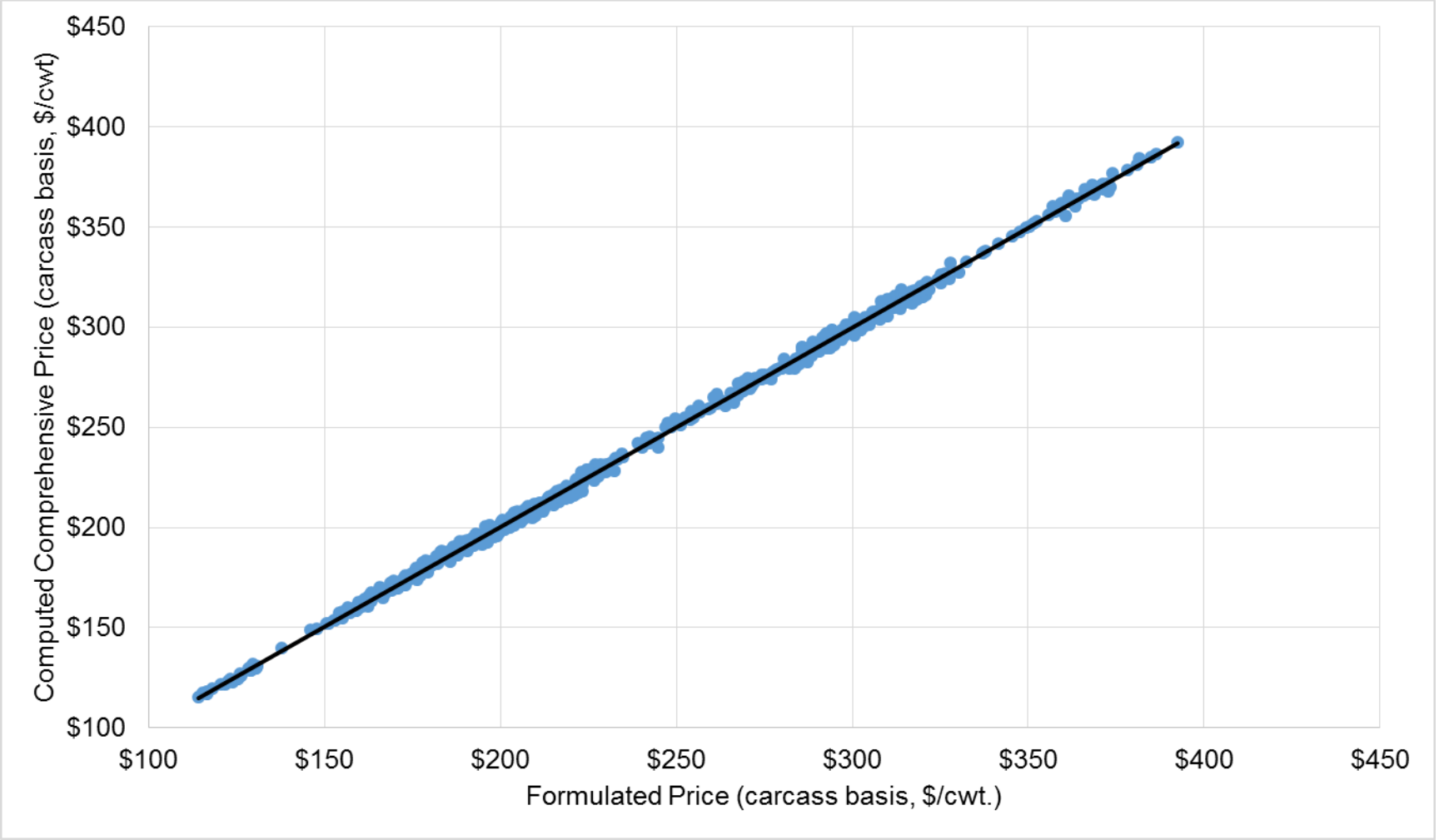
Source: Livestock Marketing Information Center and Agricultural Marketing Service.

Exhibit 4.1.4. Relationship between the weekly carcass basis reported formulated weighted average price and computed comprehensive weighted average price (January 2002 through February 2017)



Source: Livestock Marketing Information Center and Agricultural Marketing Service.

Exhibit 4.1.5. Relationship between the weekly carcass basis reported formulated weighted average price and computed comprehensive weighted average price & rule of an outlier greater than $5/cut. (January 2002 through February 2017)



Source: Livestock Marketing Information Center and Agricultural Marketing Service.

4.2 Inclusion of cooperative lambs

We examined 13 weeks of cooperate member owner lamb transactions for the impact on formula price reporting. The addition of this data does not impact the number of firms reporting. However, the LMR H-index declines sharply. Because we did not have weight categories, we were unable to reach conclusion related to specific formula weight categories. Because the addition of cooperative lamb transactions does not improve the 3/70/20 "3" threshold, the addition of cooperative lambs alone is not sufficient to overcome concerns that LMR could facilitate collusion.

Exhibit 4.2. Formula trade confidentiality measures before and after inclusion of cooperative member owned transactions.

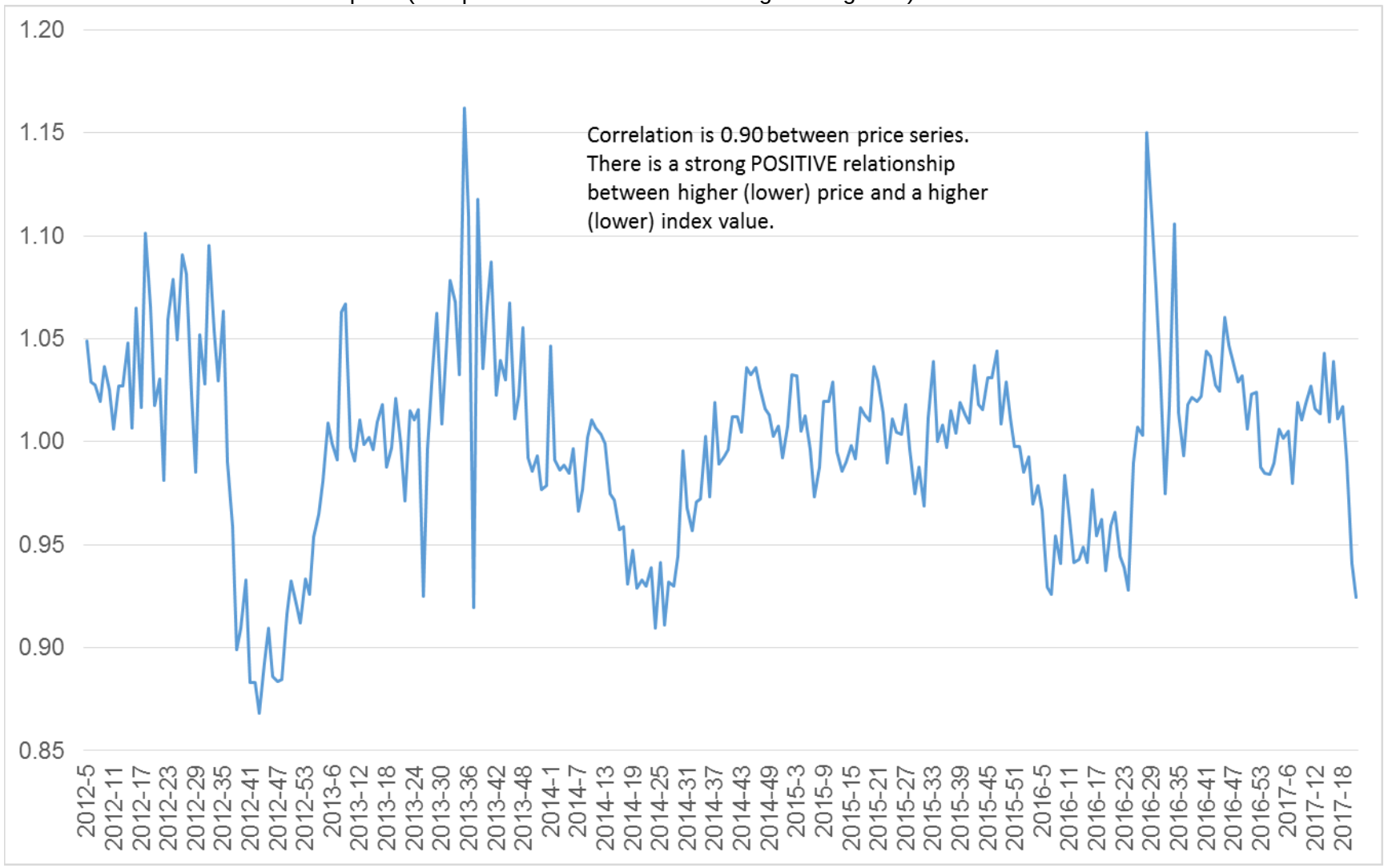
	Before		After	
	# of Firms	LMR H-Index	# of Firms	LMR H-Index
Period 1	2	0.665	2	0.525
	2	0.709	2	0.501
.	2	0.714	2	0.502
.	2	0.764	2	0.529
.	2	0.738	2	0.500
.	2	0.646	2	0.517
.	2	0.623	2	0.503
.	2	0.728	2	0.500
.	2	0.793	2	0.501
.	2	0.828	2	0.508
.	2	0.854	2	0.541
.	2	0.579	2	0.510
.	2	0.792	2	0.503
.	2	0.772	2	0.502
.	2	0.793	2	0.515
Period 13	2	0.776	2	0.759

Source: Agricultural Marketing Service.

4.3 Pricing off the net cutout

Because lamb meat cuts have more reportable transactions and a better chance of being reported, we examined the feasibility of using AMS voluntarily computed Net Cutout Value as an approximate value to a formula lamb weight category. We do not specify the weight category here to preserve confidentiality. Exhibit 4.3.1 is used to show the ratio of these prices. While the movement in price is quite high at 0.90, there are periods when the cutout and formulated carcass prices are measurably different. Values outside +/- 0.05 of the perfect relationship of 1.0 are a concern. If special considerations were put in place – such as in a window contract – the net cutout could serve as a mechanism to track lamb price. We do not now, however, see this as the best viable alternative.

Exhibit 4.3.1. Ratio of the cash price (unreportable and confidential weight categories) to the AMS net cutout value



Source: Agricultural Marketing Service.

4.4 Augment LMR with voluntary information

- We considered the option of supplementing LMR information with voluntary reported information. This option might cause confusion as to how much overlap exists between LMR and voluntary information. AMS provides supplemental information for the Live Cattle trade (see https://www.ams.usda.gov/mnreports/lsddirectfsc.pdf and the appendix), but the voluntary cattle data is not combined with LMR data.

- AMS could examine the impact on the comprehensive price by aggregating auction slaughter lamb transactions with LMR live lamb transactions. This could add volume to LMR reports. We see slaughter lamb transactions as negotiated trade, so aggregating the data will not add to the formula trade reports and the negotiated trade is too thinly traded to regularly report by weight category. AMS personnel may want to investigate this option in more detail using more robust auction transaction data.

- We visited with industry stakeholders about moving exclusively to a voluntary reporting program. Based on those discussions this is not a viable option for sustaining "printed" prices with sufficient volume to provide market price validity.

4.5 Price index

The price index shows the extent to which a price has changed over a period of time as compared with the price(s) in a certain year taken as the base. For example, if a price index has a base year of 2000, current prices are being compared to prices in that time period. Price indexes are used extensively to estimate changes in prices over time and are also used to measure differences in costs among different geographic locations. The collection of prices must be planned so that differences between the prices of any two dates will reflect changes in price and price alone.

There are several methodologies for computing an index. The simplest index price at time *t* is of the form:

$$Index\ Price_t = \frac{\frac{1}{n_t}\sum_i P_{it} \cdot n_{it}}{\frac{1}{n_0}\sum_i P_{i0} \cdot n_{i0}} = \frac{\sum P_t}{\sum P_0}$$

Where,

n_{it} is the market share of the *i*th firm in the current period *t*, subscript 0 represents the base period, and $n_t = \sum n_{it}$ and $n_0 = \sum n_{i0}$;
P_{it} represents the transaction prices in the current period; and
P_{i0} represents the transaction prices in the base period.

The challenge with persons using the simple index as a replacement for the “printed” price is that a base price period must be provided, which will disclose information related to P_0 and n_0. This allows for any entity to quite easily use a current index to back

into the current price (P_0), i.e., reverse engineer the information to facilitate the presumption of collusion and infringe on private transaction information.

We consider a less common index computation (Lowe Index) of the form:

$$Index\ Price_t = \frac{\frac{1}{n}\sum_i P_{it} \cdot n_{is}}{\frac{1}{n}\sum_i P_{i0} \cdot n_{is}}$$

Where,

n_{is} is the market share of the ith firm in period s and $n = \sum n_{it}$;
P_{it} represents the transaction price in the current period; and
P_{i0} represents the transaction price in the base period 0.

The advantage with the Lowe index is that the transaction volume weight (e.g., weight and head) share (n_{is}) assigned to a firm price is tied to an arbitrary period of time. The chosen volume weights could be suppressed from public viewing.

The advantage of this particular index is that AMS can provide the base period price (P_0) as a reference point, suppress the firm share weights used, and utilize the current price without the ease of reverse engineering the current price (P_t). Also, AMS will be able to provide the current number of transactions because the current period transactions are not used in computing the current period price.

The downside is that AMS will need to select a period from which to derive the firm transaction head and lamb weights to compute market share weights. This is a subjective decision that would need to remain in place over time.

We cannot publicly recommend a time period for the firm share weights, as this would lead to loss of suppressed information. Instead, we offer an example using secondary data from the Livestock Marketing Information Center and AMS.

Assumptions and computational process, for this example, include:

1) Looking at carcass basis prices for the formulated 75-85 lb range for the May 2013 through January 20, 2017 period (i.e., off the LS302).

2) Use the period May 2013 through July 2013 as the base pricing period.

3) Assume there are four firms in this market during the base period. Select an alternative set of dates, say the first 10 weeks of 2015, determining the four firms have a market share of formulated trade in this weight category of: 6%, 23%, 56%, and 15%.

a. Note, the share weights would be suppressed from the public. Only AMS personnel and the third-party contractor will know these weights.

b. The share weights always remain the same except for when firms do not report share weights, as they will need to be adjusted where firms do not participate in the market in a given week.

c. If any firm reports no transactions share weights, the weighting matrix will adjust accordingly.

    i. If only one firm reports, then the index will need to be suppressed due to confidentiality. This is a concern for lighter weight categories.

4) Using the information from 2) and 3) one computes the base period price is $221/cwt.

    a. Note, this will differ from the actual weighted average price computed off the 302 because the share weights will differ.

5) Moving forward to the January 20, 2017 period, the reported 75-85 formulated carcass price is computed as $291/cwt.

    a. Note, this will differ from the actual price because the index uses the weights of 3) in computing the weighted average price.

6) The index is computed as $291/$221 x 100 = 132. This is 132% of the base period price (see step 4).

    a. A user of this data would take the 132.0 reported by AMS to know that the price of 75-85 lb. lambs today is, on average, 132% of the base price period. So, the price today is 132% of $221, on $291.

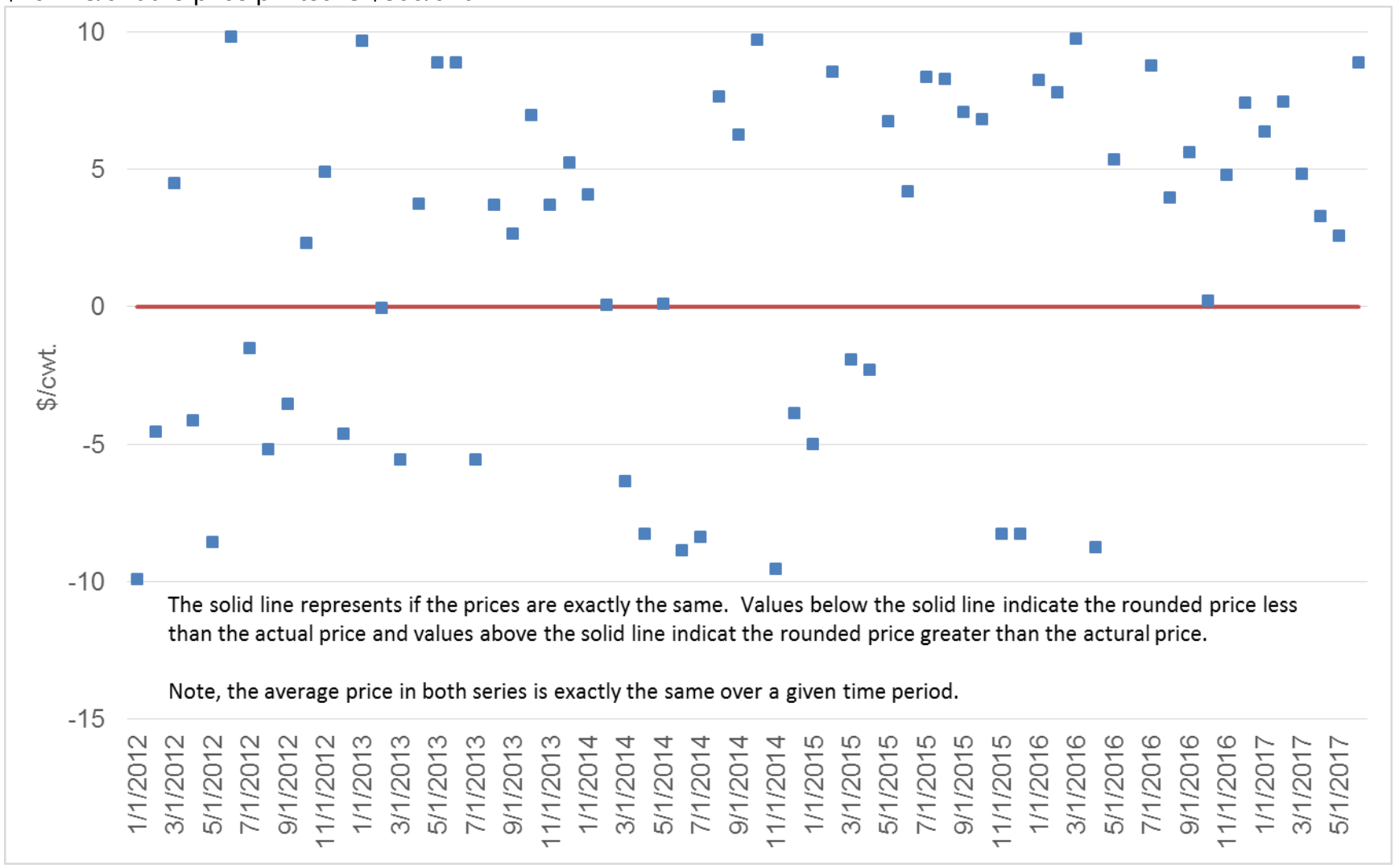
This price index is a feasible option though an option that will take considerable industry education.

4.6 Rounding

We examined the impact of rounding on the impact of market prices and on the ability to keep information confidential. Because the trade volume is light within the lamb trade and the industry is small, there is some risk that a firm could back out the true price of the day. Given this consideration, we chosen an interval of $20/cwt. to round. We chose $20/cwt, as this is approximately 7% of the average actual price in the data, which significantly reduces the chances of an entity backing out the actual price regardless of trade volume.

While rounding results in the same average price over a time span, the week-to-week variation in price is concerning. Since lamb markets will not sell the same volume of lambs each week, a lamb buyer or seller may observe a price above or below the true market value depending on the week. This approach distorts the market price in price discovery and could be controversial when used for a revenue insurance product.

Exhibit 4.6.1. Difference between formulated carcass price rounded to the nearest $20/cwt increment and actual price (@ 7% of the average price), i.e., if the actual price is $288.63 /cwt the price printed is $280/cwt, or if the actual price is $291.13/cwt the price printed is $300/cwt.



Source: Agricultural Marketing Service.

4.7 Averaging: alternatives to the weighted average

Olympic averaging

Olympic averaging refers to the process of eliminating the high and low prices (i.e., entire transaction) over a time period. In the case of LMR lamb the period is a week.

We examined the coefficient of variation (weekly standard deviation in price divided by the weekly average price) for a random formulated carcass weight category, and the graph of this data is shown in Exhibit 4.7.1. The variability of the price series suggests reporting an Olympic average could be a viable option. Removing the hi-lo values did not impact the mean value at a sufficient level to give concern to market distractions. However, upon review of the number of weekly transactions for specific weight categories there are insufficient weekly transactions to sustain any level of anonymity with the Olympic average option, i.e., easy for individual firms to identify missing transactions. While this concern is not necessarily true for heavier weight categories, the Olympic average alternative is not a long-term fix.

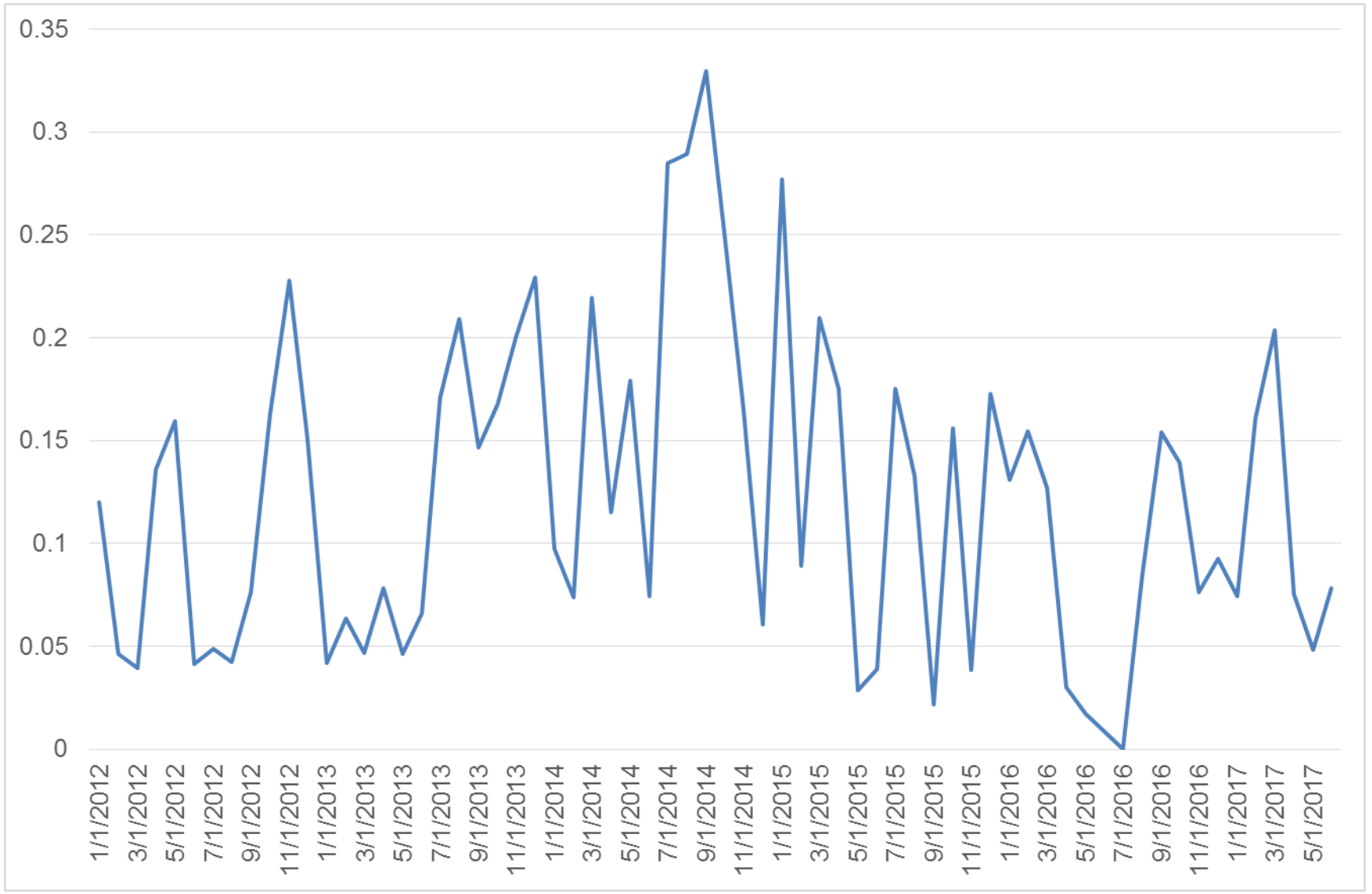
Simple Average

We looked at printing the simple average price versus the weighted average price. This is not a viable option because the simple average and weighted average differ significantly. Also, there is no week-to-week consistency in the difference. While the difference is not as pronounced for the heavier weight categories, the difference remains significant.

Trimming the Tails Average

We looked at lopping off the bottom and top 1%, 5%, and 10% of the transactions during a week. On some days, lopping off this many transactions significantly reduces the number of transactions from which to compute a weighted average price. Regardless, this price reporting alternative was sufficiently different from the weighted average price. We see this alternative as deriving a price that does not reflect the true market price.

Exhibit. 4.7.1. Coefficient of variation for a randomly chosen price series in the formulated carcass category.



Source: Agricultural Marketing Service.

4.8 Standardized pricing model

Given the well-documented challenges AMS currently faces in regularly reporting prices, a new alternative approach was considered that utilizes information from all transactions AMS receives. Specifically, a standardized price-computed approach was considered for viability using the first 17 weeks of 2017 as an examination period. The three-step, sequential approach proceeds as follows:

1. Identify the full set of transactions for the most recently completed two weeks, but not current week (e.g. at 8 am on Monday of each week). Using these actual transactions, a regression model estimates the relationship between head count, processing plant, formula, FOB, and weight category on transaction price. [1]

    a. Step 1 provides a model correlation vector describing how attributes of each raw transaction reported to AMS impact the reported prices in the examined two week period.

2. Use the full set of transactions for the current week (e.g. at 4 pm on Friday of each week) to identify the mean head count as well as the proportion of transactions that occur for each processing plant, are formula, are FOB, and fall in each of six weight categories.

    a. Step 2 summarizes the proportion of raw transactions reported to AMS in the current week that comprise each attribute considered in Step 1.

3. Multiply the model correlation vector from Step 1 by the current week's transaction summary in Step 2 to derive the "New Industry Weekly Reported Price."

    a. Given the first 17 weeks of 2017 on average contained 65 transactions (ranging from 39 to 80) being received by AMS, this results in Step 1 using on average 130 transactions and step 2 using on average 65 transactions.

This three-step process was completed sequentially for the first 17 weeks of 2017. In each new week, the process was updated to utilize one new week of information and drop the oldest week of information. As an example, for the initial week's assessment step 1 would contain information for the last two weeks of 2016 (December 17th – 30th) while step 2 (perhaps conducted late on January 6th) would contain information for December 31st - January 6th. Then when implementing for the second week's assessment step 1 would contain information for December 24th – January 6th while step 2 (perhaps conducted late on January 13th) would contain information for January 7th – 13th.

[1] Here head count is a continuous variable while all other variables are discrete (0/1) variables that serve as intercept shifters from the base case of transactions from one specific plant, non-formula, non-FOB, in the under 45 lb category.

The primary benefits of this approach include an ability to report information every week in a manner that utilizes the full set of diverse transactions reported to AMS without concern over revealing confidentiality of individual transactions. One downside of this approach is that no information is provided separating reported values by FOB, formula, or weight category characteristics.

Exhibit 4.8.1 shows how the *New Industry Weekly Reported Price* would have performed early in 2017 had it been implemented. To provide context, the simple average price of actual transactions for each week is also plotted. On average over these 17 weeks, the mean actual price was $0.73 higher than the *New Industry Weekly Reported Price* which corresponds to a 0.20% difference. The most extreme differences in mean actual price and the *New Industry Weekly Reported Price* were -$8.00 (-3.0% in week 9) and +$11.47 (+3.9% in week 14). While this suggests the *New Industry Weekly Reported Price* concept does a reasonable job of depicting representative industry trade, underlying variation in actual transactions reported to AMS warrants appreciation. To help show this in a confidential manner, the range in actual prices received by AMS each week is also shown in Exhibit 4.8.1. This also helps indicate how the *New Industry Weekly Reported Price* provides values that always fall between extremes in actual prices received by AMS without revealing information specific to these extreme transactions.

In addition to implementing this three-stage process as described, we considered a host of sensitivity analyses. These alternative approaches did not improve the process and included:

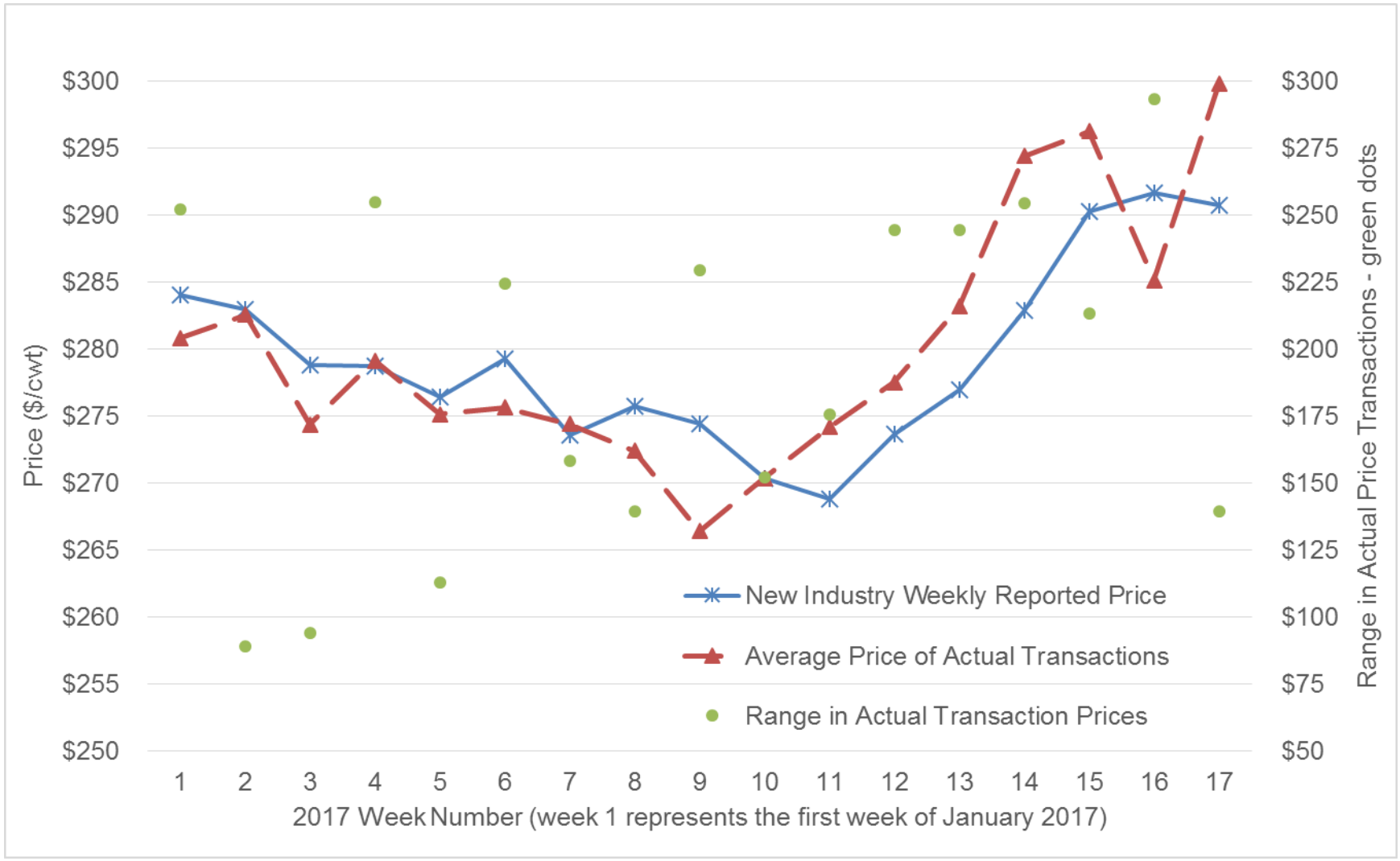
- Instead of Step 1 using the most recent two weeks, we considered using the most recent week only, using the most recent four weeks, and using the most recent five years of data. Using the two week period is consistent with our point on market information persisting for two weeks (see Section 5).

- We considered alternative specifications, including omission of an intercept term, dropping plant effects, collapsing weight categories into four groupings, and incorporating weight information continuously rather than discretely. This lead to model correlation vectors that were less robust.

- Finally, we considered using only subsets of the transactions reported to AMS. Specifically, we considered omitting transactions with prices under a certain threshold price as well as running models separately by formula characteristics. Challenges immediately arise with shrinking an already low number of transactions.

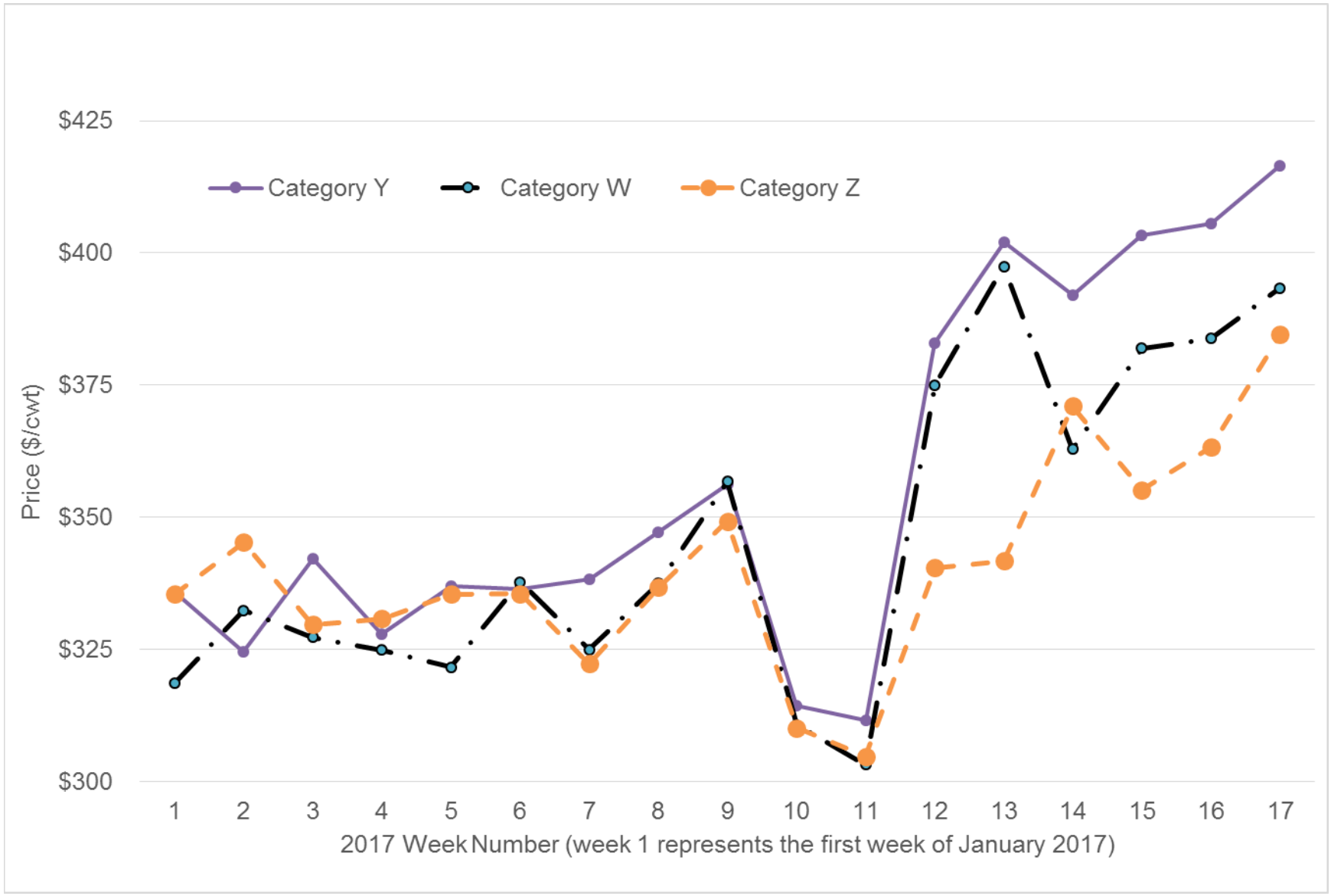
Given the variation in actual prices summarized by range information in Exhibit 4.81, to go one stage further it is worth considering how adjusting this three-step process could provide reportable information for weight categories. Exhibit 4.8.2 shows the *New Industry Weekly Reported Price* that results and could be reported. Values for lighter weight categories were not included as relationships between the lightest three categories are not stable for the examined period.

Exhibit 4.8.1. Standardized weekly reported price concept demonstration



Note: The dots (represented by the right-hand axis) indicate the price range. For example, the dot shown for week 2 is a value around $85/cwt, representing the difference between the observed low and high price for the week to be $85/cwt.

Exhibit 4.8.2. Standardized weekly reported price concept, for three chosen weight categories



5. When Is Data No Longer Confidential?

Some may wonder when information, or data, is irrelevant to the current market situation. Market prices are determined by the interstation of market supply and demand curves (see exhibit 5.1).

The market supply curve is derived from the summation of individual firm marginal cost curves. For lambs, this is the summation of individual feed yard cost curves. The factors of supply are the size of the live lamb herd, costs of inputs, and imports of lambs or carcasses. In a biological process like lamb production, lamb supply is primarily determined 6 to 8 months in advance by the number of lambs born. This is why the supply curve is drawn steeply in exhibit 5.1, i.e., once a producer has the lambs on the ground it's difficult to increase the supply of lamb much.

Market demand is determined by the summation of all end-user needs and wants, which derives the demand for live lamb by processors. End-user products vary in price and form, and the lamb value chain coordinates the flow of quantities versus payments from end-users. This creates a retail-to-processor margin as shown in exhibit 5.2. The retail price is set based on the price necessary to clear the market based on supplies established from the lamb crop 6 to 8 months ago. The retail demand price is then used to set the processor and farmer prices.

Before moving forward, let's reflect: Globally, sheep producers lambing today are a strong signal of lamb meat available 6 to 8 months from now. Currently, the end-user must find a price point to clear the market of this quantity of meat. Demand is realized through this iterative process, leaving the processor to work off a margin between the price paid for a lamb and the composite value of all the parts of the lamb sold to end-users (i.e., meat, offal, pelts, etc.). Processors then take costs out of this gross margin to arrive at a level of profitability. An individual processor's margin can tell much about operating costs, fabrication costs, employment costs, and pricing strategies of the business. Their "margin" is considered proprietary information. Reporting past prices because the prices are no longer relevant to the current market runs the risk of exposing firm-level margins, which tend to be stable over time.

Exhibit 5.1. Farm-level supply and demand.

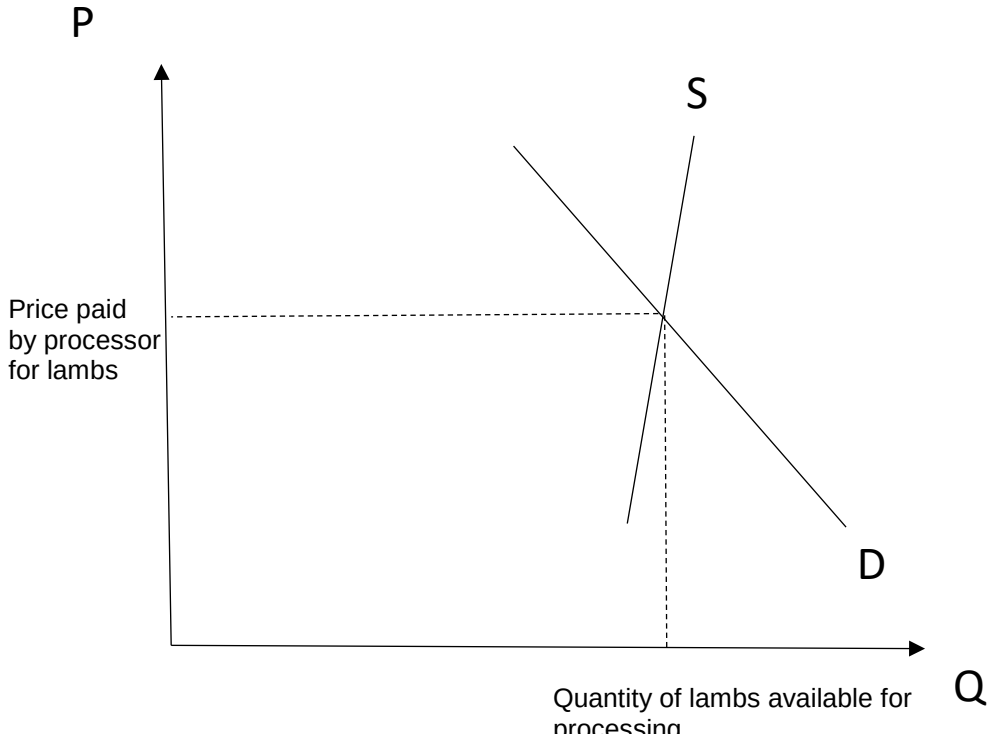
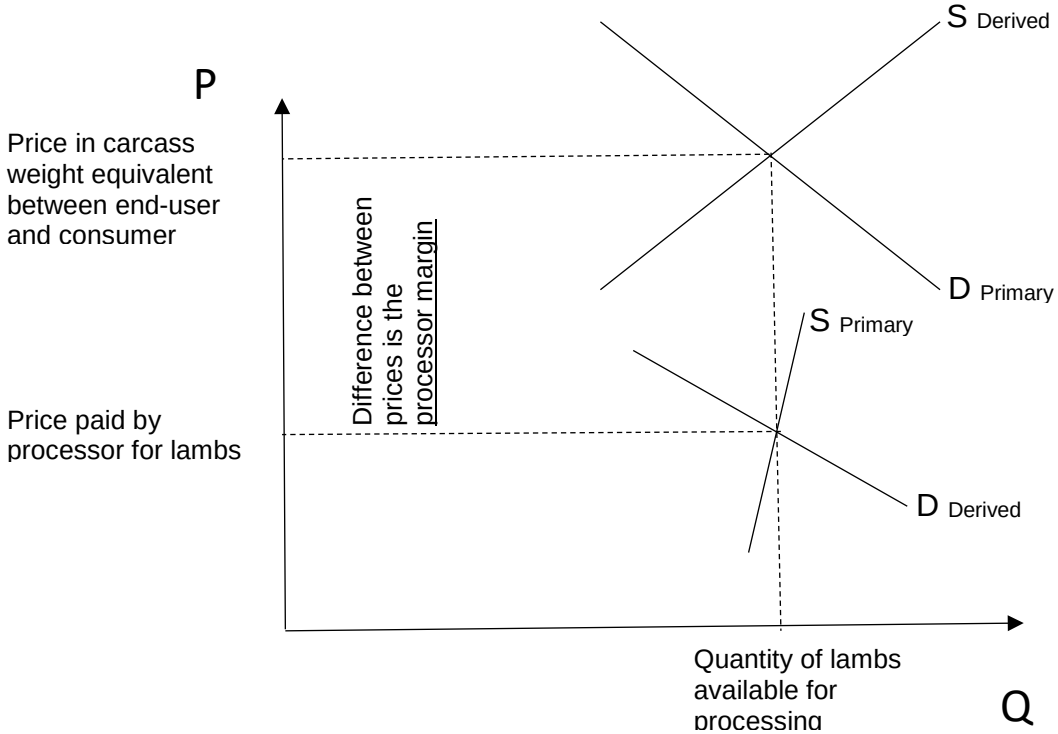


Exhibit 5.2 Farm-to-retail margin.



Market price persistence

Market prices fluctuate day-to-day or week-to-week based on supply and demand fluctuations. For livestock market reporting of live lamb, the market has been set as one week, i.e., weekly reports such as the 302, 352, or 500 (note: 500 is a 5-day rolling average) For an example, see here https://www.ams.usda.gov/mnreports/lm_lm352.txt and the appendix for the LM352, National Weekly Slaughter Sheep Review. How long does the current market remain relevant to prices in the future?

To examine this question, we used LMIC price data. To test the relationship of lamb carcass price across weeks we regressed 822 weeks of current week formula lamb carcass prices on the last four weeks of reported prices (see exhibit 5.3). One week ago the price is virtually the same. Two weeks ago approximately every $0.29 of price this week is in common with a price two weeks ago. Three and four weeks ago are virtually irrelevant to today's market. Thus we conclude that transactions more than three weeks old are of little relevance to the current market price.

Exhibit 5.3 Regression Results of Market Price Relative to Time Dimension, Using Secondary Data

Regression Statistics	
R Square	0.997
Standard Error	3.476
Observations	822

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.94	0.47	2.00	0.05
Formula price lagged 1 week	1.01	0.03	29.52	0.00
Formula price lagged 2 weeks	0.29	0.05	6.02	0.00
Formula price lagged 3 weeks	-0.08	0.05	-1.57	0.12
Formula price lagged 4 weeks	-0.23	0.03	-6.65	0.00

We completed a similar time-series study for one set of firm-level transactions for a specific weight category. The results of this analysis were revealed the exact same results of the current market price showing up in the price over the next two week period. These results are not reported here to preserve confidentiality.

We recognize the seasonality of prices is present, but we did not specifically model seasonality in the modeling.

6. Lamb Products

For lamb product cuts, we looked at transaction data over the 2016 through March 2017 period. Over 50 cuts were included in the data. Using the premise that the findings of the live trade are generally applicable to the product trade, we spent considerably less time analyzing these transactions.

As shown in exhibit 6.1, the issue of confidentiality is not as much a concern with the lamb product cuts price series. Not surprising is that frozen product cuts have fewer firms in the market than firms in the market for fresh product. We believe more harm than good can be accomplished by adjusting how lamb product prices are adjusted.

Exhibit 6.1. Percentage of approximately 55 cuts having fewer than 2, 3, or 4 firms reporting over the period January 2016 through March 2017. Includes both fresh and frozen trade.

Less than ___ firms reporting consistently	2 firms	3 firms	4 firms
	14% of cuts	23% of cuts	32% of cuts

Note: These percentages should be taken as maximums because we did not take the time to cross-reference cuts with blended IMPS codes.

Combining fresh and frozen cuts

We examined the prices between fresh and frozen product trade. When data were available prices of fresh and frozen, for the same IMPS code, were either close to each other or the frozen product was significantly discounted. AMS could consider combining fresh and frozen transaction data with a rule of dropping transactions from the computation for any frozen cut value 10% below the weighted average cut price for that reporting period.

Extending the rolling average period beyond 5 days

Because of the vastness of the lamb product cut data, we did not specifically evaluate how long a current price remains relevant beyond the 5-day rolling average. A cursory review of the many price series suggests AMS may want to investigate with industry increasing the number of days from a 5-day to a 7-day or 10-day rolling average. Due to the volume weight of specific transactions and the high value of the cuts, it is difficult to quantify the firm-level financial implications of establishing a new price series. The caveat here is that this aggregation alternative would minimally increase the number of currently unreportable prices.

Standardized pricing model

Without conducting significant analysis we believe that cut prices associated with more than one firm reporting and now unreportable could be reported using a standardized pricing model. Our review of the data for the various cuts now unreportable lead us to this conclusion. By our calculations this would allow 5 additional fresh cuts to be reported for fresh product.

7. Appendix

https://www.ams.usda.gov/mnreports/lm_lm352.txt

```
LM_LM352  **Please see note below regarding the Comprehensive section**
St. Joseph, MO    Fri Aug 18, 2017    USDA Market News

National Weekly Slaughter Sheep Review for w/e Friday, August 18, 2017

Compared to last week, negotiated purchases of slaughter lambs were
7.00 to 8.00 lower.

Negotiated Purchases:
This Week:  7600     Last Week:  5000    Last Year:  7500

Domestic Slaughter Lambs
Choice and Prime:
  Live Purchases:     Weight        Price             Wtd Avg
                      Range         Range             Price
   Wooled and Shorn  120-170 lbs   145.00-199.25     167.98

--------------------------------------------------------------------------------
Formula Purchases:
Formula purchase information for previously slaughtered lambs (carcass basis)

Weighted Average Weight:            84.14 lbs
Weighted Average Net Price:        324.01
Weighted Average Dressing Percent:  50.60
--------------------------------------------------------------------------------
**Effective today, cooperative member lambs are included in this
Comprehensive
Information section**
Comprehensive Information:
Includes all negotiated, formula, & cooperative member lamb data submitted
this week
(carcass basis)

Weighted Average Weight:            77.72 lbs
Weighted Average Net Price:        325.69
Weighted Average Dressing Percent:  51.20

--------------------------------------------------------------------------------
This report covers transactions reported this week.  Comments and market
conditions include information gathered from voluntary sources.  All prices,
weights, and head counts are gathered through the Livestock Mandatory
Reporting
system.
```

Voluntary Reporting Example: Live Cattle LS-831 complements LMR cattle fed cattle reports

SALES VOLUME:

	Thursday, 8/17/17
Reported:	15,000
Estimated:	58,000

PRICES PAID:

	STEER/HEIFER – Select and Choice		
	LIVE F.O.B (CASH)	DRESSED Delivered (CASH)	DRESSED Delivered (Grid Basis)
TX/OK/NM	110.00	None	None
KANSAS	110.00	None	None
NEBRASKA	110.00-110.50	175.00-177.00	None
COLORADO	110.50	None	None
IA/MN	110.00	175.00	None

Appendix C

Letter Provided by LMR Stakeholders

AMS Market News Staff Should Be Deemed Essential Personnel

In 1999 Congress enacted the Livestock Mandatory Reporting Act of 1999 to establish an information program regarding transactions of cattle, swine, lambs, and the meat products derived from them. The program's goals were to provide information to livestock producers, improve the United States Department of Agriculture's reporting services, and encourage market competition for livestock and livestock products. In 2001 the Agricultural Marketing Service (AMS) implemented the Livestock Mandatory Reporting (LMR) program.

AMS publishes on its website various reports using the data provided to it and not long after its implementation LMR became the sole source of market information regarding sales to packers of cattle, swine, lambs, and the subsequent sale of meat products. Other entities in that business simply could not compete from a cost perspective nor were they able to access the level of data required by LMR.

LMR is a critical tool used by livestock producers, packers, and others when making marketing decisions. And it is the only tool available regarding price information. The number of AMS employees needed to operate the LMR program and receive and publish this critically important information is relatively small. Yet, the impact of providing, or not providing, price information is profound and can be the difference whether livestock producers or companies remain in business.

Indeed, the data reported by AMS through the LMR program is used by CME Group to construct the Lean Hog Index, which is used to settle its Lean Hog futures contract. This futures contract is used widely by producers, processors, and others in the U.S. hog industry as a price benchmark and hedging tool for managing price risk. When the government shutdown occurred in 2013, CME was forced to discontinue publishing the Index and take emergency action to implement an alternative settlement procedure of the October 2013 futures contracts.

It was because of Congressional action that AMS became the primary source of important price information for the livestock markets. Because this information is critical to livestock producers, packers, and others, Congress should act to ensure the AMS officials directly involved in the operation and administration of the LMR program are deemed essential personnel for government shutdowns or sequestrations.

American Farm Bureau Federation
American Sheep Industry
CME Group
Livestock Marketing Association
Livestock Marketing Information Center
Meat Import Council of America
National Cattlemen's Beef Association
National Farmers Union
National Pork Producers Council
North American Meat Institute
Ranchers-Cattlemen Action Legal Fund, United Stockgrowers of America
Southwest Meat Association
Texas Cattle Feeders Association
United States Cattlemen's Association