

Investigation of Beef Packers' Use of Alternative Marketing Arrangements

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Executive Summary

The USDA's Grain Inspection, Packers and Stockyards Administration (GIPSA) conducted an investigation in response to complaints by participants in the cattle industry that the top four beef packers used committed supplies¹ in ways that were anticompetitive. Their concern was that by using committed supplies and formula pricing, (referred to in this report as "alternative marketing arrangements" or AMAs) the cash market was less competitive resulting in lower fed cattle prices.

Investigators from GIPSA's Western Regional Office Business Practices Unit of the Packers and Stockyards Program (P&SP) conducted the investigation. This report details the methods and findings of the investigation, the purpose of which was to determine if the use of AMAs violates the Packers and Stockyards Act of 1921 (Act).

P&SP investigators conducted numerous interviews and collected written statements from cattle producers, sellers, feeders, industry organizations, and the packers. The investigation examined confidential transaction data from USDA's Agricultural Marketing Service (AMS), and confidential transaction data from the four largest beef packers and various cattle sellers.

The report documents the structure of fed cattle markets and confirms that, in general, the markets are highly concentrated, especially at the regional level and with regard to negotiated cash sales. Negotiated cash market purchases made up about 39 percent of total fed cattle purchases in the United States in 2009. In the Texas region, the largest of all the fed cattle regions examined in this report, negotiated cash purchases made up just 25 percent of the total fed cattle marketed.

Using statistical methods, the investigation found that on a week-to-week basis, higher levels of AMA procurement were associated with lower negotiated cash prices. This finding is consistent with the complaint and with many previous academic studies. Specifically, the report found that on average in the United States, every one percent of slaughter capacity taken up by AMAs depressed negotiated cash prices \$0.0418/cwt. on a live weight basis. This estimate extrapolates to a total cash price effect of all AMAs of \$2.29/cwt. lower on a live weight basis or, a little over 2.5 percent. The report found larger effects in some regions (Texas, Kansas and Colorado) and smaller effects in others (Nebraska and Iowa). AMA prices are impacted as well because many packer pricing formulas and contract prices are based on cash market cattle prices.

While this is an important part of the investigation's findings, it is not the whole story. P&SP sought to determine the overall economic effects of AMAs, including not only the negative price effects but also the potentially offsetting economic benefits of AMAs. Courts have established that to prove a violation of the competition provisions the Packer and Stockyards Act, harm to competition must be proven. Please refer to Appendix IV to this report, entitled "Legal

¹ The terms "committed supply" and "committed procurement" refer to cattle procurement methods where cattle are committed to be sold to a packer more than 14 days prior to slaughter. These terms may be used interchangeably in this report. "Alternative marketing arrangements," (AMAs) refer more generally to committed procurement methods and all other non-cash based cattle procurement methods, including formula-priced methods.

Considerations,” for a discussion of legal rulings relevant to this case, and for an analysis of the legal implications of the economic findings of this investigation.

Interview statements that P&SP collected, as well as academic studies, including surveys and estimates developed by previous researchers contracted by GIPSA², have indicated that AMAs have significant economic benefits. Benefits from AMAs that the economic analysis of the investigation took into account included: AMAs likely benefit packers by reducing direct procurement or transaction costs, and by allowing them to operate plants at higher, more efficient capacity levels, and at more steady (less variable) volumes of cattle. AMAs likely benefit consumers by improving overall beef quality as they send price signals to producers on the value of specific cattle qualities relating to consumers’ beef preferences, and facilitate packers’ ability to sell beef with the desired qualities.

AMAs also have significant benefits for fed cattle sellers that use them. Packers consistently told P&SP investigators that sellers, not packers, have driven the use of AMAs, and that packers use AMAs because sellers want to market their cattle by those methods. Therefore, the analysis took into account these benefits to cattle sellers: By locking in future prices, or at least establishing a prior pricing method, AMAs help sellers reduce price risks of raising and selling fed cattle. AMAs assure sellers that they will have timely market access, which historically has been a major concern. AMAs allow feedlots to achieve more efficient volume levels that match their capacity. AMAs allow sellers to demonstrate creditworthiness to lenders and thus obtain better credit terms. And finally, as with the packers, AMAs help sellers reduce transaction costs.

The analysis used an economic model that took into account empirical estimates of these benefits to packers, consumers, and cattle sellers, and concluded that the negative AMA price effects were outweighed by the benefits. This means it found that the net effect of AMAs was a gain to the economy. The analysis estimated the impact of AMAs in 2009 to be a positive \$714.9 million. However, cattle sellers that only use cash methods do not receive the benefits of AMAs and are therefore likely harmed by their use.

The investigation included a probability analysis involving simulations where the parameters of the welfare analysis were allowed to vary. The analysis concluded that AMAs have a virtually certain chance of resulting in a net gain to the economy. Most simulations generated positive results for cattle sellers as a whole, consumers, and beef packers (including wholesale and retail marketers) when separately measured. All simulations generated positive results for the total combined welfare impact.

The investigation found that AMAs have a negative price effect on fed cattle. However, AMAs also have legitimate business justifications for both packers and cattle sellers. The economic analysis concluded that the benefits from AMAs to packers, consumers and cattle sellers who use them likely outweigh the negative price effect. The investigation found no evidence of conspiracy, coordination, deception, or predatory intent by the packers.

The applicable case law pertaining to the issue of whether packers’ use of committed supplies violates the Act provides that in the absence of collusion and / or predatory intent, courts will

² *GIPSA Livestock and Meat Marketing Study*, 2007, conducted by the Research Triangle Institute (LMMS), especially LMMS Volume 3: Fed Cattle and Beef Industries.

examine the practice under a modified rule of reason. The modified rule of reason standard provides that if the use of committed supplies harms competition, and has no legitimate business justification, then it may violate Section 202 of the Act.

Since the investigation did not find collusion or predatory intent, or a net harm to competition caused by committed supplies, and found that they have arguable legitimate business justifications, courts are unlikely to find that AMAs violate the Act.

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Investigation of Beef Packers' Use of Alternative Marketing Arrangements

Introduction

The Packers and Stockyards Program (P&SP) conducted this investigation in response to complaints from cattle industry sources during 2009 concerning beef packers' use of committed supplies³ and alternative marketing arrangements (AMAs). The complaints varied regarding how packers' use of committed supplies allegedly caused harm to producers, and differed regarding the types of harm allegedly caused. P&SP consolidated many specific allegations concerning packers' use of committed supplies into this investigation.

Complaints Regarding Committed Supply

In late May 2009, an industry participant complained to P&SP that packers were using committed supplies to manipulate cash cattle prices. The participant alleged that certain of the nation's largest beef packers violated Section 202(e) of the Packers and Stockyards Act of 1921(Act) by using committed supplies and AMAs to limit their participation in the cash cattle market, thereby reducing competition in the cash market and lowering cattle prices.

In late June 2009, another cattle market participant issued several complaints to P&SP regarding anticompetitive practices in the cattle industry. Briefly, the complaints included packers allegedly granting "sweetheart deals" and unreported premiums included in AMAs to certain other cattle industry participants; packers using committed supplies to bypass certain feedlots in close proximity to their plants; packers not reporting certain AMA transactions in a timely manner under Livestock Mandatory Reporting; packers refusing to offer negotiated cash bids to certain feedlots; and packers using committed procurement to allocate territory.

P&SP consolidated these complaints related to committed supplies and AMAs into a single investigation, which was initiated after the June 2009 complaint.

Investigation Process

P&SP conducted this investigation in two stages – an interview and fact gathering stage and an analysis stage. In the interview and fact gathering stage in 2009 and 2010, P&SP had ongoing contact with the complainants and other industry participants. In December 2009, P&SP met with USDA's Agricultural Marketing Service (AMS) to discuss Livestock Mandatory Reporting (LMR) requirements and data. During 2010, P&SP conducted interviews and collected data and affidavits from the head cattle buyers of the nation's four largest beef packers.

³ The terms "committed supply," "committed procurement," and "captive supply" refer to non-cash based cattle procurement methods where cattle are committed to be sold to a particular packer more than 14 days prior to slaughter. These terms may be used interchangeably in this report. "Alternative marketing arrangements," (AMAs) refer more generally to committed procurement methods and all other non-cash based cattle procurement methods, including formula-priced methods. This report defines and categorizes specific procurement methods in the "Investigative Analysis and Findings" section, below.

Input from Cattle Sellers

For this investigation, P&SP explored the possibility of procuring data and written statements from certain industry participants including packers, cattle producers, feeders, and sellers. Sellers include feedlots or individual cattle owners and their agents who sell fed cattle to packers. Due to the confidential nature of some of P&SP's requests, certain participants were reluctant to provide information, or would only cooperate with P&SP under conditions of anonymity. Despite this, the P&SP investigation team was able to collect useful data, conduct interviews, obtain affidavits, get contemporaneous accounts of the prevailing conditions in the cattle market, and observe the cattle trade.

Input from USDA Agricultural Marketing Service

In January 2010, P&SP requested AMS data for daily and weekly prices for cattle reported by beef packers under LMR requirements for all types of fed cattle purchases and all information reported under LMR requirements for packer-owned cattle. The data P&SP requested are confidential individual transaction-level data that AMS uses to create its Market News reports.

Some of the allegations made to P&SP concerned possible misreporting of AMA fed cattle transactions. Therefore, in December 2009, P&SP investigators met with AMS employees in Washington, D.C. to clarify how certain AMA transactions were required to be reported by packers and how they were categorized in AMS reports.

Input from Packers

P&SP acquired 2009 packer procurement data from Tyson Fresh Meats ("Tyson" or "TFM"), Cargill Meat Solutions ("Cargill" or "CMS"), JBS USA LLC ("JBS") and National Beef Packing Company ("National" or "NBP").

During July 2010 P&SP interviewed, obtained data, and took sworn statements from packers. The interviews inquired about different aspects of AMAs, obtained the packers' responses to specific allegations regarding use of AMAs, and discussed their justifications for engaging in AMA procurement methods.

Summary of Allegations

Industry organizations and individuals opposed to the use of AMAs have commonly cited increased packer use of AMAs and decreased packer participation in the cash cattle markets as causing lower prices for fed cattle. P&SP collected several affidavits from industry participants complaining about the effects of AMAs. The complaints alleged that reduced packer participation in cash cattle procurement due to committed supplies results in packers competing less vigorously for cattle sold under cash-based procurement methods. That is, AMAs allow packers to procure a significant portion of their slaughter needs without competitively pricing those cattle, thus reducing their need to bid aggressively for cattle in the negotiated cash markets. Complainants allege that packers reap additional benefits of lower volumes and prices in the cash market by using an artificially lowered cash price as the base price for their committed supply and formula-priced cattle.

One aspect of this complaint involves the creation of an oligopsony (few buyers) or monopsony (single buyer) in the cash market reflecting a dominant buyer phenomenon, whereby a few or a single bidder sets the price of cattle in a non-competitive cash market causing lower cash cattle prices and formula base prices. Base prices in formulated procurement arrangements all across the country are often established by the resulting "cash" price in the negotiated market from a single region or group of regions.

In the dominant buyer scenario, a majority of packers "sit out" of the cash market initially, until another packer bids to establish a price of the cattle in the cash market. Only then do the other packers match the price of the initial dominant buyer to fill whatever "gaps" in supplies AMAs cannot fill. This works to the advantage of the dominant buyer, who has to compete less vigorously in the cash market for cattle. This also works to the advantage of the non-dominant buyers, since they allow the dominant buyer to set a lower market price (a monopsony price) which they use as a base price for their AMAs. Thus, the other packers benefit from refraining from bidding directly against the dominant buyer for cash cattle.

A related allegation is that packers take delivery of committed supplies and simply "pass over" bidding on cash cattle supplies for one to several weeks, causing uncommitted cattle to be overfed, thereby distressing cash sellers and ultimately extracting lower prices for their cattle. This observation of the alleged practice of "passing over" was later reiterated in further detail by one cattle seller that stated in late 2009, the weights of the cattle increased because the packers bid an unacceptably low price for three to four weeks, "making us feed longer and making them bigger." The cattle seller further stated that during the week of December 8, 2009, one large packer's buyer bid on his cattle, but said that he might not pick up the cattle until the week of the 23rd of December 2009. He believed that this was due to committed supply. In his statement, he attributed certain cattle feeding losses he incurred due to the packers not timely bidding on his cattle since they were full with captive cattle, thus resulting in his cattle being overfed.

P&SP received other complaints related to packers leveraging their committed supplies of cattle to lower prices in the cash cattle markets by:

- buying fewer cattle on a cash basis creating thinner volumes
- making unreasonably low bids, or less aggressive bidding
- making "take it or leave it" short-term pressure bids
- only offering market-based price bids once a lower market price is established

One cattle feeder interviewed in August 2009 gave these specific examples: He noticed a recent push by packers to top-of-the-market pricing (TOMP) deals. Packers told him that they didn't have slaughter room unless he turned in his cattle at the "high of the week (or TOMP)." This observation supports the dominant buyer theory, that one large packer, being often the sole bidder in the cash market (due to committed supplies) is able to offer lower prices that were established with reduced competition, while other large packers will not bid or will bid only at a reduced market-based price, or with unfavorable conditions attached. The cattle feeder further observed:

“I can get a bid from (the other packer), but it is almost always lower than (the dominant packer’s) bid. I talk to (the other packer) and they might come in if I pay the freight. But if I have ten pens of cattle, (the other packer) wants just the top pen at a lower price.”

This also supports the theory that the other packer cited may bid less aggressively due to having a majority of its needs met by committed supplies. The cattle feeder also provided the following example of packer behavior: He said that (the dominant packer) has asked him to tie up his whole yard at “50 cents or \$1 over the market,” but he won’t do it. This suggests that (the dominant packer) also engages to some extent in market-based formula pricing.

A manager of another feedlot complained that he had to sell mainly now to one packer. He attributed that lack of competition to committed supplies because the other three large packers: 1) won’t send a buyer to his feedlot and 2) would not buy live from him, only at TOMP or one of the packer’s grids; and one packer shifted its territory out of his region because it now gets enough cattle from its captive feedlot. He said the market in his region is now (September 2009) a dollar lower as a result. He pointed also to statements and tactics of packer buyers which he attributes to increased use of committed supplies:

“...one week in April, (the packer buyer) told me that he had taken in 6,000 head and didn't have to negotiate the price on one head. I asked him what would happen if he would have to and he said that it probably would raise the price \$2 - \$5 if they actually had to buy any cattle that week.... They also like to buy cattle in (other states) when they can, for this keeps the average price down for all the grid cattle they take in.”

P&SP received the following additional allegations during interviews and in collected affidavits:

- Increased use of committed supply does not effectively communicate quantity and price to define demand for cattle so that the cattle market is distorted.
- Packers participate in the cash market to a much lesser extent during the first two weeks of each month.⁴
- Packers manipulate the futures markets to depress cash cattle prices.
- Packers delay or misreport market-based pricing transactions to their own advantage.⁵

⁴ Another aspect of alleged use of committed supplies to avoid participation in the cash market involves the allegation that packers strategically time their use of committed supplies to lower cash market prices.

⁵ One cattle seller stated that he “...feels that these early in the week “top of the market” (TOMP) deals are committed supply, because the packers have committed cattle when they negotiate with other sellers who sell later in the week, and the TOMP sales are not priced until the cattle are delivered and processed, usually the following week.”

Packer Responses to AMA Allegations

P&SP investigators interviewed and received written statements from the four largest fed cattle packers concerning allegations that AMAs harmed the cattle markets. In the interviews and written statements, the packers communicated the following points among others regarding their procurement practices:

- packers compete for cattle in response to market fundamentals of supply and demand;
- packers offer a mixture of marketing opportunities for sellers in response to seller and producer needs;
- packers use a variety of procurement methods, including AMAs, to meet the needs of their customers;
- packers use AMAs to increase plant efficiencies;
- packers use AMAs to ensure a stable supply of cattle;
- packers use AMAs to better manage risk;
- sellers determine the timing of when to market their cattle to packers; and
- packers state they do not vary their procurement methods by region.

One head cattle buyer stated that committed supply does not help him buy cattle more cheaply. A benefit of committed supply he cited was more efficient plant operations. He gave a specific example of age-verified cattle that his company uses for its meat exports to Japan. His company has an arrangement to sell meat from a certain number of age-verified under-20-month old cattle for export to Japan. His company can export beef intestines to Japan if the cattle are verified to be less than 20 months of age. It takes an additional eight people on the processing staff to process the intestines for export. There are not enough of these exports to run two shifts with the extra staff, so his company schedules these age-verified cattle for the first shift only. If the under-20-month old cattle were to show up on the second shift, then his company would have to destroy the intestines because there would be no staff to process them. Therefore, his company must work with the suppliers who have the age verified marketing agreements to schedule a steady supply of these cattle for slaughter during the first shift.

In his affidavit, the head buyer stressed the importance of quality for his company's committed procurement programs. "The use of value-based grids or grade and yield, market-based pricing and CME basis forward contracts (collectively, "Non-Cash Methods") rewards producers economically for providing quality beef, operating efficiently and managing risk effectively. These same goals benefit (his company) and its customers with a more predictable supply of high quality beef, plant efficiencies, animal welfare, and risk management."

With regard to top-of-the-market transactions, the head buyer stated: "(his company) uses market based marketing agreements with premiums and discounts for operations that desire to maximize returns of their feeding operation as an alternative to traditional 'grade and yield' or 'cash negotiated' marketings. These relationships have developed over time led by the selling feed yard manager and a (company) fed-cattle buyer using mutually beneficial economic opportunities to (i) increase feed yard operating efficiencies, (ii) reward producers with premiums for producing cattle that meet (the packer's) branded beef programs, (iii) improve plant operating efficiencies, and (iv) minimize animal stress. These 'market' based agreements

are traditionally oral negotiated agreements between the selling feed yard manager and (his company) with no long-term commitments by either party.”

The head buyer attributed increased use of AMAs by the packer to its meeting the needs of its customers. “(The company’s) customers have continued to demand increased quantities of branded beef products. In working with suppliers, we have expanded Non-Cash Methods (some of which may be committed) volume to meet customer needs.”

He acknowledged that his packing company does not participate in the negotiated cash market every week. He indicated that he believes that competition in the market-place corrects any price or quantity imbalances that may occur. In his affidavit, he stated, “Regional cash purchases by (his company) are driven by the quantity of committed supplies, economic factors based in beef market spreads and customer needs. These factors vary both weekly and seasonally.”

Another packer’s head buyer stressed that producers ultimately decide what type of method they use to market their cattle. He denied that the use of marketing agreements and other forms of non-cash marketing methods have increased over time: “Generally speaking, since 2005 there may be some modest variances between producers' selling under spot/negotiated, marketing agreement and forward contract methods through the years due to supply/demand and other issues, but on average (his company) does not believe the use of any one method has significantly increased or decreased. Because the cattle producer chooses how to sell his cattle, whatever changes have occurred have been due to changing preferences by producers.”

In response to an inquiry about whether his company considers how cash prices may affect formula priced transactions in making its procurement decisions, he focused on the need for his company to meet its margin, and emphasized that producers decide what levels of cash market and committed cattle are marketed. He stated, “When bidding on cattle the criteria for (his company’s) pricing decisions are based on the market prices for beef products, and trying to maintain a margin between the price of the live cattle (his company) is bidding on and the beef products (his company) sells. Since the pricing formula in most of (his company’s) marketing agreements is based on the negotiated cash market, the market is the market whether producers choose to market 50% or 100% of the cattle in the negotiated market, and (his company) needs to find producers willing to sell at a price (his company) is willing to pay (i.e., market discovery), (his company) simply focuses on maintaining a margin on the cattle it is bidding on in the spot/negotiated market.”

He stressed in his statement that his company’s participation in the cash market is producer-driven. He stated, “The producer is the party that determines whether they want to market their cattle under a negotiated/spot basis, under a marketing agreement, or through a forward contract.” However, he went on to state, “During a period of high supply or oversupply of cattle, once (his company’s) needs for a week are fulfilled at a given plant, (his company) stops buying cattle for that plant for delivery in that week. As in any supply and demand based business, as the demand from (his company’s) customers decreases, the price (his company) is willing to pay for cattle also decreases.”

P&SP collected a statement from another top four packer's head buyer in response to a set of questions regarding its committed procurement vs. negotiated cash cattle procurement. P&SP investigators also interviewed the head buyer as a follow-up to his statement.

He described the benefits of using committed supplies as supporting his company's branded beef programs. He stated "(the company) has developed a number of proprietary beef brands which are produced pursuant to specific customer specifications. We work with producers to help ensure that a consistent, ratable supply for these brands is produced and available to meet our customers' needs."

He also stressed that committed supplies provided a steady supply of cattle to specialized supply streams. These include Holsteins, age and source verification for export programs, and Mandatory Country of Origin Labeling (MCOOL). He indicated that his company's chief focus for committed supply is its brands, so it can have a steady supply of qualifying cattle for its program beef sold to retailers. According to the head buyer, his company currently supplies 100 percent of the beef for a particular large grocery chain, and that 30 to 40 percent of his company's tonnage goes into branded beef programs. Other benefits of committed supply he cited include:

- improved efficiencies (quality) and demand for beef
- new demand for natural beef programs that a cash market could not fill
- risk management support for producers (i.e., CME basis contracts)
- having precisely-timed cattle delivery to avoid "overnight" cattle starters
- predictable plant hours
- helping the packer manage various weather issues
- support for food safety research
- support for cattle feed research

He also acknowledged some benefits to cash-based cattle procurement. He stated "additionally, the spot cash trade allows us the opportunity to purchase animals that meet the continuously fluctuating needs of our programs." In response to P&SP's question about what determines the level of the packer's use of committed supplies, the head buyer indicated that the levels of committed supplies vs. cash marketing was determined by the producer: "Any increases in (his company's) committed supplies are due to an increase in the demand from producers to market their cattle through these options. We believe that, to the extent producers are increasingly using committed supply options to bring their cattle to market, they are doing so to meet their individual needs, such as risk management, etc." he stated.

With regard to benefits of the cash market and the packer's participation in that market, the head buyer stated, "Many producers continue to utilize the spot market as an option for selling their cattle. Today, this market also serves to provide price discovery and transparency, allows the market to provide more current inputs into the process, and ensures that the overall market responds to supply and demand inputs. Assuming that producers continue to market their cattle via the spot market, (his company) will continue to purchase a significant number of cattle there." He indicated that his company did not have any concerns that the cash market was too thin.

He said his company determines its cash market participation on a weekly basis in the following manner: “The hours of operation for each of our plants are determined on a weekly basis, but are projected out over the next eight weeks. As market conditions change, we do our best to plan our hours to match the available supply of cattle with the demand for meat by our customers, and final decisions are based upon a series of assumptions on these supply and demand factors. Once hours are set, the spot cash needs are determined in order to meet the planned hours of operation.”

With regard to whether the packer has the ability to control when delivery occurs for committed cattle, the head buyer did not specifically address the issue but did give a hint when extolling the advantages of committed supplies during poor weather. “During times of extremely inclement weather we are able to bring in cattle from our committed supply streams when other sources are unable or unwilling to transport cattle. This allows us to continue operations during these challenging periods,” he stated in his affidavit.

The head cattle buyer for another top four packer stated the packer’s use of committed supplies was beneficial “to ensure a supply of consistent quality cattle that meet the specific needs of our customers. It would be difficult to sell a program if we could not guarantee a consistent supply of the finished product.” He emphasized the risk the packer assumes when committing cattle because the packer must accept the cattle even if the plant goes down. He stated that the added cost of margin calls on futures contracts is an additional risk. He added that there are higher administrative costs associated with committed supply methods. However, he acknowledged that it is part of doing business since many producers demand such procurement methods.

He continually emphasized that other than program cattle, his company’s use of committed supplies is determined by the marketing method the producer chooses. “In almost all other cases it is the producer that asks us for formulas,” he stated. He said producers (sellers) were the drivers behind the levels of committed procurement for (his company), and that 90 to 95 percent of the formula agreement and forward contracts are the result of efforts initiated by the producers, and not solicited by his company. He said that his company does not advertise alternative marketing methods or otherwise push committed procurement arrangements on sellers.

The head buyer denied that his company uses committed supplies to achieve lower cash market prices. He dismissed the suggestion that packers use committed supply strategically to stay out of the market to depress cash prices. He said he did not know beforehand which of the other packers did or did not need cash market cattle in any given week. He emphasized that his company decides whether to be in the market based only on what it needs to fill its orders and its plants, and does not consider other packers’ needs. The pricing is determined by the markets, not by packers’ strategic use of committed supply. The idea of strategic use of committed supply to break the market gives the packers too much credit, he indicated. He said that his company does not plot ways to affect cattle prices.

Investigative Analysis and Findings

In addition to conducting interviews and collecting affidavits, anecdotal evidence, and responses to allegations, the investigation used AMS data, sellers' data, and packer procurement data to conduct an economic analysis of the alleged effects of AMAs on cash market prices. The economic analysis was also used to determine what empirical support there exists for the asserted benefits regarding AMAs. The purpose of this analysis was to determine whether the alleged packer practices concerning the use of AMAs could result in reduced demand and prices in the cash cattle markets causing economic harm to producers and to competition.

The analysis focuses on the interactions among the methods packers use to procure fed cattle. Therefore, it is critical to define clearly the relevant procurement methods.

Procurement Method Definitions

This investigation classifies procurement methods into eight distinct categories. Each of the categories used for this investigation are described as follows:

1. Negotiated cash live: These transactions are negotiated on the spot for delivery in 14 days or less and priced on a live-weight basis. The specific pen or pens and the respective price for each are negotiated. The packer typically picks the day and time of delivery, which is usually within seven days of the agreement. Cattle are typically weighed at the feedlot at the time they are picked up. A pencil shrink⁶ agreed to at the time of transaction is applied and payment is determined at the pickup time. The packer typically pays freight.
2. Negotiated cash dressed: These transactions are negotiated on the spot for delivery in 14 days or less and priced on a dressed (or hot)-weight basis. The specific pen or pens and the respective dressed price for each are negotiated. The packer typically picks the day and time of delivery, which is usually within seven days of the agreement. The hot carcass weight is determined right after slaughter and payment is determined then. The seller typically pays freight.
3. Negotiated cash with time: These transactions are negotiated on the spot, but buyer and seller agree on a delivery time that is more than 14 days later. The negotiated price can be either live or dressed weight basis. The packer typically picks day and time of delivery. Live weights are determined at pick-up and an agreed-upon pencil shrink is applied. Hot carcass weight is determined right after slaughter and payment is determined then. The packer typically pays freight on live weight basis transactions. The seller typically pays freight on dressed weight basis transactions. The cattle feeder continues to bear the feeding costs until delivery.

⁶Pencil shrink is a customary practice in live cattle transactions. It is a percentage reduction applied to the live weight measured at the feedlot. Pencil shrink is intended to compensate for the weight that cattle will lose as they are transported from the feedlot to the packing plant. The customary percentages can vary by region and by distance to the feedlot, and are negotiable. In practice, a typical pencil shrink in the southern plains is four percent.

4. Marketing agreements: These transactions are ongoing agreements between sellers and packers whereby the seller will provide cattle to a specific packer. The packer and seller agree to the pricing method, but not the specific price. The pricing methods are typically formulas or grids. Each week, the producer typically notifies the packer how many cattle he or she will have available for delivery two weeks hence. The packer determines the day of delivery.

The base price is not usually determined until the week of slaughter. Most often, base prices are tied to the previous week's market prices which are published by AMS on Mondays for the previous calendar week. Alternatively, base prices may sometimes be tied to average packer procurement costs for the previous week or Chicago Mercantile Exchange (CME) futures prices. Adjustments to the base price (the premiums and/or discounts) are based on carcass characteristics and are not determined until after grading, which is typically two days after slaughter.

Marketing agreements do not apply to specific pens of cattle. They may or may not specify quality and volumes of cattle to be delivered, but often they do. Though sellers determine the week of delivery, the packers often work with the feedlots, and monitor the progress of the cattle on feed. Packers will typically have a good idea of how many cattle will be delivered under the agreement several weeks in advance. There are many types of marketing agreements, but the key features are that they are ongoing agreements or arrangements, and apply more generally between buyer and seller rather than to specific lots of cattle.

5. Forward contract: Under a forward contract, a transaction for a specific lot or group of lots of cattle is typically negotiated several months in advance of delivery. Packer and seller agree to the delivery month and pricing method for each pen of cattle. A specific price can be negotiated, but in the typical case the price is determined by a futures price. These are often called "basis" contracts, because the parties usually negotiate a basis, which is the difference between the futures price and the actual payment price.

Typically, the seller can pick the day any time after the agreement to set or "lock in" the payment price. The packer can pick the day of delivery as long as it is within the agreed-upon delivery month. Packers will usually notify the sellers either one or two weeks in advance of when they want the cattle delivered.

6. Negotiated grid: Negotiated grids are carcass merit purchase agreements, but are negotiated on a lot-by-lot basis. Negotiated grids are typically negotiated for delivery the following week. The base price is typically negotiated relative to a published price (i.e. market plus or minus a dollar), though a set price can be negotiated. Packers usually specify the premium and discount schedules, though in theory, at least, these are subject to negotiation also.

The relevant features of negotiated grids for this investigation are that packers may not know more than one week in advance the number of cattle it will procure under these

negotiated grids, and the base price will not be known at the time of the agreement. The base price will typically be known the week of slaughter, and the net price two days after slaughter. Sometimes, packers will not give a live bid to a seller for an off-quality lot, but will “bid the grid,” knowing a discount will be applied to compensate for the lower quality of the lot.

7. Top-of-the-market pricing (TOMP): With TOMP transactions the seller and packer typically agree the week before delivery on specific pens of cattle to be sold at or relative to a published negotiated price, commonly the top price in a specified region, subject to a minimum volume traded at that price. These are similar in timing to negotiated grids, but are typically purchased on a live weight basis with no premiums or discounts. They are classified as formula purchases by AMS. It is a pricing method offered by some packers as a method for sellers to sell on a live weight basis, but without the “hassle” of negotiation. Again, the actual price is not known by either party until the week after the agreement was reached.
8. Packer fed: Packer fed cattle are cattle owned by a packer more than 14 days prior to slaughter. Packers (arguably) have the most control over these cattle, in terms of feeding program and delivery dates. Companies often value their packer fed cattle with an internal transfer price based on a formula, but the price is not a market price. Some packers use joint ventures whereby they share ownership of the cattle with the producer or feeder. P&SP classifies these partially-owned cattle as packer fed if any percentage is owned by the slaughtering packer.

Data Sources

The economic analysis uses data from multiple sources. The three non-public data sources are: 1) USDA’s lot-by-lot Livestock Mandatory Reporting data (AMS data), 2) lot-by-lot packer transaction data from the four largest beef packers, and 3) sales and bid data from cattle sellers. Each set of data has its own unique characteristics, advantages, and limitations.

AMS Data: AMS transaction data are the primary data used for this investigation. They are confidential (non-public) data P&SP obtained for this investigation as authorized by Sec. 251(b) of the Agricultural Marketing Act of 1946 (7 U.S.C. 1636(b)). The data represent individual transactions reported to AMS under the Livestock Mandatory Reporting (LMR) program. After applying audit procedures to remove incomplete, incorrect, or suspect data from the twice-daily mandatory packer reports, AMS aggregates these transaction data and compiles them into its published Market News reports.

The time period for which P&SP obtained the AMS transaction data is January 1, 2009 to June 30, 2010. AMS refers to these data as the “LS113” data, named after the form AMS requires the packers to fill out when submitting the data. Packers must submit LS113 data twice each business day, and once on Saturday if the packer is doing Saturday business.

P&SP also obtained files from AMS containing information about packer fed cattle slaughter. AMS refers to the packer fed slaughter data as the “LS115” data, again named for the form

packers are required to fill out when submitting packer fed cattle slaughter data. Packers submit these data once per week, on Mondays, covering the previous week's packer fed slaughter.

The LMR Act and regulations require packers to file the LS113 and LS115 forms for reporting of steers and heifers if they process more than 125,000 head of cattle per year. In 2009, 14 U.S. beef packers filed these reports.⁷ The 2009 LS113 file includes about 410,000 records. The file for the first half of 2010 contains about 200,000 records. The LS115 data files contain about 10,000 records for 2009 and about 5,000 records for the first half of 2010.

The transaction data (the LS113 files) include the following relevant fields: Reporting date, number of head, purchasing plant, origin state of cattle seller, price including separate reporting of base price and specific premiums and discounts where applicable, procurement method, pricing basis, delivery method, and various cattle characteristics (e.g. dairy/beef breed, sex, estimated percentage Choice or better, average lot weight, and estimated dressing percentage). However, the AMS data do not include fields that identify the procurement date, the slaughter date, or the name or city of the seller.⁸ The LS115 (packer fed) data are considerably less detailed.

The AMS data have advantages for use in this investigation not present in other data sources. For example, the data are consistent – the data for all reporting packers are recorded in the same format, definitions and field codes. The data are comprehensive in that they include information from all packers processing over 125,000 head per year. Fed cattle slaughter for the reporting packers was about 96.1 percent of all commercial fed cattle slaughter in 2009. The data are reliable because all information is provided to AMS under LMR and the data are subject to AMS compliance audits. AMS applies screens and real-time validation of the data before publishing each report.

The analyses for this investigation that use AMS data only use data that were included in the published reports. One of the most common reasons AMS excluded records is that by policy, AMS did not include lots of fewer than 10 head in its reports. Auction purchases of cattle are not required to be reported to AMS, as these transactions take place in public and thus are excluded from mandatory reporting. Thus, the data set used for the model does not include observations from livestock auction sales. Only about 1 percent of all fed cattle marketed in the U.S. are procured through livestock auctions.

⁷ AMS collects data on other forms for packers to report cow and bull purchases (forms LS131 and LS132). The packing plants that process only cows and bulls (and no steers or heifers) are not included in the 14 packers cited here, nor are their data used for this report. Plants that primarily process cows and bulls and less than 125,000 head per year of steers and heifers, are, however, included in the analysis.

⁸ Packers submit LS113 reports when prices are established. For negotiated purchases this is the procurement date, although the procurement date may be a day earlier than the reporting date if the transaction occurs after the afternoon reporting cutoff time, in which case they are reported the following business morning. The data indicate if this occurs, and the therefore for negotiated purchases, the purchase date is known. For formula, negotiated grid and forward contract purchases, base prices are often not established until the week following delivery, and net prices are not established until after the carcasses have been graded, so the purchase dates for those types of transactions are often less certain.

The primary limitation of the AMS data for this investigation is that the procurement date and slaughter date are not included. The data only include the reporting date. LMR requires packers to report each purchase on the date the price is established. For negotiated purchases, the reporting date and procurement date are the same.⁹ However for formula, negotiated grid and forward contract purchases they are not. In the case of most formula and negotiated grid purchases, there are two prices, the base price and the net price, and thus, packers report those transactions twice to AMS on the dates each price is established. When investigating the impact of committed procurement on cattle prices and competition in the negotiated cash market, the relevant date for formula cattle is the slaughter date. This is because the large beef packers generally procure cattle in the negotiated cash market to fill in immediate and projected slaughter needs after accounting for the slaughter schedules of committed cattle.

The base price reporting date to AMS for formula purchases is usually the week after purchase, and can be as much as two or three weeks after the procurement date. This varies depending on the type of arrangement and pricing method. For example, negotiated grid base prices may be established during the purchase week -- one or two weeks before slaughter, if the base price is negotiated, or the week of or after slaughter if the base price is calculated from plant average costs. This can be especially problematic for forward contract cattle as the base price can be established any number of weeks before slaughter. TOMP base prices are established the week after purchase, and slaughter occurs within one to 14 days after the purchase date. Net prices for formula and contract purchases are established one or two days after slaughter, but even that can vary according to cooling times employed, and when the data are available to determine the base price and premiums and discounts.

For negotiated cash purchases, the price may be established during the slaughter week or one or two weeks prior to slaughter (or even more in the case of cash purchases “with time”) depending on delivery scheduling. This leads to uncertainty as to when cattle were slaughtered, and can lead to possible inaccuracies when trying to estimate week-to-week impacts of committed procurement volumes on negotiated cash prices.

The other main limitation with the AMS data is that they do not identify the seller by name or location other than state. This makes analysis of local or intra-state issues with these data infeasible.

Packer Transaction Data: For this investigation, P&SP obtained procurement records from the four largest beef packers for the cattle they slaughtered during the 2009 calendar year. The data fields most relevant for this investigation in each database are transaction date, slaughter date, plant name, location of seller, final cattle dressed cost, number of head, procurement method, and cattle characteristics. The databases do not include AMS reporting date, base price, or in most cases, premiums and discounts.

The packer data are advantageous because knowing the slaughter date of each lot of cattle is very important to the investigation. Other advantages to these data are that they contain added detail on procurement methods such as top of the market identifiers, and the name of the alliance or

⁹ See the discussion in the previous footnote.

marketing agreement. The packer data also include the seller name and location within a state, as well as more detail on cattle characteristics. The data are comprehensive in that they include condemnments and odd lots.

Drawbacks of these data are that the base price is not included, the final cattle cost is not defined consistently across packers or plant (i.e., some are reported net of transportation, while others are not), the data are not audited and the coverage is for the top four packers only (about 82 percent of total commercial fed cattle slaughter in 2009). Each packer database lists different fields, formats and accounting conventions. Sometimes formats vary across plants in the same firm.

Unfortunately, it is extremely cumbersome and in most cases not practical to join the packer transaction data with the AMS data. Packers group the lots differently in their internal transaction data than in their reports to AMS. In general, packers report larger aggregated lots to AMS, and smaller disaggregated lots in their internal transaction data files. In addition, the cattle characteristics in the packer data are usually actual carcass performance data, while in the AMS data, the dressing percentage and grading data are estimates made by packer buyers at the time of purchase while the cattle are still alive. Though it would seem to be an advantage to have actual performance data, it may not be for this investigation because prices for live weight purchases are based on the estimated, not actual cattle characteristics. Finally, having actual performance makes it more difficult to join the data with the AMS database, which only has estimated performance.

Cattle Seller Data: The fed cattle seller data P&SP obtained covered the time period of the investigation through June 2010. The seller data covered sales from several, but by no means all producers and feedlots in various cattle producing states. The sales data obtained were predominantly for negotiated cash market transactions (live and dressed), though there were some on a grid or formula basis.

The useful seller data included such items as the location of the seller, the showlist week, number of head, buying packer, sales method, price, and limited information on cattle characteristics. The main drawback to using these data for this investigation is the limited coverage, both geographically and by sales method. And, the data are not reported consistently across different sellers. For example some seller records note that top-of-the-market method was used, while others list a top-of-the-market sale as a cash sale, but without a price. Other limitations are that slaughter date and destination plant are not reported as many sellers are not aware of these items or don't need to record them.

Bid Data: P&SP also collected some limited information on bids certain sellers received on some pens of cattle they marketed. Most pens with bid data only showed one packer bidding. Of note is that the bid records show an earlier time and generally a price lower than the final sales price. This is indicative of packer behavior to bid a low price and raise it until it finds willing sellers. It was generally difficult and sometimes not possible to match bid data for pens to the final sales data. However, the data demonstrated that packers may participate in the market by bidding on cattle even if they do not actually make any purchases.

Several factors limit the usefulness of bid data for this investigation. For example, there was not consistency on how individual sellers recorded data, for example, if and when a bid was recorded. Bidding can be subjective – what constitutes a bona fide bid may be a matter of opinion. For example, while visiting sellers during trading, packer buyers sometimes make hints at bids, conditional bids, offers to call their head buyer, qualified bids for only the seller’s best pens, and other bids that may not have been firm. Bids often may apply to multiple lots, and sellers may not have recorded the bid for every lot to which it applied. Sellers may not have recorded multiple bids by the same packer over time or within a week. It appeared in many cases that only the most recent bid was recorded, so a particular packer’s entire bidding pattern may not have been recorded. Finally, the bid data P&SP obtained were limited in coverage.

Size of the Cash Market

A major concern regarding the use of AMAs, and one cited by complainants is that it dilutes or thins the cash market. Many AMA formulas used in marketing agreements determine base price from a reported cash price, or an average procurement cost. Top-of-the-market pricing (TOMP) formulas and many negotiated grids also determine base price from a reported negotiated cash price. Forward contract prices generally do not directly depend on a cash market price, and this investigation does not concern itself with reported packer fed cattle prices as they do not reflect uncontrolled market transactions.

Nationally in 2009, according to the AMS database, 38.9 percent of all fed cattle purchases were negotiated cash purchases, including those with time (this is the sum of the first three columns of the top row of Table 2 below). Another 29.75 percent were formula purchases and another 6.79 percent were TOMP.¹⁰ Therefore, nationally, in 2009, 38.9 percent of the trade in fed cattle determined 75.4 percent of the prices which includes all non-cash transactions except negotiated grid, forward contract and packer fed cattle.¹¹ The percentages for each purchase method vary considerably by region. See Table 1 below for absolute numbers by method and Table 2 for percentages.

¹⁰ Note that TOMP is not a purchase type reported to AMS. P&SP estimated TOMP purchases from AMS records reported as formula purchases on a live weight basis and whose net price did not include premiums or discounts.

¹¹ If one recalculates the percentages excluding packer fed transactions, which are not priced in market transactions, 42.1 percent of the trade determines the price of 81.6 percent of the total transactions. Note also that most negotiated grid purchases involve base prices tied to the cash price. If one treats negotiated grids as formula pricing then, 42.1 percent of the trade determines prices for 89.7 percent of the transactions.

Table 1 – Fed Cattle Procurement by Method and Region – AMS Data - 2009 – (in head)

Region	Neg. Cash Live	Neg. Cash Dressed	Cash With Time	Neg. Grid	Top-of-the-Market	Formula	Forward Contract	Packer Fed	Total
Total U.S.	5,252,802	3,793,924	51,563	1,765,561	1,588,415	6,957,828	2,219,657	1,757,659	23,387,409
Texas/OK	1,449,288	25,665	7,081	421,806	693,057	2,273,660	299,795	673,851	5,844,203
Kansas	1,547,231	275,406	14,263	40,090	540,172	1,508,340	326,180	464,406	4,716,088
Nebraska	936,334	1,886,233	14,273	348,683	159,951	745,553	391,991	0	4,483,018
Iowa/MN	662,636	950,471	3,490	317,514	40,046	241,409	300,006	531	2,516,103
Colorado	317,287	151,740	11,213	42,930	37,140	914,859	177,920	106,358	1,759,447
Midwest	174,314	98,025	31	228,018	2,248	17,566	198,729	26,876	745,807
Southwest	6,294	556	0	2,842	54,191	505,199	187,163	241,173	997,418
Northwest	1,336	20,824	0	64,764	45	527,166	14,415	244,384	872,934
Other U.S.	157,480	359,623	1,212	177,685	51,709	166,672	121,913	80	1,036,374
Canada	602	25,381	0	121,229	9,856	57,404	201,545	0	416,017

Table 2 – Fed Cattle Procurement by Method in Percent – AMS Data - 2009

Region	Neg. Cash Live	Neg. Cash Dressed	Cash With Time	Neg. Grid	Top-of-the-Market	Formula	Forward Contract	Packer Fed	Total
Total U.S.	22.46%	16.22%	0.22%	7.55%	6.79%	29.75%	9.49%	7.52%	100.00%
Texas/OK	24.80%	0.44%	0.12%	7.22%	11.86%	38.90%	5.13%	11.53%	100.00%
Kansas	32.81%	5.84%	0.30%	0.85%	11.45%	31.98%	6.92%	9.85%	100.00%
Nebraska	20.89%	42.08%	0.32%	7.78%	3.57%	16.63%	8.74%	0.00%	100.00%
Iowa/ MN	26.34%	37.78%	0.14%	12.62%	1.59%	9.59%	11.92%	0.02%	100.00%
Colorado	18.03%	8.62%	0.64%	2.44%	2.11%	52.00%	10.11%	6.04%	100.00%
Midwest	23.37%	13.14%	0.00%	30.57%	0.30%	2.36%	26.65%	3.60%	100.00%
Southwest	0.63%	0.06%	0.00%	0.28%	5.43%	50.65%	18.76%	24.18%	100.00%
Northwest	0.15%	2.39%	0.00%	7.42%	0.01%	60.39%	1.65%	28.00%	100.00%
Other U.S.	15.20%	34.70%	0.12%	17.14%	4.99%	16.08%	11.76%	0.01%	100.00%
Canada	0.14%	6.10%	0.00%	29.14%	2.37%	13.80%	48.45%	0.00%	100.00%

Given that negotiated cash prices determined prices in many other transactions, the competitive conditions for those purchases were examined closely in this investigation. P&SP examined cash market volume by packer in detailed geographic regions and found several highly concentrated regions in terms of how many packers participated in the negotiated cash (spot) purchases.

The four largest beef packers have fed cattle slaughter plants in the following locations:

- Tyson (TFM) has plants in Amarillo, TX; Holcomb, KS; Dakota City, NE; Lexington, NE; Pasco, WA; Denison, IA; and Joslin, IL.
- Cargill (CMS) has plants in Dodge City, KS; Fort Morgan, CO; Plainview, TX¹²; Friona TX; and Schuyler, NE. CMS harvests small numbers of fed cattle at its cow plants in Fresno, CA; Milwaukee, WI; and Wyalusing, PA.
- JBS has plants in Cactus, TX; Greeley, CO; Grand Island, NE; Hyrum, UT; Green Bay, WI; Plainwell, MI; Souderton, PA; and Tolleson, AZ.
- National (NBP) has plants in Dodge City, KS; Liberal, KS; and Brawley, CA.¹³

¹² CMS closed its Plainview, Texas plant on February 1, 2013.

¹³ NBP closed its Brawley, California plant on May 23, 2014.

Ten other packers reported fed cattle procurement to AMS, and their data were included in this analysis. The statistics P&SP reports here aggregate the other ten packers, treating them as if they were just one packer.

Cash Market Concentration

Table 3 below shows the concentration of the negotiated cash markets by region.

**Table 3 – Concentration in Negotiated Cash Procurement by Region
AMS Data – January 2009 to June 2010**

Region	HHI	Packers by 78 weeks	Packers by 78 weeks > 1,000 hd.	CR3	Percent Negotiated Cash	Percent Non-Cash
Total U.S.	2,458	390	389	79.63%	39.71%	60.29%
Texas/OK	4,069	319	230	92.97%	25.60%	74.40%
Kansas	3,581	381	267	94.36%	40.64%	59.36%
Nebraska	2,629	373	349	82.55%	60.29%	39.71%
Iowa/ MN	3,816	342	298	92.83%	66.03%	33.97%
Colorado	3,900	290	179	98.20%	28.32%	71.68%
Midwest	3,281	322	161	90.36%	43.44%	56.56%
Southwest	3,253	97	0	85.79%	1.30%	98.70%
Northwest	6,589	90	9	(d)	2.49%	97.51%
Mid North	2,831	331	271	83.28%	47.00%	53.00%
Other U.S.	3,142	264	17	87.96%	29.97%	70.03%
Canada	4,968	96	16	99.95%	8.09%	91.91%

(d) indicates data withheld per the confidentiality guidelines for the LMR Program.

HHI is the Herfindahl-Hirschman Index of market concentration. It is calculated as the sum of the squared market shares of the four largest packers plus squared share of the other ten combined. Negotiated Cash includes cash transactions with time.

“Packers by 78 weeks” is the number of packers that bought at least one head by a negotiated cash method during each week, summed over the 78 weeks of the data period. “Packers by 78 weeks > 1,000 head” is the number of packers that bought at least 1,000 head by negotiated cash methods during each week, summed over the 78 weeks of the data period. Like for the HHI, P&SP combined the other 10 smaller packers in the AMS data (i.e., the packers other than the four largest) and treated them as a single packer in calculating the “Packers by 78 weeks” indices. Thus, for this calculation, there are a maximum of five packers purchasing cattle by negotiated cash methods in any region during any given week. The data cover a period of 78 weeks, so a maximum of five packers per week summed over 78 weeks means 390 is the maximum value for any region. Note that the value for the total U.S. is 390, meaning each of the top four packers and at least one of the smaller packers bought at least one head of cattle in the cash market somewhere in the United States and Canada during every week in the 18 month period.

CR3 is the percentage of fed cattle purchased by the three largest cash purchasers over the 78 weeks.

Tables 1 through 3 demonstrate that the areas with the largest number of cash cattle marketed and the highest measures of concentration for negotiated cash sales are Texas, Colorado and Kansas.

In Iowa, Midwest and Mid North (The Mid North region includes MT, SD, ND, and UT), “Other” packers have collectively the second largest market share. Since “Other” typically includes more than one packer, the CR3s are overstated for those regions. The HHIs are overstated for every region where “Other” includes more than one packer. The Northwest, Southwest and Canada regions have very few cattle procured by the cash method, so concentration measurements are less meaningful.

The Department of Justice (DOJ) and the Federal Trade Commission (FTC) standards relating to specific levels of HHI and concentration ratios, which are used for anti-trust analysis and enforcement, do not apply here. The numbers shown here are for negotiated cash purchases only. DOJ and FTC apply their standards to broader markets that include close substitute goods, specific regions, and generally do not differentiate by procurement method. Negotiated cash and AMA purchases of fed cattle are close substitutes, and for anti-trust enforcement analysis would likely be combined when defining a market. Note also that the regions this analysis uses are based on state borders and groupings, and are therefore not geographic markets rigorously determined according to specific packer draw areas.

Econometric Analysis

Complainants alleged that higher AMA usage led to lower negotiated cash prices in general, and that lowers AMA fed cattle prices to the extent AMAs use formulas that reference a negotiated cash price. The econometric portion of this investigation first examines the relationship between AMA usage and negotiated cash prices. It then explores potential inferences regarding the welfare impacts of AMA usage on the U.S. economy.

P&SP conducted the primary analyses described here using a combination of USDA’s Agricultural Marketing Service (AMS) transaction data and packer transaction data from 2009 and 2010. The analyses applied modeling methodologies similar to those used and published by previous researchers¹⁴, but with different data. P&SP also conducted several alternative and exploratory analyses that are discussed in this report.

Some specific characteristics of the P&SP framework and analysis that differentiate it from previous research are:

- P&SP examined the relationship between AMA usage and negotiated cash prices for the time period encompassing all of calendar year 2009.

¹⁴ See, for example, *GIPSA Livestock and Meat Marketing Study*, 2007, conducted by the Research Triangle Institute (LMMS). In particular, see LMMS Volume 3: Fed Cattle and Beef Industries - section 2.3: “Effects of Marketing Arrangements on Cash Market Prices in the Fed Cattle and Beef Industry.”

- The analysis conducted by P&SP uses data from the top four beef packers to measure AMA usage, but uses a different data set for statistical analyses of prices and volumes in the negotiated cash markets. It uses the 2009 AMS transaction level data reported by packers to AMS under the LMR program as its basis for modeling negotiated cash market activity. Like the packer transaction data, the LMR transaction level data are confidential and are generally not available to others who have studied this issue. P&SP investigators believe there are distinct advantages to using the LMR data set.
- P&SP conducted the analysis on a detailed regional level for multiple regions as well as the United States as a whole. In addition, the analysis P&SP conducted for the U.S. as a whole employs a regionally defined measure of AMA usage that results in a good fit of the specified equation to the data.
- The P&SP analysis considers specific types of AMAs separately, in addition to considering AMAs as a whole in its modeling of the AMA effect on cash prices.

Methodology and Results

The basic methodology applied by P&SP is regression analysis. The data set is LMR data for negotiated cash market transactions only, live or dressed basis. The model is:

$$PRICE_{i,t} = \beta_0 + \beta_1 AMA_{t+1,r} + \beta_2 MKT_t + \beta_3 CHAR_{i,t} + \beta_4 D_PLANT_{i,t} + \beta_5 D_MONTH_t + \varepsilon_{i,t}$$

Where t indexes the week each transaction was reported to AMS in 2009 ($t=1, \dots, T$ and $T = 53$), r indexes the region of the fed cattle seller from which the cattle were sold ($r=1, \dots, R$ and $R = 10$ -- the country was segmented into ten different regions), and i indexes individual transactions or fed cattle lots purchased by packers and reported to AMS as negotiated cash purchases, (live or dressed, but not negotiated grid) where $i=1, \dots, I_t$, and I_t varies each week. The β s are vectors of parameters the regressions estimate and $\varepsilon_{i,t}$ is an error term.

The dependent variable, $PRICE_{i,t}$, is the transaction price reported to AMS for lot i in week t on a dollars per live hundred pounds (cwt.) basis for negotiated cash transactions. If the purchase was made on a dressed weight basis, P&SP converted the price to live weight by multiplying the reported dressed price by the transaction's reported expected dressing percentage.¹⁵ The mean value for $PRICE_{i,t}$ in 2009 was \$82.73879. Total number of observations for the equation is 76,029.

$AMA_{t+1,r}$ is the main explanatory variable of interest. In order to isolate the effects of the AMA variable on negotiated cash prices, the model contains several vectors of control variables:

First, the model uses a vector of market condition variables, MKT_t , which represent market factors. The specific variables are: 1) the week's current composite cutout price for a Choice carcass reported by USDA, 2) the current weekly average live cattle futures settlement price

¹⁵ P&SP chose to use live basis prices for the model over dressed weight prices because the AMS data had more live weight purchase records, and therefore more records would have actual prices rather than adjusted prices. Negotiated cash transactions where delivery occurred more than two weeks later ("cash with time") were modeled as AMA purchases, and thus are not part of the sample over which the equation was estimated.

reported by CME, and 3) rolling total of current plus next two weeks' cash and TOMP fed cattle slaughter levels of the four largest packers taken from the top four packer transaction data. This last market variable is intended to measure cash market supply. Each of these variables has a different value each week, but are national variables and do not differ by region or by transaction within a given week.

The model also uses a vector of independent variables designed to measure specific characteristics of each lot, $CHAR_{i,t}$. These variables are: 1) head count, 2) expected percentage of cattle in each lot to grade choice or better, 3) a binary variable indicating an expected average carcass weight is greater than 1000 pounds or less than 600 pounds, and 4) a binary variable indicating if the cash sale was based on a dressed weight. Each of the characteristics variables' values is specific to each observation (lot) in the data set.

The model also contains a vector of 37 binary variables, $D_PLANT_{i,t}$, indicating which plant purchased the lot.¹⁶ The model also contains 11 binary variables, D_MONTH_t , indicating which month the transaction occurred. January is the reference month.

The explanatory variable of interest to this investigation, $AMA_{t+1,r}$ is each week's relative volume of cattle purchased through AMAs. It measures the usage of cattle procured by AMA methods as a percentage of slaughter capacity for each region in each week.¹⁷ It has a different value each week, in each region, but does not vary by transaction within a week and region.

The regression analysis estimates the effect on this week's negotiated cash price from next week's proportion of slaughter capacity made up of AMAs while controlling for the other factors in the model. The hypothesis tested is that the more AMA cattle packers know they will have available for slaughter next week (week $t+1$), the fewer they will need to buy on the negotiated cash market this week (week t), and the negotiated cash prices in week t will be lower as a result.¹⁸ Packers generally know before the slaughter week begins how many head they will have available through most alternative marketing arrangements. Cattle purchased in the negotiated cash market are generally delivered for slaughter the following week.¹⁹ Therefore, the price and volume of negotiated cash transactions are typically negotiated after packers already know how many AMA cattle they will have available for slaughter the following week.

The AMS database used in this investigation only contains a reporting date. Neither the slaughter dates nor the purchase dates are reported. The dates that AMA transactions are

¹⁶ Thirty-eight packing plants reported to AMS during the period. P&SP selected a large plant in the cattle feeding region as the reference plant for the model.

¹⁷ Slaughter capacity for purposes of this equation is measured as each plant's largest single slaughter value observed during any week within the sample period.

¹⁸ The opposite effect is also alleged in the complaint; When packers know they will have fewer AMA cattle next week, they will bid more aggressively in the negotiated cash market during the current week and prices will be higher. Prices to producers on their sales through alternative marketing arrangements are also affected because most of those transactions are priced on formulae based on prices in the negotiated cash market the week prior to slaughter.

¹⁹ This is evident from the fact that most weeks, the bulk of cash trade occurs late in the week. In 2009, of the negotiated cash transactions reported in LM_CT_100 for the year, live FOB and dressed delivered, steers and heifers, 75.6 percent traded on Thursday or Friday, and 24.4 percent traded on Monday, Tuesday or Wednesday.

reported to AMS can vary considerably from the slaughter date. Thus, P&SP would have to establish the timing associated with those events for each lot by using assumptions or a different database. This is why P&SP used the packer transaction data to construct its AMA variable.

Because markets are made up of multiple packers, the actions of one packer may affect the price paid by other packers in that market. The model therefore calculates the AMA percentages from data aggregated across packers by region.²⁰ The lowest possible value for AMA is 0 and its maximum possible value is 1.²¹

Econometric Properties of the Regression Equation

P&SP explored the econometric properties of this regression model in depth. Specifically, P&SP looked at the potential problems common in regression analysis of serial correlation, heteroskedasticity, multicollinearity, and simultaneity bias.

Serial Correlation

Serial Correlation is present in time series data when the errors associated with observations in a given time period are correlated with errors in different time periods. Usually the time periods of dependency among error terms are adjacent time periods. (For example, the error terms for one week carry over to the next week.) The main consequence of serial correlation is that the standard errors of the estimated coefficients are incorrect. The presence of serial correlation does not bias the coefficient estimates, but the resulting t-tests on the statistical significance of the estimates are invalid.

P&SP tested the model for serial correlation. Because the fed cattle data are cross-section time series data with a different number of observations from different groups during each time period, the most common tests for serial correlation such as the Durbin-Watson statistic cannot be applied without modification. P&SP estimated the auto-correlation coefficient $\hat{\rho}$ as:

$$\hat{\rho} = \frac{\sum_{i=1}^n \sum_{t=2}^T \hat{\varepsilon}_{it} \bar{\varepsilon}_{i,t-1}}{\sum_{t=2}^T \bar{\varepsilon}_{t-1}^2 n_{t-1}}$$

This is the method described in Greene²² with the modification that the mean of the error terms in period $t-1$ was substituted as a proxy for each $\hat{\varepsilon}_{i,t-1}$. This modification was necessary due to the

²⁰ P&SP also explored a single national measure of AMAs as a percentage of U.S. capacity. The regional definition for the AMA variable resulted in a better statistical fit for the equation, and therefore it is the main measure used for this investigation.

²¹ In practice, the lowest value of AMA was 0.117975. The maximum value of 1.0 occurred just once.

²² William H. Greene, "Econometric Analysis," Third edition, Prentice Hall, New York, 1997, p. 663, equation 15-20. This same method also appears in Jan Kmenta, *Elements of Econometrics*, Macmillan Publishing Company, New York, 1971, pp. 510, equation (12.26).

fact that the number of observations n , in a given week is not the same from week-to-week. The point estimate of the autocorrelation coefficient is -0.03656. This means that if the equation over (under) estimated the actual price in one week, on average, it will under (over) estimate the price in the next week by 3.656 percent of the previous weeks over (under) estimate.

To correct for the estimated autocorrelation, P&SP applied the transformed model also described by Greene.²³ The transformed equation for the serial correlation correction is shown below where Y denotes *PRICE*, and the X_{ks} denote the K right-hand side variables from the original model equation shown at the beginning of the Methodology and Results section.

$$Y_{i,t}^* = \alpha + \beta_1 X_{i,t,1}^* + \beta_2 X_{i,t,2}^* + \dots + \beta_K X_{i,t,K}^* + u_{i,t}^*$$

When $t > 1$ (time periods beyond the first week), the transformed terms are:

$$Y_{i,t}^* = (Y_{i,t} - \hat{\rho}\bar{Y}_{t-1}) \quad \text{and} \quad X_{i,t,k}^* = (X_{i,t,k} - \hat{\rho}\bar{X}_{t-1,k}) \quad \text{and} \quad u_{i,t}^* = \varepsilon_{i,t} - \hat{\rho}\bar{\varepsilon}_{t-1}$$

When $t=1$ (the first week of data), the transformed terms are:

$$Y_{i,1}^* = (1 - \hat{\rho}^2)^{0.5} Y_{i,1} \quad \text{and} \quad X_{i,1}^* = (1 - \hat{\rho}^2)^{0.5} X_{i,1} \quad \text{and} \quad u_{i,1}^* = (1 - \hat{\rho}^2)^{0.5} \varepsilon_{i,1}$$

The resulting correction had little effect on the parameters. The original equation had an estimated coefficient on the AMA variable of -3.49973 with a standard error of 0.07561. The transformed equation correcting for auto-correlation had an estimated coefficient on the AMA variable of -3.43055 with a standard error of 0.07520. The correction had relatively little impact because the value of $\hat{\rho}$ is small. The fact that $\hat{\rho}$ is negative causes the corrected standard error to be smaller.

Heteroskedasticity

Heteroskedasticity is present when the variance of an equation's error terms is correlated with any combination of the explanatory variables. The main consequence of heteroskedasticity is that the standard errors of the estimated coefficients are incorrect. The presence of heteroskedasticity does not bias the coefficient estimates, but the resulting t-tests on the statistical significance of the estimates may understate the estimated precision of those estimates (the estimated standard errors may be too large).

P&SP conducted a test for heteroskedasticity on the original equation. The first step was to estimate the original equation with the ordinary least squares method and save the error terms. The second step transformed the error terms to the log of each term squared. The third step was to regress the same set of independent variables on the transformed error terms and perform an F- test on the significance of that equation. The R-squared value was .1030, and the F value was

²³ William H. Greene (op.cit.) p. 663. Specifically, we applied the Prais-Winsten transformation denoted in equation 15-17. This is the same transformation detailed in Kmenta (op. cit.) p. 510, equation (12.27), except it (Prais-Winsten) has the advantage that it includes a transformation for the first time period of data, ($t=1$ or week 1) so those observations can be used.

161.63 which indicated that the independent variables explained a statistically significant portion of the error term variance, and thus, there is some degree of heteroskedasticity present in the original equation.

To correct for heteroskedasticity, P&SP re-ran the transformed equation (with the serial correlation correction) using the weighted least squares method. P&SP calculated the weights according to the method described in Kmenta.²⁴ Specifically, the calculation is:

$$s_{ui}^2 = \frac{\sum_{t=1}^T \hat{u}_{it}^{*2}}{T-1}$$

Where the $\hat{u}_{i,t}^*$ are the residuals from estimating the transformed serial correlation correction equation.²⁵

Then P&SP applied $1/S_{ui}$ as the weights and then re-ran the serial correlation corrected equation with weighted least squares to correct for heteroskedasticity. The results changed the estimated coefficient on the AMA variable to -4.17577 and the standard error to 0.06147 . The adjusted R-Square statistic increased from $.6524$ to $.7030$.

Multicollinearity

Multicollinearity is present when two or more of the explanatory variables are correlated with one another. With multicollinearity, inferences are invalid because the assumption that all other variables are constant does not hold. That is, for X_1 to change, X_2 also changes. The presence of multicollinearity does not bias the coefficient estimates, but the resulting estimated coefficients are not very precise (their variances are high). P&SP tested for multicollinearity by estimating “Variance Inflation Factors” (VIFs) for each variable, and concluded it was not a significant problem. The VIFs were all below 4.5, and most were less than 2. Typically, a VIF greater than 10 indicates potential collinearity problems.

Causality

Regression is useful in establishing correlation, but does not, by itself determine causality. With this model, P&SP has established a likely correlation between high use of AMAs and lower negotiated cash prices, but the model does not prove that AMA usage causes reduced cash

²⁴ Jan Kmenta, *Elements of Econometrics*, Macmillan Publishing Company, New York, 1971, pp. 511, equation (12.28). That equation actually has $T-K-1$ in the denominator, where K is the number of explanatory variables. In this case, P&SP corrected for heteroskedasticity across plants, and in some weeks K exceeded the number of observations per plant, so we followed Greene (op. cit., page 659, equation 15-8) and did not subtract K in the denominator. In making this modification to the formula in Kmenta, Greene states that “there is no problem created by doing so.”

²⁵ Note that in this case, P&SP corrected for heteroskedasticity across plants, so it estimates a unique S_{ui}^2 for every i^{th} plant, and T is the number of transactions for each plant. This method produced superior R-squared and standard error of equation statistics compared to correcting for general heteroskedasticity across all variables, indicating the heteroskedasticity correction across plants was more efficient.

prices. As some industry participants have suggested, it is possible that the lower cash prices encourage the use of AMAs and vice-versa. This hypothesis is that when prices are high, sellers want to sell on the cash method to take advantage of the higher prices and when cash prices are low, sellers believe they can get more value for their cattle by selling through AMAs.

By evaluating the effects of lead (future values) and lagged (past values) observations of the variables, one can test the hypothesis. With the original equation, if AMAs cause negotiated cash prices to move, but the causality is not reversed, we would expect the coefficients on the lead terms to be statistically insignificant individually or at least as a group. If, however, the coefficients on the lag terms are insignificant while the lead term coefficients are significant, the causality is reversed. If both are significant, the causality runs both ways, and a simultaneously determined model is indicated.²⁶

P&SP performed a test by running the original equation with four lead and four lagged terms added on the AMA variable. If AMAs affect negotiated cash prices, as the complainants suggest, then we would expect the coefficients on the lag terms (but not the lead terms) to be statistically significant individually or at least as a group.

By this criterion, the data mildly support that causation runs from AMAs to cash price, but not the other direction. P&SP ran the equation with four weeks of lead and lagged AMA terms. More of the AMA coefficients are of the expected negative sign and statistically significant on the lag terms than on the lead terms, and generally speaking, the negative lag terms are larger in absolute value compared to the lead terms. This indicates that causality leans toward AMAs affecting negotiated cash prices as opposed to the other way around. Specific results are shown in Appendix I.

Endogeneity

Closely related to the causality issue is the issue of endogeneity. If an explanatory variable is determined endogenously then it is possible the equation coefficient estimates are biased. Therefore, P&SP tested for endogeneity between the use of AMAs and negotiated cash market cattle prices using the Hausman specification test. The Hausman test compares results from an instrumental variables estimator to those from an Ordinary Least Squares estimator. The results will be very similar if there is no simultaneity. The results indicated that the instrumental variables approach (using the remaining dependent variables as instruments for the AMA variable) yielded virtually the same results as OLS, and therefore, the test indicated there was no

²⁶ See Robert S. Pindyk and Daniel L. Rubinfeld, *Econometric Models and Economic Forecasts*, Second Edition, 1981, McGraw-Hill, Inc., pp 244-245. The logic of this test is that the past can influence the present, but the future cannot because the future is unknown. If the future is correlated with the present, the logic is that it is the present that is influencing the future, not the future influencing the present. In other words, if X causes Y then changes in X should precede changes in Y. In this case, one could argue that the packers know what their AMA usage will be in the future, and that could influence the current cash price, but this is not supported by the data.

endogeneity bias. Specifically, the test can determine if it is necessary to use an instrumental variables method rather than a more efficient OLS estimation, and in this case, the test determined that the instrumental variable approach is not necessary.

Estimation Results

The model results were robust in that the use of AMAs was consistently negatively correlated with negotiated cash prices in most regions and variations of the model specification. P&SP tested the impact using both a broad and a narrow definition of AMAs with the difference being that negotiated grid and TOMP procurement are included in the broad definition along with the methods in the narrow definition which are packer fed, marketing agreement, forward contract, and cash with time. P&SP concluded the broad definition of AMAs is the best specification for this investigation because it best fits the complaint. Complainants expressed concern that all methods of procurement that do not establish a specific price make the negotiated cash market less competitive.

The different model specifications resulted in relatively small differences in the estimated impact of AMAs. In general, the broad definition of AMAs had a somewhat larger impact on negotiated cash prices as measured by the AMA variable's coefficient, but a slightly worse fit to the data as measured by slightly smaller R-squared statistics.

P&SP also tested the effects of a single national AMA measure each week that was not region-specific. The regional AMA variable not only resulted in a better fit of the equation to the data, but allows the model to account for regional characteristics of fed cattle markets and better fits the theory and the complaint.²⁷ Using the national variable for AMA usage, for the most part, resulted in larger negative coefficients, but somewhat worse equation fits as indicated by lower R-squared statistics. The results presented in this report, unless otherwise stated, will be from models using the region-specific broad definition of AMAs. Table 4 shows the AMA regression results by region.

²⁷ For example, if packers in Texas ship in AMA cattle from Kansas to increase supply in Texas and reduce prices for negotiated cash cattle originating from Texas, the regionally defined measure of AMA usage in Texas captures the effect, while a single national measure would not.

Table 4 -- Results from the AMA Regressions by Region – 2009 Data

Region Covered by Equation	Sample Size (N) in AMS Records	Mean Value of Dependent Variable	Adjusted R-Squared	AMA Estimated Coefficient*
Total U.S.	76,029	\$82.74	.7030	-4.17577
Texas/OK/NM	10,989	\$83.64	.9663	-4.54493
Kansas	14,847	\$83.33	.8960	-5.31462
Nebraska	18,919	\$83.11	.8075	-1.65938
Iowa/MN/MO	17,613	\$82.06	.9928	-0.79365
Colorado	2,802	\$82.61	.8645	-3.20432
Midwest	5,349	\$81.68	.7502	-4.06172
Other U.S.	4,653	\$81.85	.6995	-1.57584
Pacific NW	186	\$79.59	NA	NA
West/ SW	63	\$80.81	NA	NA
Canada	608	\$78.24	NA	NA

The regions are by seller and are indicated by state. Midwest includes IL, IN, OH, PA, WI and MI. Pacific Northwest includes WA, OR and ID. West/Southwest includes CA, AZ and NV. "NA" is Not Analyzed -- The sample is too small to produce meaningful results. *All the regions reported had negative and statistically significant coefficients (at the 5% level of confidence) on the AMA variable.

Interpretation of Results: Estimated Impact of AMAs on Negotiated Cash Price

All the regions shown had negative and statistically significant coefficients at the 5% level of confidence on the AMA variable. The total U.S. coefficient of -4.17577 means that for every 1 percent of additional AMA purchases relative to capacity, negotiated cash prices are \$0.0418/cwt. lower on a live weight basis. In the Texas/Oklahoma/New Mexico region, the coefficient of -4.54 means that for every 1 percent of additional AMA purchases relative to capacity, cash prices are \$0.0454/cwt. lower on a live weight basis. The impacts are smaller in regions with less packer concentration, such as Iowa and Nebraska.

To estimate the entire effect of AMAs on negotiated prices, one also has to take into account how widely AMAs are currently used. The average percentage of AMAs relative to capacity in each week in 2009 for the nation as a whole was 54.72 percent. Thus, the total impact of all AMAs on negotiated cash prices for fed cattle in the United States is -\$4.18 /cwt. times 0.5472 or -\$2.29/cwt.

Table 5 shows the estimated AMA price effects for all the regions.

Table 5 – Estimated Price Effects of all AMAs by Region – 2009

Region Covered by Equation	AMA Estimated Coefficient Regional (A)	AMA Percentage of Regional Capacity (B)	Total AMA Price Effect – Dollars per Live Basis Cwt. (A x B) x \$0.01	95% Confidence Interval of AMA Price Effect
Total U.S.	-4.17577	54.72	-\$2.29	-\$2.01 to -\$2.56
Texas/OK/NM	-4.54493	58.25	-\$2.65	-\$1.87 to -\$3.42
Kansas	-5.31462	58.53	-\$3.11	-\$2.34 to -\$3.88
Nebraska	-1.65938	42.25	-\$0.70	-\$0.51 to -\$0.89
Iowa/ MN	-0.79365	29.69	-\$0.24	-\$0.18 to -\$0.29
Colorado	-3.20432	52.85	-\$1.69	-\$0.10 to -\$3.29
Midwest	-4.06172	30.78	-\$1.25	-\$0.17 to -\$2.33
Other U.S.	-1.57584	54.72	-\$0.86	-\$0.38 to -\$1.34

These impacts are less certain than a point estimate would imply. The coefficients estimate the marginal impact from data points at the mean, and may not hold for large variations or extreme values of AMA. No actual observations were found with the extreme result of no AMAs. In fact, the lowest value for any week any region in the data set over which the equation was estimated is 0.117975 (this occurred in Iowa/MN the week ending September 5, 2009 and means that 11.8 percent of plant capacity in that region was procured through AMAs). Thus, the interpretation that the total AMA price effect for the U.S. is -\$2.29 per live hundred pounds should come with a caveat that the estimate assumes a constant linear relationship between AMA usage and cash price that may not hold if AMA usage were to significantly decrease.

In addition, the point estimates have statistically determined standard errors, which are used to calculate the confidence intervals reported above. These standard errors measure the uncertainty of the point estimates about their mean. To help address this uncertainty, the investigation employs Monte Carlo sensitivity analysis described later to estimate probabilities of a range of outcomes.

Other Econometric Tests

During this investigation P&SP conducted several other tests. The results and methods for these other econometric results are discussed in detail in Appendix I. The other effects explored include: 1) Detailed effects broken out by type of AMA; 2) Detailed lag and lead effects by length of lag or lead; 3) Price effects from direct measures of market participation including weekly HHIs, CRs; 4) Indexes of numbers of packers participating in the cash market derived from both AMS data and seller's bid data; and 5) an alternate model specification using seller's showlist data. In addition, Appendix II present the results of P&SP's detailed exploration of the specific allegation that multi-plant packers ship cattle purchased from one region to be slaughtered in another to depress cash prices in the destination region.

Summary of Principal Econometric Results

The investigation has found that the use of AMAs is generally associated with lower negotiated cash fed cattle prices. The effects vary by region, but tend to be stronger in regions where there are fewer packers and more concentration in the negotiated cash market. Estimates by AMA type indicate the effects are largest for marketing agreements, forward contracts and packer fed cattle. For the nation, using the most realistic regional and broad definitions of AMAs, the estimated effect of all AMA usage is about -\$2.29/cwt. on a live weight basis. The effect is estimated at about -\$2.65/cwt. in Texas, -\$3.11/cwt. in Kansas, -\$1.69/cwt. in Colorado, -0.70/cwt. in Nebraska, and -\$0.24/cwt. in Iowa.

To put these values in perspective, the DOJ/FTC horizontal merger guidelines use a 5 percent threshold in defining a “Small but Non-Transient Increase in Price” (“SNIP”). The total AMA estimated impact of -\$2.29/cwt. is 2.8 percent of the \$82.81/cwt. average negotiated cash price reported to AMS in 2009. Negotiated live cattle transactions occur in a commodity business, and margins (both packer and producer margins) in this industry are generally lower than most other industries, so what is considered significant to a cattle producer or packer may be lower in percent terms than in many other industries.²⁸

Effect on Competition - Welfare Impacts

The complainants’ theory in this investigation is that AMAs reduce competition for fed cattle in the cash market, depressing prices. The implication is that packers have oligopsony market power, and packer concentration and cash market thinness created by AMAs may allow packers to exploit that power. The investigation has found no evidence of conspiracy, coordination, deception, or predatory intent by packers. Nonetheless, a negative price effect was found. Oligopsony market power is one possible explanation for the price effect. Some oligopsony market power may exist due to a combination of thinness and concentration in cash markets.

Appendix III contains a brief discussion of the results of some academic research on the extent of market power in the beef packing industry. While there is considerable literature that suggests beef packers possess at least some degree of market power, many of the academic studies suggest the market power is relatively small. Others still are inconclusive or have mixed results in establishing whether beef packers even possess measurable degrees of market power.

Regardless, the observed price effect from AMAs is not necessarily due to anti-competitive behavior or even the exercise of oligopsony market power by packers. Certain pecuniary and non-pecuniary benefits may accrue to sellers when they market their cattle through AMAs. AMA sellers may be willing to market their cattle through AMAs despite that fact that they know it may depress cash prices, (and thus their cash-price-based formula prices) because they

²⁸ Regardless, the SNIP concept applies to merger analyses, and this is not a merger analysis.

receive offsetting benefits from selling through AMAs. In addition, the AMA price effect may be offset by certain improvements in industry efficiency for meat packers and cattle feeders, and improvements in beef quality facilitated by AMAs.

The welfare analysis that follows employs an accepted economic model which takes into account the negative impacts on cash sellers from the AMA price effect, but also accounts for the offsetting effects of benefits AMAs may have 1) on packers through improved efficiency of operation, 2) on consumers through improved beef quality, and 3) on AMA sellers through various feeding efficiencies, risk shifting and other mechanisms. Thus, the analysis is intended to capture and estimate the overall impact of AMAs on the welfare of all those affected by the beef and cattle industries.

Welfare Effects – The Marketing Margins Model

This investigation examines the welfare impacts of AMAs using a Marketing Margins Model (MMM) framework.²⁹

Figure 1 graphically illustrates the MMM. The MMM framework allows the analysis to incorporate the fed cattle price effect of AMAs estimated in the econometric analysis. However, in applying the MMM, one must accept that the price effect of AMAs is due to the packers' ability to lower fed cattle prices by the use of AMAs. The model is especially useful for this investigation because it also facilitates quantitative analysis of pro-competitive factors potentially related to AMAs including potential processing cost reductions, improvements in product quality, benefits accruing to sellers from using AMAs, and other interactions in the beef marketing chain. The model allows estimation of changes in consumer and producer surplus, and it allows quantification of deadweight social welfare loss or gain caused by structural changes in the demand and supply relationships affected by AMAs.

The framework relies on two primary relations: The retail demand curve for beef (line 1 in Figure 1) and the producer supply curve for cattle (line 2 in Figure 1). The two derived relationships are the derived demand for fed cattle by the packers (line 3) derived from the retail demand for beef, and the derived supply of retail beef (line 4) derived from the producer supply of cattle. The intersection of supply and demand in both the beef and cattle segments determines the prices and quantities for both. The difference in the price of cattle and the retail beef price is the margin, or revenue, earned by the entire packer/marketing complex.

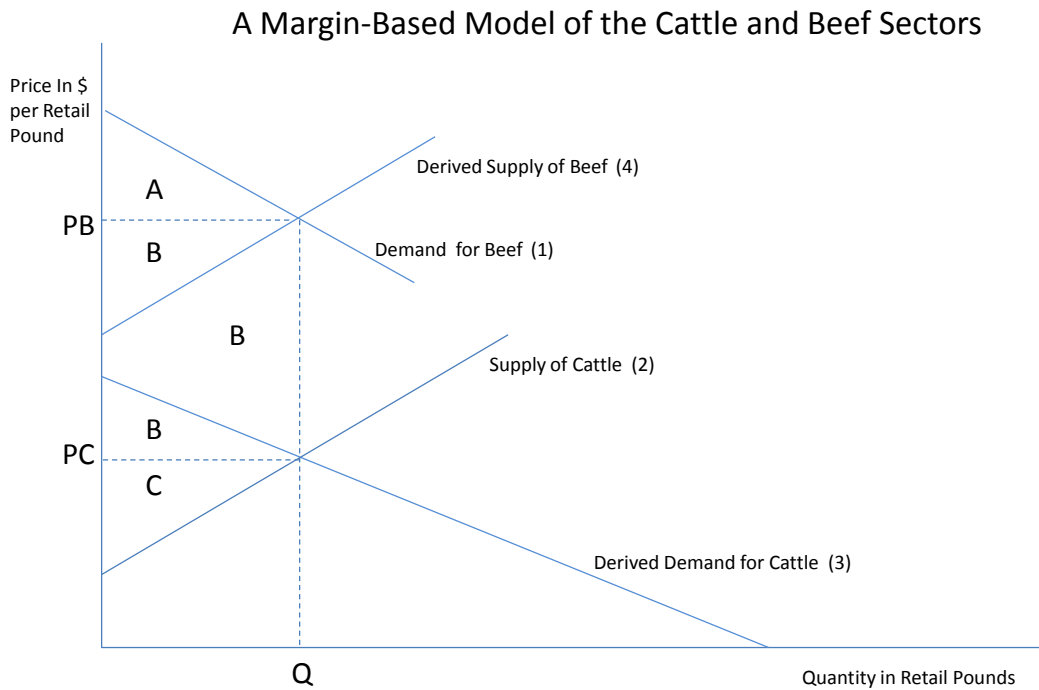
The modeling framework measures welfare by the traditional concepts of consumer surplus and producer surplus. Consumer surplus of beef consumers is the area above the beef price and below the beef demand curve, denoted by triangular area "A" in Figure 1. It represents the surplus to consumers that would be willing to pay a higher price for beef, but don't have to because the equilibrium market price is below what they would be willing to pay.

²⁹ The framework is explained in detail in Tomek, W.G. and K.L. Robinson "Agricultural Product Prices," third edition, 1990, Cornell University Press.

Producer surplus for cattle producers is the area below the cattle price and above the cattle supply curve, denoted by triangular area “C” in Figure 1. It represents the surplus to producers that would be willing to supply cattle at a lower cattle price, but don’t have to because the equilibrium market price is above what they would be willing to accept.

The other welfare measure is the revenue or margin received by packers, wholesalers, retailers and other marketers of beef (this report refers to this as the “packer/marketing complex,” or just the “marketing complex”). It is the vertical distance between the price of cattle and the price of beef, times the horizontal distance representing the volume of beef produced. The marketing complex revenue is represented by the rectangular area “B” in Figure 1.

Figure 1



- (1) Demand for beef - consumers buying beef at retail – primary economic demand driver – elasticity = -0.864
 - (2) Supply of cattle - producers raising and selling cattle - primary economic supply driver – elasticity = 0.133
 - (3) Derived demand for cattle - packers buying cattle from feedlots / producers - elasticity -0.401
 - (4) Derived supply of beef – packers / marketers providing and selling beef to consumers – elasticity = 0.349
- Welfare measures : consumer surplus = triangle A; marketing complex revenue = rectangle B; producer surplus = triangle C
 Total economic welfare = A + B + C
 PB (price of beef) minus PC (price of cattle) represents the producer–retail price spread or marketing margin.

Estimating the welfare impacts of AMAs is possible with this model by using various data points and parameters that represent actual conditions in the beef and cattle sectors in 2009. This analysis uses actual 2009 data points for price and quantity in the beef and cattle sectors in 2009 and also uses certain elasticity parameters estimated in the GIPSA Livestock and Meat Marketing Study (LMMS). Table 6 shows the data and parameters used in the model.

Table 6 -- Marketing Margins Model Data and Parameters

Price and Quantity Data	Model Value
Number of Head of Fed Cattle Slaughtered *	27,137,287
Carcass Weight of All Cattle Slaughtered (lbs.)*	25,965,000,000
U.S. Population - Calendar Year Average **	304,543,000
Per Capita Disappearance (Retail lbs.)**	61.1
Per Capita Disappearance (Carcass lbs.) **	87.3
Pounds of Retail Beef Consumed per Pound of Carcass Beef Slaughtered (lbs.)	0.700
Retail Disappearance (lbs.)	18,607,577,300
Disappearance (Carcass lbs.)	26,586,603,900
Net Imports (Carcass lbs.) **	691,402,000
Net Change in Cold Storage Stocks (Carcass lbs.) **	-77,000,000
Cow and Bull Slaughter (Carcass lbs.) ***	3,934,627,655
Retail Beef Disappearance adjusting for cows, bulls, cold storage, net imports (lbs.)	15,315,995,262
Average Price for Retail Beef (\$/lb.) **	\$ 4.260
Average Dressed Price for Fed Cattle (\$/lb.) *	\$ 1.321
Average Boxed Beef Cut-out Price *	\$ 1.407
Average Price for Fed Cattle per Retail Pound Sold (\$/lb.)	\$ 1.888
Average Price for Boxed Beef per Retail Pound Sold (\$/lb.)	\$ 2.010
Average Live Weight Basis Cattle Price (\$/lb.)	\$ 0.8325
Own Price Elasticity of Demand for Cattle	-0.401
Own Price Elasticity of Supply for Cattle	0.133
Own Price Elasticity of Demand for Retail Beef	-0.864
Own Price Elasticity of Supply for Retail Beef	0.349
Own Price Elasticity of Demand for Wholesale Beef	-0.584
Own Price Elasticity of Supply for Wholesale Beef	0.424

Sources:

* Livestock Marketing Information Center, www.lmic.info, and USDA/NASS, FIData slaughter database

** USDA ERS, <http://www.ers.usda.gov/data-products/livestock-meat-domestic-data.aspx>, *WASDE_Beef.xls*

*** Estimated No. of head from USDA/NASS FIData slaughter database and average weights from USDA ERS - <http://www.ers.usda.gov/data-products/livestock-meat-domestic-data.aspx>, *slaughterweightsfull.xls*

Elasticity parameters are estimated in *GIPSA Livestock and Meat Marketing Study* conducted by the Research Triangle Institute, 2007 (LMMS).

Other data values are calculated from sourced data shown in the table.

The AMA Price Effect

The first step in analyzing the welfare impacts of AMAs is to use the MMM to estimate the impacts of the AMA price effect. The analysis begins by assuming no AMAs exist, and the market is operating on an entirely negotiated cash basis. The cash market equilibrium exists at the intersections of supply and demand in the beef and cattle markets, at cattle price PC_C , (price of cattle, cash) beef price PB_C (price of beef, cash) and quantity (in retail pounds) of Q_C (denoting quantity of beef produced in an all cash market).

The analysis then introduces packers' and sellers' use of AMAs and ignores, for the moment, all other effects of AMAs except the downward impact on cattle prices. Packers' use of AMAs allows packers to buy the same amount of cattle at a lower price. This means that introduction of

AMAs is illustrated by the lower demand curve for cattle (“Derived Demand for Cattle_{AMA}” in Figure 2).

The reduction in cattle prices is limited by the fact that supply curve for cattle is upward sloping and any reduction in price is accompanied by a reduction in the quantity of cattle supplied. A reduction in quantity supplied is represented in Figure 2 by a downward and to the left movement along the “Supply of Cattle” curve. The reduction in quantity supplied tightens the market and instead of price falling by the entire vertical distance between the two derived demand curves, the cattle price reduction resulting from packer use of AMAs is limited to the distance between PC_C and PC_{AMA} . (PC_{AMA} denotes the price of cattle with AMAs introduced into the market.)

This reduction in the quantity of cattle purchased results in a corresponding reduction in the derived supply of retail beef. Because retail demand for beef is unaffected, the result is modeled as an upward and to the left shift of the “Derived Supply of Beef” curve. Less beef is produced at the same retail price because fewer cattle are procured, and the supply curve shifts from “Derived Supply of Beef_{CASH}” to “Derived Supply of Beef_{AMA}.” Because the demand curve is not affected, the price change is limited to less than the entire vertical shift in the supply curve. That is, consumers move up and to the left on the demand curve resulting in less quantity demanded for beef at a higher price. The price moves up by the amount from PB_C to PB_{AMA} . PB_{AMA} denotes the price of beef with AMAs introduced into the market and Q_{AMA} denotes the quantity of cattle and beef with AMAs introduced into the market.

The welfare impact of AMAs is represented in this model as the net sum of changes in consumer surplus, producer surplus, and the packer/marketing complex revenue or marketing margin.

Consumer surplus is represented graphically by the area above the price of beef and below the retail demand curve for beef. When the price of beef goes up and the quantity decreases as in this analysis, consumer surplus declines. This decline in consumer surplus is represented in Figure 2 by a change in consumer surplus from areas A, B, and C before AMAs to just area A after AMAs.

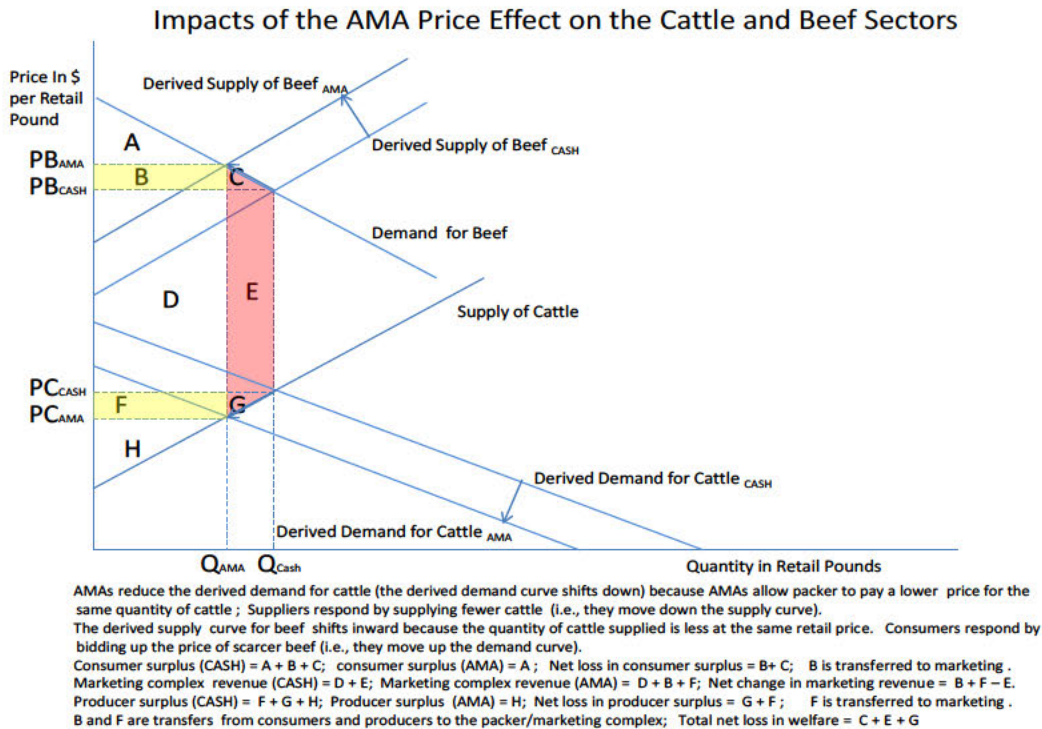
Producer surplus is represented graphically by the area below the price of cattle and above the supply curve for cattle. When the price of cattle declines and the quantity supplied decreases as in this analysis, producer surplus declines. This decline in producer surplus is represented in Figure 2 by a change in producer surplus from areas F, G, and H in the all cash scenario to just area H in the AMA scenario.

The marketing margin, which is revenue received by the beef packer/marketing complex, is represented by the rectangular area between the beef price and the cattle price and to the left of the quantity. In this case, where the price of beef increases, and the price of cattle decreases, the marketing margin per pound of beef produced increases, but is offset, at least partially, by the decrease in quantity produced. The original (cash) packer/marketing revenue is represented in Figure 2 by the rectangular areas D and E, and when AMAs are introduced, it changes to areas B, D, and F.

In the retail beef market, the introduction of AMAs causes a transfer of surplus from consumers to the packers and marketers of beef (represented by area B and shown in yellow in Figure 2). In the cattle markets there is a similar effect. The decline in cattle price and quantity causes a transfer of surplus from cattle producers to packer/marketing complex (represented by area F and shown in yellow in Figure 2).

The model shows that the marketing margin does not increase by as much as the consumer surplus and producer surplus shrinks, and the difference is the deadweight welfare loss. The deadweight welfare loss represented by areas C, E and G in Figure 2 (shown in red). The upper triangle of the red trapezoid (area C) is lost consumer surplus. The lower triangle of the red trapezoid (area G) is lost producer surplus, and the rectangular center of the red trapezoid (area E) is lost marketing margin, or revenue to the packer/marketing complex.

Figure 2



Using the data points and elasticities shown in Table 6, and the AMA price effect estimated in this investigation, the model calculates the estimates of the welfare effects of the AMA price effect. Table 7 shows the model results. The AMA price effect in isolation results in lower

prices for fed cattle of \$2.29/cwt. live basis, and the total estimated net welfare effect from the AMA price effect is -\$134.7 million.³⁰

Table 7 - Estimated Impacts of the AMA Price Effect in Isolation

Estimated Coefficient From the AMA Price Effect Model	-4.17577
Change in Price of Fed Cattle due to AMAs (\$/ Live Weight lb.)	-\$ 0.0229
Change in Price of Fed Cattle due to AMAs (\$/Retail lb.)	-\$ 0.0519
Percent Change in Price of Cattle due to AMAs	-2.748%
Change in Quantity of Beef Produced (lbs.)	-55,918,136
Percent Change in Quantity of Beef Produced	-0.366%
Change in Price of Retail Beef (\$/Retail lb.)	\$ 0.0180
Percent Change in Price of Retail Beef	0.423%
Change in Consumer Surplus (in Total Dollars)	-\$275,513,667
Change in Packer/Marketing Revenue (in Total Dollars)	\$934,027,400
Change in Producer Surplus (in Total Dollars)	-\$793,254,191
Net Change in Economic Welfare (in Total Dollars)	-\$134,740,458

The MMM shows that the reduction in fed cattle prices to sellers simultaneously leads to higher beef prices for consumers. At first, this seems counter-intuitive. One might think that packers would pass on the lower cattle costs, and the lower costs would induce marketers to sell meat at lower prices, especially if the meat market is competitive. That would be the case for an exogenous decrease in packer costs, but because the decrease in packer cattle costs is associated with reduced cattle supply and beef output, the reduced output causes a simultaneous increase in consumer price. The demand for beef has not changed in this scenario, and a reduced output means that the quantity demanded (not demand) is lower. Consumers have moved up and to the left on the downward sloping demand curve for beef, which means there must be a higher price.

The higher beef price and reduced quantity cause the decrease in consumer surplus. The lower cattle price and quantity cause the decrease in producer surplus. Packers and marketers benefit by the larger price spread (margin) between cattle prices and beef prices, and receive more revenue despite the reduction in quantity. As noted above, the total net effect on welfare is negative. However, this negative welfare effect does not consider any benefits of AMAs.

³⁰ These changes and the others modeled in this section are measured from a starting point of the actual observed 2009 levels of activity in the cattle and beef markets. Both AMA and cash procurement methods were being employed. The MMM uses linear supply and demand curves and the changes simulated are relatively small compared to the quantities of beef and cattle in 2009, so the starting point makes almost no difference in the estimated effects of the changes.

Offsetting Benefits of AMAs

The investigation has found that packers and researchers have indicated that there are various benefits associated with the use of AMAs. This analysis will discuss three areas of those benefits. First, packers and researchers have cited certain efficiency benefits that accrue to packers from the use of AMAs. Researchers have also found that AMAs facilitate the improvement of beef quality. Finally, researchers and cattle sellers have found that cattle sellers using AMAs receive certain benefits from those marketing methods.

Packer Efficiency Benefits from AMAs

The best and most recent source of useful quantitative estimates of potential benefits to packers from AMAs available to P&SP is from the 2007 GIPSA Livestock and Meat Marketing Study (LMMS)³¹. Section 3, and specifically section 3.4.4 and table 3-4, of the LMMS discusses three cost-related benefits to packers from AMAs, and derives quantitative estimates of them.

The first cost-related benefit of AMAs to packers is the direct cost reduction benefit. The LMMS packer survey suggested several factors that may contribute to the direct cost reductions including the need for fewer buyers, reduced transaction costs, and increased efficiencies in the production process due to the ability to procure a higher and more consistent quality of cattle. The LMMS econometrically estimated the impact of these direct cost savings at 0.88 percent of total processing costs (excluding cattle costs) or \$1.22 per head. These savings, (which are separate from the volume-related savings or economies of scale discussed below) are not uniform across packers or AMAs. For example, one packer said in its affidavit for this investigation that total buying costs were higher with marketing agreements due to administrative and monitoring costs.

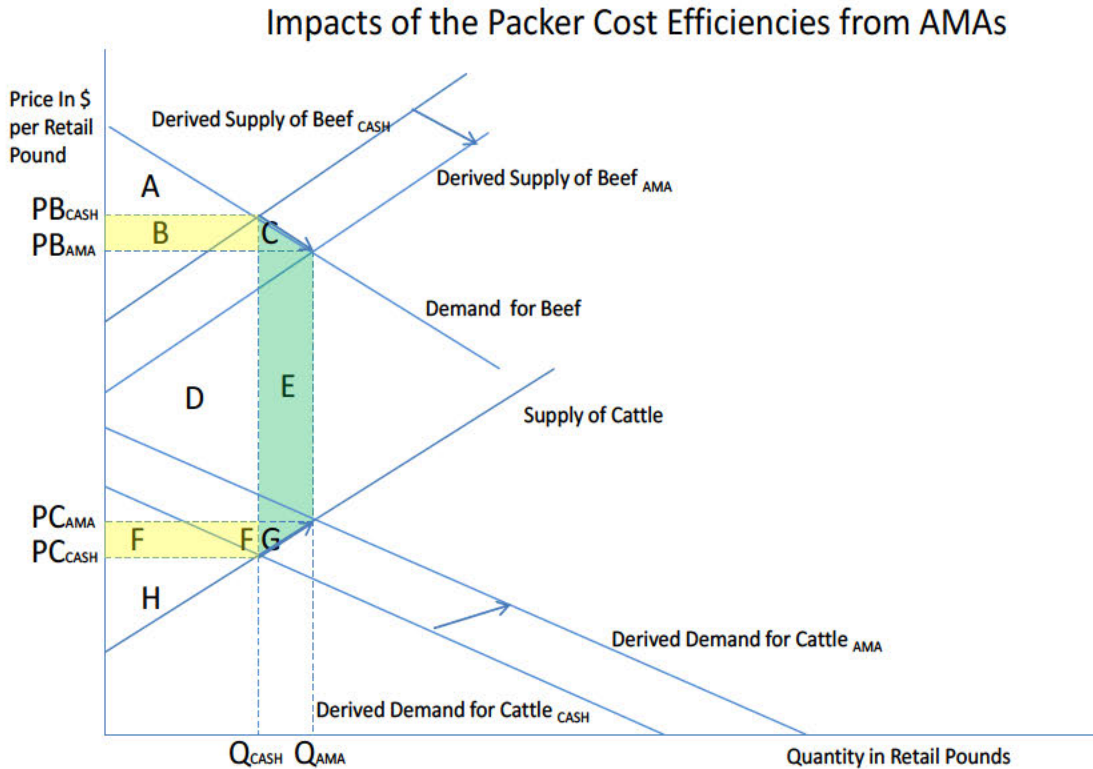
The second cost-related benefit of AMAs is that they help packers achieve higher volumes of throughput, which leads to improved efficiency from better utilization of capacity. The LMMS estimated plant-specific econometric equations that showed average total packer processing costs per head generally declined with volume, (i.e. positive economies of scale in beef packing). The LMMS also estimated equations that showed three forms of AMAs (marketing agreements, forward contracts and packer feeding) all had small positive impacts on plant-level volumes. The LMMS concluded that volume increases coupled with economies of scale results in reduced processing costs per head at the plant level. It econometrically estimated the impact of this effect at 2.57 percent of total processing costs (excluding cattle costs) or \$3.56 per head.

The third cost-related benefit is that AMAs may tend to reduce volatility in total purchasing volume at each plant. The LMMS used packer-provided plant specific profit and loss (P&L) statements and a simulation algorithm to estimate that processing costs would be less because AMAs result in less volatility in procurement volumes. The LMMS econometrically estimated impact of this volatility effect is 1.23 percent of total processing costs (excluding cattle costs) or \$1.70 per head.

³¹ *GIPSA Livestock and Meat Marketing Study*, Research Triangle Institute, 2007, Volume 3: “Fed Cattle and Beef Industries,” Op. Cit.

The LMMS concluded that cost-related benefits to packers from AMAs add up to about \$6.48 per head. P&SP modeled these benefits of AMAs to packers as a downward vertical shift in the beef supply curve. This is illustrated in Figure 3. That is, if cost savings of \$6.48 per head from AMAs are realized, packers could supply the same amount of beef at a lower price by \$6.48 per head, or conversely, packers could supply more beef at the same price. The increased supply of beef means that the derived demand for cattle increases, increasing the price of cattle while lowering the price of beef. Table 8 below shows the quantitative estimates of this benefit in isolation. The estimated impact is an increase in consumer surplus of \$106.1 million, an increase in surplus of producers of fed cattle of \$305.6 million, a decrease in packer/marketing complex revenue of \$361.0 million and a net welfare gain of \$50.7 million, again, in isolation.

Figure 3



AMAs reduce costs for packers, resulting in more supply at the same retail price (the derived supply curve for beef shifts to the right). Consumers buy the more plentiful beef at lower prices (i.e., they move down the demand curve). The reduced packer costs means packers are willing and able to buy more cattle at the same price (the derived demand curve for cattle shifts to the right). Suppliers respond to the increased demand by supplying more cattle at a higher price (i.e., they move up the supply curve).
 Consumer surplus (CASH) = A; Consumer surplus (AMA) = A + B + C; Net gain in consumer surplus = B + C; B is transferred from marketing.
 Marketing complex revenue (CASH) = B + D + F; Marketing complex revenue (AMA) = D + E; Net change in marketing revenue = E - B - F.
 Producer surplus (CASH) = H; Producer surplus (AMA) = H + F + G; Net gain in producer surplus = F + G; F is transferred from marketing.
 B and F are transfers from the marketing complex to consumers and producers; Total net gain in welfare = C + E + G.

Table 8 – Marketing Margins Model – Packer Cost Efficiencies from AMAs in Isolation

Estimate of Packer Processing Cost per Head	\$138.61
Percent Reduction in Processing Cost per Head Due to AMAs	-4.680%
Change in Processing Cost per Head due to AMAs	-\$6.487
Change in Processing Cost due to AMAs (\$/Retail lb.)	-\$0.0115
Change in Processing Cost due to AMAs as percent of Wholesale Price	-0.572%
Change in Quantity of Beef Produced (lbs.)	21,512,394
Percent Change in Quantity of Beef Produced	0.1405%
Change in Price of Retail Beef (\$/Retail lb.)	-\$0.0069
Percent Change in Price of Retail Beef	-0.163%
Change in Price of Fed Cattle due to AMAs (\$/Retail lb.)	\$0.0199
Percent Change in Price of Fed Cattle due to AMAs	1.056%
Change in Consumer Surplus (in Total Dollars)	\$106,142,546
Change in Packer/Marketing Revenue (in Total Dollars)	-\$361,009,271
Change in Producer Surplus (in Total Dollars)	\$305,603,786
Net Change in Economic Welfare (in Total Dollars)	\$50,737,061

Beef Quality Benefits from AMAs

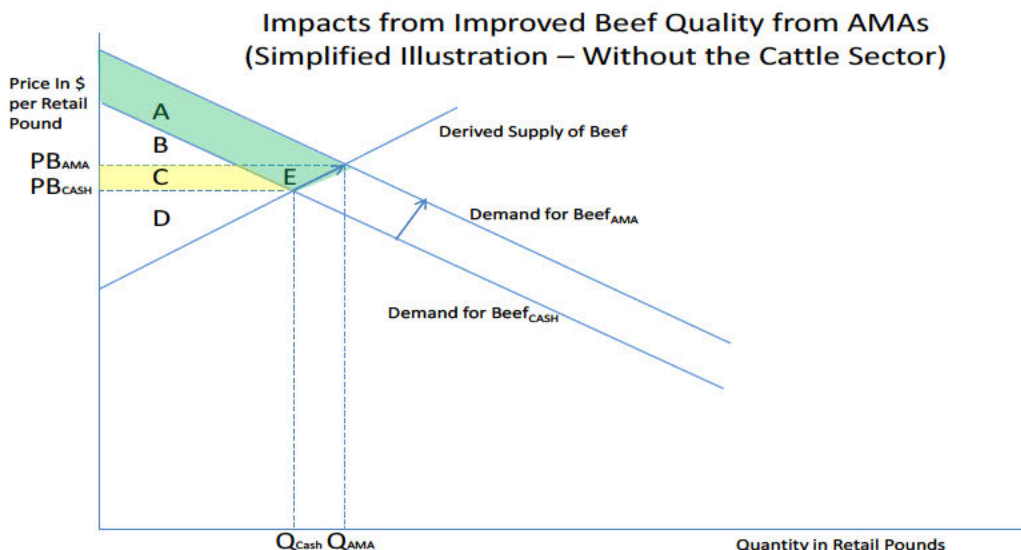
Packers and researchers have also cited beef quality improvements due to AMAs, and that results in increased consumer demand for retail beef. Section 6.7.2 of the LMMS estimates that if all AMAs were eliminated, retail demand for beef would decrease to an extent that would result in a decline of 0.157 percent in the retail price of beef. This estimate was based on a variety of data sources, including LMR data on quality based premiums.

Packer affidavits discuss how they use marketing agreements to compensate producers for added costs of producing specialty and niche market cattle in such programs as grass-fed, special export programs, organic and natural, etc. While there are some brands that could be administered under negotiated cash procurement methods, others would require an advance production or marketing agreement to induce producers to participate.

To estimate the welfare impacts of this improvement in beef quality, this analysis takes the estimate from the LMMS that the quality improvements from AMAs increases consumer demand for beef such that the retail price increases by 0.157 percent.³² This is shown geometrically in Figures 4 and 5.

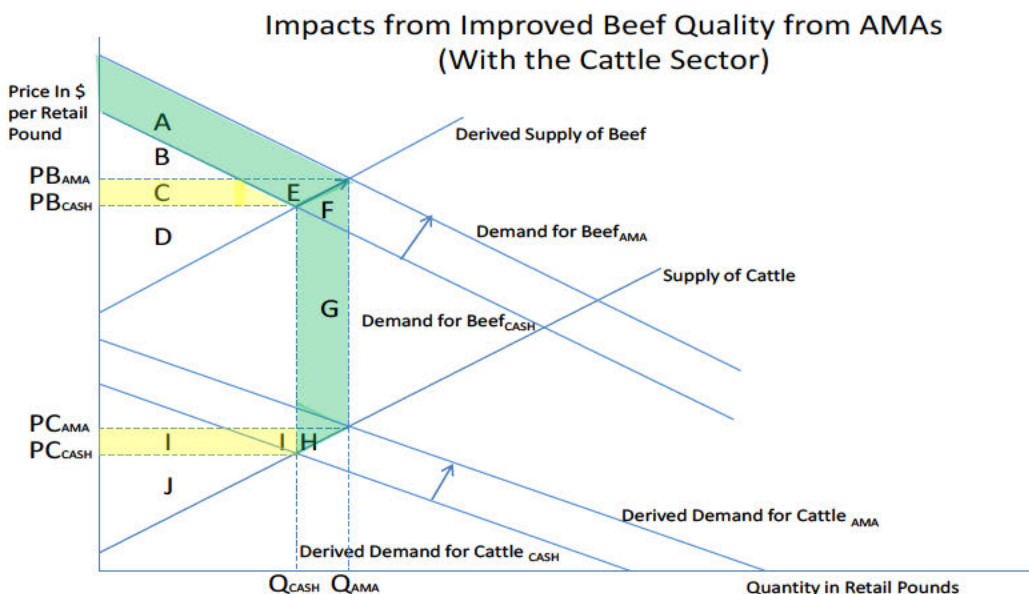
³² Because the supply curve for retail beef is upward sloping, the vertical shift in the demand curve would be more than 0.157 percent. Actually, given the demand and supply elasticities in the MMM, the upward vertical shift resulting in a price increase of .157 percent would be about 0.22 percent.

Figure 4



AMAs improve the quality of retail beef, increasing consumer demand for beef (i.e., the demand curve for beef shifts to the right), raising the price. Suppliers of beef respond to the higher price by increasing supply (they move up the supply curve). Price and quantity both increase. Consumer surplus (CASH) = B + C; Consumer surplus (AMA) = A + B; Net change in consumer surplus = A - C. Marketing complex surplus (CASH) = D; Marketing complex surplus (AMA) = D + C + E; Net change in marketing surplus = C + E. C and E are transfers of surplus from consumers to the packer / marketing complex; Total net gain in welfare = A + E

Figure 5



AMAs improve the quality of retail beef, increasing consumer demand for beef (i.e., the demand curve for beef shifts to the right), raising the price. Suppliers of beef respond to the higher price by increasing supply (they move up the supply curve). Retail Price and quantity both increase. As a result, derived demand for cattle increases, raising the cattle price and quantity supplied. Consumer surplus (CASH) = B + C; Consumer surplus (AMA) = A + B; Net change in consumer surplus = A - C. Marketing revenue (CASH) = D + I; Marketing revenue (AMA) = C + D + E + F + G; Net change in marketing revenue = C + E + F + G - I. Producer surplus (CASH) = J; Producer surplus (AMA) = J + I + H; Net gain in producer surplus = I + H. C and I are transfers of surplus to and from the packer / marketing complex; Total net gain in welfare = A + E + F + G + H.

Table 9 shows the impact, in isolation, of an increase in consumer demand for beef that results in a 0.157 percent price increase. P&SP modeled this quality effect as an upward (vertical) shift in the consumer demand curve for beef necessary to increase the equilibrium price by 0.157 percent. Table 9 shows an increase in consumer surplus of \$41.5 million, an increase in the surplus of producers of fed cattle of \$119.4 million, and a net increase in welfare of \$164.1 million. Quality improvement in isolation most notably benefits cattle producers, though all three segments benefit.

Table 9 – Marketing Margins Model – Effect of Improved Beef Quality in Isolation

Change in Retail Price (\$/lb.)	\$0.0067
Percent Change in Retail Price due Change in Quality	0.157%
Change in Quantity (lbs.)	8,408,129
Percent Change in Quantity	0.055%
Change in Price of Fed Cattle (\$/Retail lb.)	\$0.0078
Percent Change in Price of Fed Cattle	0.413%
Change in Consumer Surplus (in Total Dollars)	\$41,468,127
Change in Packer/Marketing Revenue (in Total Dollars)	\$3,204,985
Change in Producer Surplus (in Total Dollars)	\$119,394,316
Net Change in Economic Welfare (in Total Dollars)	\$164,067,428

Benefits to Cattle Sellers from AMAs

The four largest beef packers told P&SP in their affidavits that the use of AMAs is seller-driven. That is, many sellers ask the packers to buy their cattle using AMAs because that is how the sellers prefer to market their cattle. P&SP also knows from independent academic studies, past investigations, public comment on proposed marketing regulations, and other sources that many sellers prefer to market their cattle using AMAs and do so willingly. Those sellers must perceive that there are net benefits, or services they receive, from using AMAs. The following are potential benefits to feedlots and producers from marketing their fed cattle using AMAs.

- **Reduced Price Risk** - By selling through forward contracts, producers can reduce price risk. On a futures basis contract, the seller can lock in the price based on exchange-traded futures contract market prices any time before delivery, giving the producer a higher degree of control over prices.
- **Assured Market Access** - Many producers enter into marketing agreements or forward contracts to avoid a non-price risk, which is to assure that their cattle will be bought on a timely basis. Packers strive to operate their plants at full capacity as explained in their affidavits. It is not unreasonable to expect that there may be weeks when a packer does not have enough slaughter capacity to buy all the cattle the sellers wish to sell. Market access is a major concern to many sellers as evidenced by the seller affidavits collected for this investigation. AMAs reduce the risk to sellers that they will have no buyer for their fed cattle when the cattle are ready for slaughter.
- **Improved Credit Terms** – P&SP is aware that many lenders encourage producers to enter into advance sales agreements. Sellers may be able to get better credit terms if they

demonstrate to the lenders that they have these agreements in place. In some instances the lender may require the seller to enter into advance cattle sales agreement as a condition for offering a loan.

- Feeding Efficiencies – If feedlots know there will be a timely buyer for their cattle, they can manage their operations to efficient capacities and achieve economies of scale. AMAs may give feedlots the certainty and degree of control over the marketing process to allow them to focus on achieving the most efficient use of their feeding resources.
- Cost Recovery through Quality Based Premiums - Certain producers whose cattle may be of special quality can assure that they receive premiums for those cattle through commitments involving formula pricing. Similarly producers or feeders that incur added costs for particular special programs (for example, organic) can gain assurance that they will be compensated for the added production costs through marketing agreements and alliances with packers.
- Transaction Costs – Packers and sellers have both asserted that many sellers prefer formulas and marketing agreements because they are easier for the seller. Agreeing to a market price, or a grid formula is convenient for the seller because it minimizes the back and forth of the negotiating process. Packers have said sellers who prefer these methods do so because they can avoid the “hassle” of haggling over price, which can be especially important in a brief trading window. The reduced transaction costs discussed here apply mainly to the seller because packers may still bear significant transaction costs with AMAs for such functions as cattle evaluation, contract administration, monitoring, and enforcement, and in some cases, hedging.

This section describes methods P&SP used for estimating the value of the benefits listed above and for taking them into account in the Marketing Margins Model of the welfare effects of AMAs.

Reduced Price Risk - Sellers benefit from AMAs by shifting the price risk to packers when they sell via forward contracts. This benefit to cattle sellers that forward contract has not been accounted for elsewhere in the analysis. This section of the report discusses how P&SP has estimated the value of this risk shifting to sellers. Several studies have shown that cattle sellers are willing to sell their cattle for less under forward priced contracts because of the reduced risk to them. P&SP uses an estimate of this historical difference in price between forward priced cattle and negotiated cash transactions as a measure of willingness to pay, and thus, as a proxy for the value cattle sellers place on shifting the price risk.

There has been considerable research on the value of price risk reduction. Two early notable studies have used economic theory to predict that forward contract prices must be lower than the expected values of cash market prices.³³ Several studies have attempted to measure this price difference, and most found that forward contract prices are lower because of the risk transfer.

³³ Carlton, D.W., “Contract, Price Rigidity, and Market Equilibrium,” *Journal of Political Economy* 87(1979): 1034-1062. Also: Barkley, A.P., and T.C. Schroeder, “The Use and Impacts of Forward Contracts In Fed Cattle Markets,” Selected paper presented at the *American Agricultural Economics Association Annual Meetings*, Manhattan, KS, August, 1991.

One of the studies published in 1992 found a price difference of \$0.28/cwt. to \$0.59/cwt. in steers and from \$0.86/cwt. to \$1.64/cwt. in heifers.³⁴ The data were from the late 1980s. Another study from 1991 found a risk shift effect ranging from \$1.37/cwt. to \$1.77/cwt.³⁵

A GIPSA study from 1996 using 1992/93 data estimated that forward contract prices were lower than cash market prices by between \$1.90/cwt. and \$1.99/cwt. on a live weight basis.³⁶ The authors said those results paralleled previous empirical research and also supported the theoretical conclusion that forward contract prices must be lower than the expected values of cash market prices.

More recent research from 2008 using the data gathered for the LMMS estimated the forward contract prices were lower than cash prices by \$4.70/cwt. carcass basis.³⁷ This translates to about \$2.96/cwt. on a live weight basis. This research takes into account price correlation within and across weeks, which if not accounted for, may result in misleading inferences. This study by Muth, et. al. thoroughly documented its methods and results, and reported the relevant variances. P&SP chose to use the estimate from that study, because it was the most recent, most econometrically rigorous, and was derived from data in a period where fed cattle prices were similar to prices during the investigation period.

Because this price risk transfer benefit would only accrue to forward contract sellers, P&SP weighted the estimate by the prevalence of forward contract transactions. In 2009, forward contracting made up 9.49 percent of fed cattle sales (see Table 2), so the benefit used for the analysis was 9.49 percent of \$2.96, or \$0.281/cwt. live basis.

The price difference estimate was derived from econometric methods, and the study reported a standard error estimate that translates to a 95 percent confidence interval of approximately plus or minus 3.4 percent. P&SP applied this variation in the probability analysis of the welfare effects of AMAs, resulting in a final range of \$0.281 plus or minus \$0.01/cwt. live weight basis.

While reduced price risk may be the main benefit of forward contracting, sellers may benefit from other characteristics of forward contracting. In one example of previous research,³⁸ authors found that feeders in a survey also noted benefits from locking in a known buyer. This benefit of assured timely market access not only allows feeders to attain more efficient use of resources in

³⁴ Elam, E., "Cash Forward Contracting vs. Hedging of Fed Cattle, and the Impact of Cash Contracting on Cash Prices," *Journal of Agricultural and Resource Economics*, 1992.

³⁵ Eilrich, F., C.E. Ward, W.D. Purcell, and D. Peel, "Forward Contracting vs. Hedging Fed Cattle: Comparisons and Lender Attitudes," Virginia Tech University, Research Institute on Livestock Pricing, *Research Bulletin 8-91*, November 1991.

³⁶ Ward, C.E., S. R. Koontz, and T.C. Schroeder, "Short-Run Captive Supply Relationships with Fed Cattle Transaction Prices," *Role of Captive Supplies in Beef Packing*, GIPSA-RR 96-3, U.S.D.A, Grain Inspection, Packers and Stockyards Administration, May, 1996.

³⁷ Mary K. Muth, Yanyan Liu, Stephen R. Koontz, and John D. Lawrence, "Differences in Prices and Price Risk Across Alternative Marketing Arrangements Used in the Fed Cattle Industry," *Journal of Agricultural and Resource Economics* 33(1), 2008, pp. 118-135.

³⁸ Ward, C.E. and T.J. Bliss, "Forward Contracting of Fed Cattle : Extent, Benefits, Impacts, and Solutions,": Virginia Tech University, Research Institute on Livestock Pricing, Blacksburg, VA, *Research Bulletin 4-89*, November 1989. Also see Ward, C.E., S.R. Koontz, and T.C. Schroeder, 1996, op. cit.

planning the feeding program, but also can lead to better credit terms with their lenders. Both of these benefits are quantified separately below, but are not applied to forward contract purchases in the analysis in order to avoid double-counting of the benefits.

Assured Market Access – Sellers face two risks from not having an assured market for their cattle when they are ready to be sold. The optimal time period to sell cattle is relatively short, only about two weeks. If sellers do not have an assured market for their cattle when they are ready, they run the risk that they will have to bear the costs of overfeeding their cattle. Sellers also face risk that when their cattle are ready, if no buyer is assured, they have less leverage in negotiating a sales price.

Sellers can reduce these risks through ongoing marketing agreements. Under most marketing agreements, the seller notifies the packer a week or two in advance of the number of cattle that he or she wishes to sell, and the packer will then schedule the day of delivery within that week. Some, but not all marketing agreements also have volume commitments the seller must meet over a specified period. An agreed-upon formula usually determines the price.

To estimate the financial effects of avoiding extra days on feed, P&SP assumed that AMA sales would assure feeders that they would avoid the net additional feeding costs they would incur for feeding cattle 14 days beyond the optimum sales window.³⁹ P&SP relied on data from two research papers to estimate the net costs of extra days on feed.

The first research paper estimated average performance that cattle would achieve if they were incrementally held on feed for an additional 21 days.⁴⁰ The research used data on 4,470 actual feedlot closeouts covering 809,907 head of fed cattle from 1999 to 2004. It estimated performance trends based on days on feed and extrapolated them to estimate the costs of incremental days on feed beyond the observed sales date.

The study showed that steers placed on feed at 500 to 800 pounds would average 1.91 pounds gained per day, and heifers placed at the same weights would gain 1.71 pounds per day during an extra 21 days on feed. The study also showed that the extra 21 days on feed would result in a feed conversion rate of about 11 pounds of feed for each pound of gain. The study concluded that “The last days in the feeding period are the least efficient and most expensive days on feed.” For the entire time on feed, a typical range for average daily gain is 3 to 3.5 pounds per day at a conversion rate of 6 to 8 pounds of feed per pound of gain.

For this analysis, P&SP assumed that if the cattle were fed extra days, they would benefit from an additional 25.2 pounds of live weight based on average daily gain of approximately 1.8 pounds (the mid-point between the average weight gain of steers and heifers) times 14 days.

³⁹ P&SP chose 14 days for this analysis because sellers most often cited two to three weeks as the time packers asked for on delivery when they purchased cattle “with time.” P&SP believes this to be a reasonable and conservative assumption.

⁴⁰ Jeff Pastoor, Senior Cattle Consultant, Land O’Lakes Beef Feeds, “How Do Days on Feed Effect My Profits?,” <http://www.beeflinks.com/dof.htm>. The analysis estimated trends based on days on feed and extrapolated them to estimate the costs of feeding cattle an extra 21 days.

The average slaughter live weight (steers and heifers combined) in 2009 based on AMS reports was about 1,275 pounds, and the average price from the AMS data was about \$83.25/cwt. Therefore, the gross benefit of weight gain from 14 extra days on feed are growing the cattle to a slaughter weight of 1,300.2 pounds from 1,275 is 25.2 pounds times \$0.8325, which comes to \$20.98 per head.

The research also showed that for steers, the percentage Choice or better would increase by about 1.5 percent from an additional 21 days feeding, but there would be no grading improvement for heifers. The study also looked at the effects of extra feeding on dressing percentage and found conflicting evidence. One data set from the study showed that dressing percentage leveled off after 150 days on feed, while another showed a small increase. The author made the assumption, as will P&SP, that the small benefit from an increase in dressing percentage from longer days on feed will be entirely offset by discounts for heavy carcasses and increased yield grades 4 and 5.

P&SP's estimate of the effects an extra 14 days on feed assumes that grading would improve percentage choice by 0.5 percent, which is derived from the above estimate of 1.5 percent for steers by taking two-thirds (14 days instead of 21) of 1.5 percent, and assuming half of fed cattle sales are heifers, which showed no grading improvement. (Two-thirds multiplied by 1.5, then multiplied by one-half equals 0.5.)

Therefore, the benefit of the cattle increasing in percent Choice is quite small, about \$0.195 per head, because only about 1 percent of steers and none of the heifers improve their grade, and the Choice-Select spread in 2009 averaged approximately \$0.0475 per pound of wholesale cutout applied to the average carcass weight of 819 pounds (63 percent of 1,300 pounds live weight). The entire estimated gross benefit of 14 extra days on feed is \$21.175 per head (\$20.98 plus \$0.195).

In calculating its estimate of the effect of extra days on feed, P&SP offsets the benefits of extra weight gain and improved grading by the feeding costs, which are the feed, interest and yardage costs of the extra days on feed. To estimate these costs, P&SP turned to a recent study by Kansas State University (KSU).⁴¹

The study used the actual feedlot costs from a large Nebraska feedlot in 2011, and provided detail on the actual feed ration and its component costs. The ration consisted of 30.12% high moisture corn, 39.71% wet distillers grain, 19.05% corn gluten, 7.76% silage, 2.44% steep water soluble, and 0.92% mineral supplements by weight. The feeding program averaged 42.74 pounds of feed per day (all feed weights cited here are on an "as is" basis as opposed to "dry matter" basis) for 112 days. The KSU study assumed a baseline corn cost of \$6.00 per bushel (or

⁴¹ Aaron Lueger, Ted C. Schroeder and David G. Renter, "Feedlot Costs of Vaccinating Cattle for E. Coli," Kansas State University Department of Agricultural Economics, Publication: TCS – December 2012, http://www.agmanager.info/livestock/budgets/production/beef/TCS_FactSheet+EcoliVaccination_12-07-12.pdf. Average feed costs in 2009 are difficult to estimate because feed costs and rations vary significantly by feedlot, over time, by season, by region of the country and by relative prices. In addition, feedlots generally regard their actual costs as proprietary information. However, for this analysis P&SP regards this study as a reliable source of representative cattle feeding costs.

\$0.107 per pound at 56 pounds per bushel). P&SP converted the feed prices to the 2009 average price of corn of \$4.06 per bushel, or \$0.0725 per pound.

Table 10 – Assumptions Used for Estimating Cost of Feeding Cattle an Extra Two Weeks

Feed Ration	Percent feed wt. (“as fed” basis)	Feed prices \$6.00/bu. corn	Avg. feed wt. per day = 42.74 lbs. (“as fed” basis)	Cost per day at \$6.00/bu. Corn	Cost per day at \$4.06/bu. corn (2009)
High Moisture Corn	30.12%	\$6.00 / bu	12.87	\$1.379	\$0.933
Wet Distillers Grain	39.71%	\$72.15 / ton	16.97	\$0.612	\$0.414
Corn Gluten	19.05%	\$63.34 / ton	8.14	\$0.258	\$0.174
Silage	7.76%	\$48.00 / ton	3.32	\$0.080	\$0.054
Steep Water Solubles	2.44%	\$177.90 / ton	1.04	\$0.093	\$0.063
<u>Supplements</u>	<u>0.92%</u>	<u>\$322.80 / ton</u>	<u>0.69</u>	<u>\$0.063</u>	<u>\$0.063</u>
Total Feed	100%		42.74	\$2.485	\$1.702

Source: KSU (2012) and P&SP calculations.

Table 11 shows the remaining feedlot costs (the non-feed costs) that were documented in the study.

Table 11 – Assumptions Used for Estimating Cost of Feeding Cattle an Extra Two Weeks

Other (non-feed) Cost Category	Cost per head per day
Veterinary Services, Drugs and Supplies	\$0.107
Interest on Cattle and Feed	\$0.189
Labor @ \$17.00 per hour	\$0.152
Marketing Costs	\$0.054
Utilities, Fuel, and Oil	\$0.054
Facility and Equipment Repairs	\$0.058
Depreciation on Facilities and Equipment	\$0.040
Interest on Facilities and Equipment	\$0.029
Insurance and Taxes on Facilities and Equipment	\$0.018
Total Non-Feed Costs of Feeding Cattle Per Head Per Day	\$0.700

Source: KSU (2012) Table 3, page 6, and P&SP calculations.

Combining the feed costs of \$1.702 per head per day with the non-feed costs of \$0.70 per head per day results in a total feeding cost estimate of \$2.402 per head per day.

The costs of the extra days on feed are the daily feed and yardage costs of \$2.402 times 14 days, for a total of \$33.63 per head. The net cost of two extra weeks on feed is therefore estimated to be \$33.63 less the benefit of \$21.175 from weight gain and grading improvement, or \$12.455 per head.

There is one more likely cost of not having an assured buyer; sellers likely have less leverage in negotiating a sales price. P&SP’s estimate of the benefits of assured market access also took

this likely effect into account. To estimate this effect, P&SP turned to the data it obtained from sellers. The data P&SP obtained from some sellers contained a category indicating that the cattle seller felt that he or she must sell that particular lot during the current marketing week. Only 10 different sellers recorded any lots as “must sell.” Therefore, P&SP did not consider the information collected to be representative of the population of motivated sellers or indicative of the overall prevalence of overfeeding.⁴² Nonetheless, P&SP found a small but statistically significant price difference in the sales of cattle designated by the seller as “must sell” that it believes is useful for this analysis.

P&SP estimated a regression equation on 9,293 lots of fed cattle sold through negotiated cash sales in 2009 that had price as the dependent variable, and the “must sell” indicator as an independent binary variable. The equation also had several other independent variables to control for cattle quality and market conditions. The control variables were lot size, percentages in each lot of choice, yield grade 4 and 5, and Certified Angus Beef in the lot, total weight gain and gain per day on feed, level of the futures market, current beef cutout values, and binary variables for purchasing plant, month purchased and if the lot consisted of dairy-bred cattle.

The results showed that other things being equal, cattle with the “must sell” designation had prices that were lower by \$0.25 per live cwt. than other negotiated cash cattle sales. The results support the hypothesis that even after controlling for cattle quality, reduced bargaining leverage for sellers resulted in lower prices, and that marketing agreements to assure timely delivery are of tangible value to sellers. The summary results of the equation are shown below in Table 12.

Table 12 – Results from the “Must Sell” Regression – 2009 Data

Region Covered by Equation	Sample Size (N) in Records	Mean Value of Dependent Variable	Adjusted R-Squared	“Must Sell” Coefficient	95% Confidence Interval of “Must Sell” Coefficient
All	9,293	\$83.49	.6010	-\$0.2487	-\$0.3922 to -\$ 0.1052

The effect estimated from this regression is just the sales price effect. The full estimated cost of not having an assured buyer is the sum of the negative price effect plus the additional costs incurred for feed and yardage, offset by the benefits of extra weight gain, and possible increases in grading or yield.

The negative price effect of \$0.25/cwt. on a 1,300.2 pound steer or heifer is \$3.25 per head. The total net estimate therefore is \$12.455 plus \$3.25 per head, or \$15.705 per head, which translates to \$1.208/cwt. Sellers use committed supplies to avoid these costs.

Since only the sellers using AMAs that assure timely market access avoid these costs, P&SP weighted the per head estimate by the percentage of AMA fed cattle sales not counting forward

⁴² In addition, P&SP did not receive information indicating why the seller designated any lots as “must sell.” Data analysis did not indicate the lots of cattle that had been fed longer or had gained more weight than the others, so sellers may have had reasons for the “must sell” designation besides overfeeding.

contracted sales or TOMP sales.⁴³ In 2009, that came to 44.82 percent of fed cattle sales (see Table 2), so the estimated average benefit to sellers of all fed cattle from the assurance of timely market access is 44.82 percent of \$1.208. The final estimate was adjusted downward slightly because the 25 cent “must sell” discount would not likely apply to packer fed cattle. The final weighted point estimate of the benefit of assured market access is \$0.533/cwt.

The logic of the estimate is that AMAs allow sellers to avoid the risk of non-access to timely cattle sales and overfeeding. It does not assume that if all sales and prices were negotiated in a spot market, that all cattle would be overfed. The logic is that AMAs allow sellers to avoid the risk of overfeeding, even if they might not have been overfed. AMAs improve the efficiency of the entire cattle marketing system by allowing both packers and feeders to know with relative certainty when the cattle will be delivered, so the feeders can plan the feeding program accordingly to avoid the possibility of overfeeding. This benefit accrues to all sellers of cattle under AMAs, whether the cattle would have been overfed or not. That is why P&SP applied the estimate to all AMAs (except forward contract and TOMP sales.)

Table 12 above showed that the 95 percent confidence interval on the “must sell” discount estimate of \$0.2487/cwt. is \$0.1052/cwt. to \$0.3922/cwt, or plus or minus \$0.1435/cwt. The estimated discount is only a portion of the overall incremental feeding cost estimate. The source study did not estimate variances of the extra feeding costs. Therefore, in the probability analysis, P&SP applied only the variability of the “must sell” discount to the entire calculation. This yielded a variation of the total incremental feeding cost estimate of \$0.533/cwt. plus or minus \$0.064/cwt., (44.82 percent of \$0.1435), for a range of \$0.597/cwt. to \$0.469/cwt.

Improved Credit Terms – Fed cattle sellers have indicated that most lending institutions provide better terms of credit if the seller can demonstrate that his or her cattle have a guaranteed market and/or a guaranteed price. To estimate the benefit from improved credit terms, one might start by looking at publically available credit market data on interest rate differentials between different financial assets that best compare to the difference between the assured market access afforded by marketing agreements and unsecured debt. However, such comparisons would be approximate at best.

P&SP turned to a 1991 study that surveyed large and small institutions that loaned money to cattle feeders.⁴⁴ The survey indicated that the lenders generally did not require feeders to use price risk management tools, but they encouraged it. The encouragement lenders cited was in three forms: 1) reduced interest rates on loans – respondents gave a range of .25 to 1 percent for the reduction; 2) a lower equity requirement – respondents indicated a range of 10 to 20 percentage points lower; and 3) by agreeing to loan money to feeders for their margin calls on hedging contracts. (This last incentive does not apply to cattle forward contracts or marketing

⁴³ While forward contracting reduces price risk and assures a market, it does not entirely assure a timely market. Under a forward contract, the month of delivery is assured, but the packer chooses the delivery day. Thus, it does not assure that the cattle will be delivered at the optimum time from the feeder’s perspective. The seller is still subject to some risk that the cattle under contract will be overfed (or underfed) by as much as an entire month. TOMP sales are generally agreed upon on the spot, so TOMP sales do not assure timely market access either.

⁴⁴ Eilrich, F., C.E. Ward, W.D. Purcell, and D. Peel, November, 1991, op. cit.

agreements, only to hedging activities. Presumably, the margin loans are an incentive for feeders to hedge.)

The survey also asked lenders to list the advantages and disadvantages of the various risk management tools. Lenders cited assured market access as an advantage of cash and basis forward contracts. Therefore, one would expect that lenders viewed the assured market access aspect of marketing agreements favorably and would want to encourage them as well, though they were not part of the survey.

For this analysis, P&SP assumed that feeders would have access to an interest rate discount of 0.625 percentage points (5/8 of one percent) on their contracted cattle. This is the mid-point of the range cited in the study. Assuming a feeder calf average weight of 650 pounds when placed on feed (the seller data 2009 average in-weight) and the 2009 U.S. average feeder cattle cost of \$96.45/cwt., the feeder would need to pay \$627 for each calf purchased. This analysis assumed that a lender would require the seller to provide 30 percent equity on the loan, so the lender would finance 70 percent of the cost of a feeder calf, or \$439. The value of 0.625 percent interest at an annual rate on \$439 for 194 days (the CPB 2009 average days on feed) comes to about \$1.46 per head.

Cattle feeders also must finance the feeding costs. Based on the analysis described above, the average feeding cost per day is \$2.40, so the total feeding cost is \$2.40 times 194 days or \$466. Since the feeding costs accrue on a daily basis over the feeding period, and not all at once at the beginning of the period, the average outstanding feeding cost over the feeding period is one-half the full amount of the feeding cost, or \$233 per head. This is the amount the feeder would have to finance. Thus, the interest saving is applied to 70 percent of \$233, or \$163 per head. That adds another \$0.54 per head to the \$1.46 for a total saving on the interest rate reduction of \$2.00 per head.

The survey also found that lenders would reduce the equity requirement by 10 to 20 percentage points to incent feeders to contract cattle. P&SP used the mid-point of 15 percentage points for its analysis. The estimated benefit of the equity reduction is derived from the savings a feeder would accrue from not having to self-finance 15 percent of the cattle feeding investment with a personal loan. Therefore, to estimate the value of the reduced equity requirement, P&SP looked to the difference in the rate on a feeder cattle loan and a personal loan. This rate difference applied to the amount of additional equity a lender would finance on a cattle loan per head is the benefit calculated by P&SP.

According to the Federal Reserve's interest rate statistics, the interest rate on southern plains feeder cattle loans in 2009 was 6.9 percent.⁴⁵ The Federal Reserve reported that the average interest rate for 24-month personal loans from commercial banks in 2009 was 11.1 percent.⁴⁶

⁴⁵ Source: Federal Reserve Bank quarterly surveys of agricultural credit conditions at commercial banks. Table C.4, Average Fixed Interest Rate on Farm Loans – Feeder Cattle Loans, reported by the Eleventh Federal Reserve District (LA, TX, and NM) for 2009. See www.federalreserve.gov, statistical reports, http://www.federalreserve.gov/releases/e15/20100331/pdf/afdr_c4.pdf.

⁴⁶ Federal Reserve release G.19 – Consumer Credit, <http://www.federalreserve.gov/releases/g19/current/default.htm>.

P&SP applied that difference (11.1% - 6.9% = 4.2%) to 15 percent of the feeder cattle cost, and to one-half of the feeding cost over the feeding period. This resulted in an estimated benefit from the reduced equity requirement of \$2.88 per head.

P&SP assumed the credit financing benefits would not apply to loans on facilities or equipment, only on loans for cattle and feeding. Therefore P&SP's total estimated financing benefit to sellers from AMAs is \$2.00 plus \$2.88, or \$4.88 per head, which translates to about \$0.383/cwt. on a live basis. Multiplying \$0.383/cwt. by the percentage of AMA procurement (less forward contracts and TOMP sales -- 44.82 percent), results in a total estimate of \$0.172/cwt. for the financing benefit of AMAs to sellers.

To avoid double counting of these financing benefits, P&SP did not apply them to forward contract sales since the risk transfer benefit explained above may have already included these benefits. Nor did P&SP apply these financing benefits to TOMP sales, because TOMP sales are often not arranged in advance. This analysis does not quantify or account for the other benefit cited in the research – the extension of credit for margin calls on hedging activity – because this benefit could apply to any hedging activity and is not necessarily related to AMAs.

The survey results cited above indicated a range of reduced interest rates of 0.25 percent to 1.0 percent and a reduction in equity requirements of between 10 percent and 20 percent. P&SP used the midpoints of these ranges for its point estimate. However for the probability analysis of the welfare effects of AMAs, P&SP used the outer ends of the reported ranges of these two parameters, which resulted in a total range of estimates of \$0.172/cwt. plus or minus \$0.076/cwt. for a range of \$0.096/cwt. to \$0.248/cwt. P&SP applied this variation in its probability analysis of the welfare effects of AMAs.

Feeding Efficiencies – If feedlots know they have assured market access, they can plan better and can confidently buy enough cattle to feed to increase capacity utilization and lower average feeding costs. This benefit is distinguished from the “Assured Market Access” benefit, (discussed above) in that the benefit here is derived from better utilization of resources over the entire feeding period as distinguished from avoiding extra days on feed.

The LMMS, through its face-to-face interviews of feedlot managers and fed cattle producers concluded feedlots that sold cattle through pricing formulas had over 90 percent capacity utilization while those that did not operated at less than 80 percent of capacity.⁴⁷

This analysis assumes that AMAs allow feedlots to become more efficient by increasing capacity utilization from 80 to 90 percent (an increase of 12.5 percent). According to the feedlot cost structure derived from the KSU study⁴⁸ shown in tables 10 and 11, 83.2 percent of the costs of feeding cattle are variable costs, (feed, medicine and interest on cattle) and the rest of the costs, 16.8 percent, are fixed when going from 80 to 90 percent capacity. The fixed costs are labor, utilities, repairs, depreciation, interest, insurance and taxes on facilities and equipment. The

⁴⁷ See Stephen R. Koontz, “What Does the RTI Study Say About Captive Supplies in the Cattle and Beef Industry?,” Colorado State University Extension, *Agricultural Marketing Report*, July 2010, p.1.

⁴⁸ Lueger, et. al., 2012, op.cit.

analysis measures the decrease in feeding costs per head, as the fixed costs are spread across more cattle.

The logic of the estimate is that holding total cattle supply constant, there would be fewer feedlots, but they would be operating at higher capacity because of AMAs. The result is a reduction of 1.87 percent in cost, or 4.5 cents per day, from \$2.40 per head per day to \$2.355 per head per day.⁴⁹ Over a feeding period of 194 days this increase in feedlot capacity utilization results in cost savings of \$8.71 per head, or \$0.683/cwt. on a live weight basis.

The estimated savings of increased feedlot capacity utilization would apply to nearly all cattle, because the efficiencies gained from increased capacity utilization would reduce the feeding cost of all cattle on feed in any feedlot using AMAs. Cattle in feedlots that only used cash methods would not benefit. Most feedlots use a variety of sales methods. However, P&SP assumed that one-third of cash sales were conducted at feedlots that only sold by cash methods, resulting in a weight of 87 percent. Applying that weight to the \$0.683/cwt. full estimate resulted in a final point estimate of about \$0.594/cwt. for the feeding efficiency benefit.

The LMMS survey results cited above did not indicate a range of improved feedlot capacity utilization from AMAs, only citing the 80 percent and 90 percent figures, which P&SP used for its point estimate. If the capacity utilization changed in a range from 80 percent without AMAs to either 88 or 92 percent with AMAs, the result would be a total range of estimates of \$0.594/cwt. plus or minus \$0.108/cwt. or from about \$0.486/cwt. to \$0.702/cwt. P&SP applied this assumed variation in the probability analysis of the welfare effects of AMAs.

Cost Recovery through Quality-Based Premiums – Cash sellers are reluctant to produce cattle under special programs such as “natural” or “organic” because they cost more to produce. Marketing agreements recognize that the meat from these special program cattle can command a higher price, and thus packers are willing to enter these agreements with producers to procure these cattle at prices that compensate the sellers for the extra cost.

P&SP believes that this benefit is already included in the analysis of improved beef quality above. In that analysis, derived from the LMMS, AMAs induced producers to produce higher quality beef, by among other things, sending price signals that reward the higher quality. The higher quality increases consumer demand, and therefore causes higher retail prices. The increased consumer demand results in higher derived demand and prices for fed cattle. Because this is similar to the added benefit discussed here for sellers and cost recovery through higher prices, and therefore is likely included in the prior estimate, P&SP did not include this factor as an added benefit in its estimate of seller benefits from AMAs.

Transaction Costs – Investigators found that cattle producers are willing to pay at least one cattle marketing organization a fee of \$1 per head to market their cattle. Therefore P&SP estimates the

⁴⁹ The formula for the spreading of overhead is: $\text{pct.ch. in total cost} = ((\text{pct.ch.Q}/(\text{pct.ch.Q}+100)))/(-1/\text{pct.FC})$, where Q is quantity, and pct.FC is the baseline percentage of fixed costs out of total cost. In this case, pct.ch.Q, the percent change in quantity in going from 80 percent capacity to 90 percent capacity is 12.5 percent. The baseline percentage of fixed costs is 16.82 percent. The formula is $(12.5/112.5)/(-1/16.82)$, or $0.1111/-0.059453 = -1.87$

benefit to sellers of reduced transaction costs from AMAs is \$1 per head for all steers and heifers sold under AMAs (except forward contracts). P&SP assumes the transaction cost savings, if any, from forward contracts are factored into the price premium, and already accounted for in the above analysis. The average slaughter weight for cattle in 2009 was about 1,275 pounds (steer/heifer composite), so \$1.00 per head comes out to about \$0.0784/cwt. live basis. The savings would apply to cattle sold by committed methods excluding forward contracts, or 51.61 percent of fed cattle sales in 2009, so this analysis uses the total benefit of reduced transaction costs of \$0.04/cwt. live basis. P&SP did not apply any variation to this estimate in the probability analysis of the welfare effects of AMAs.

Total Seller Benefits

Total Seller Benefits from AMAs (Summary)

Table 13 – Total Estimated Seller Benefits from AMAs in Dollars/cwt. Live Weight Basis

<u>Seller Benefit</u>	<u>Point Estimate</u>	<u>Low</u>	<u>High</u>
Reduced Price Risk on Forward contracts	\$0.281	\$0.271	\$0.291
Assured Market Access	\$0.533	\$0.469	\$0.597
Improved Credit Terms	\$0.172	\$0.096	\$0.248
Improved Feedlot Efficiency	\$0.594	\$0.486	\$0.702
Recovery of Premium Program Costs	-	-	-
Reduced Transaction Costs	\$0.040	\$0.040	\$0.040
Total Seller Benefits	\$1.620	\$1.362	\$1.878

This study uses the average weight of fed cattle in 2009 of approximately 1,275 pounds to convert per head dollar amounts to dollars per hundredweight on a live basis. Therefore, \$1.62/cwt. converts to \$20.65 per head of seller benefits.

The LMMS conducted numerous face-to-face interviews of feedlot managers and cattle producers. In a summary of the LMMS, a co-author concluded that “Feedlots used AMAs to reduce costs by \$1 to \$17 per head through improved capacity utilization, personnel use, feeding program standardization, and reduced financial requirements.”⁵⁰

These feedlot cost reductions cited by LMMS interviewees are related to some of the seller benefits P&SP estimated here. The feedlot cost reductions cited in the LMMS resulted from feedlot efficiencies and reduced transaction costs (improved capacity utilization, personnel use, feeding program standardization), and improved credit terms (reduced financial requirements). The feedlot cost reductions cited by the LMMS co-author did not include reduced price risk, reduced market access risk, or the extra profit feeders receive from premium feeding programs. These benefits not included in the range cited by the LMMS co-author are about 47 percent of

⁵⁰ Koontz, July 2010, Op. Cit., p.1-2.

the total seller benefits P&SP estimated, so the estimate P&SP uses here of \$20.65 per head is consistent with the range cited in the LMMS. The low end of the estimated range is \$17.34 per head, and the upper end of the range is \$23.97 per head.

P&SP modeled the seller benefits in the context of the Marketing Margins Model. The model showed that the \$1.62 per cwt. live basis of estimated seller benefits, shown in Table 14, results in net welfare gains of \$146.8 million to consumers, \$63.7 million to the packer/marketing complex and \$422.8 million to cattle producers.

Figure 6 illustrates how P&SP estimated the impacts of these sellers benefits in the MMM. The analysis shifts the supply of cattle curve downward vertically by \$1.62/cwt., reflecting the weighted average cost reduction sellers receive from AMAs.

Figure 6

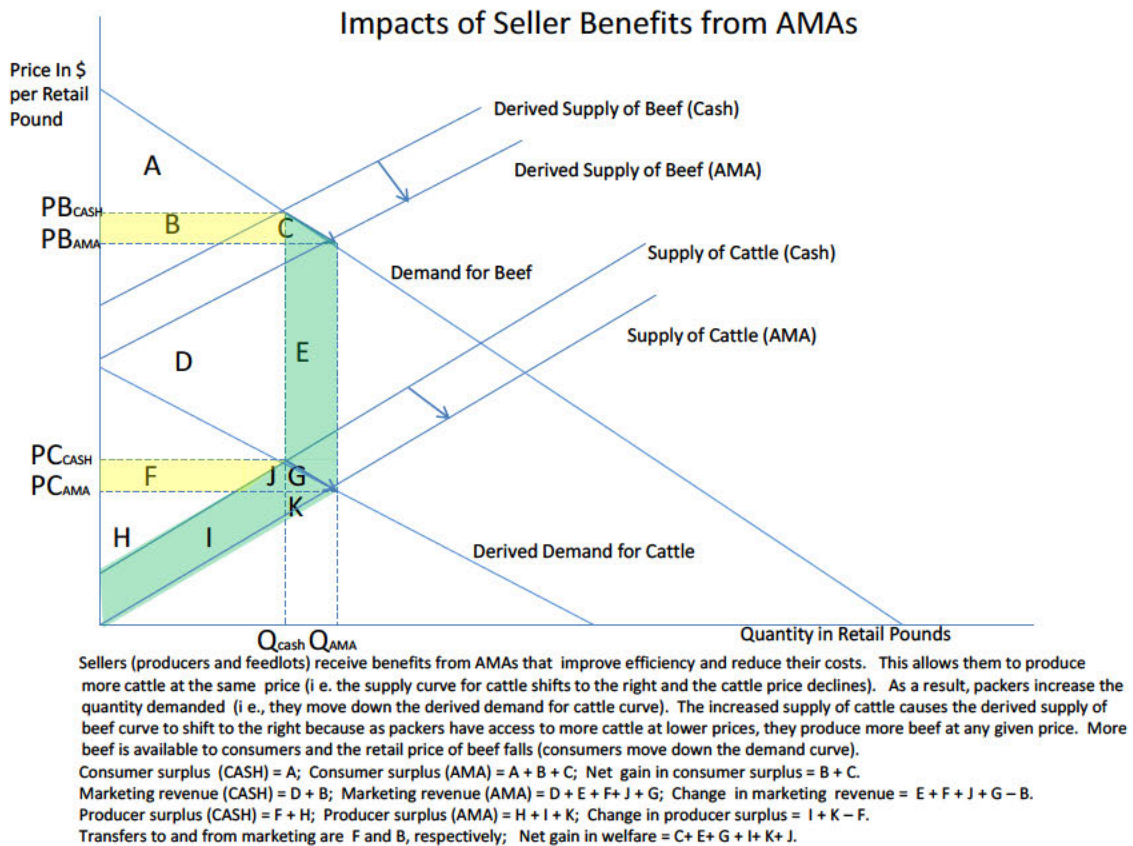


Table 14 – Marketing Margins Model – Effect of Seller Benefits of AMAs in Isolation

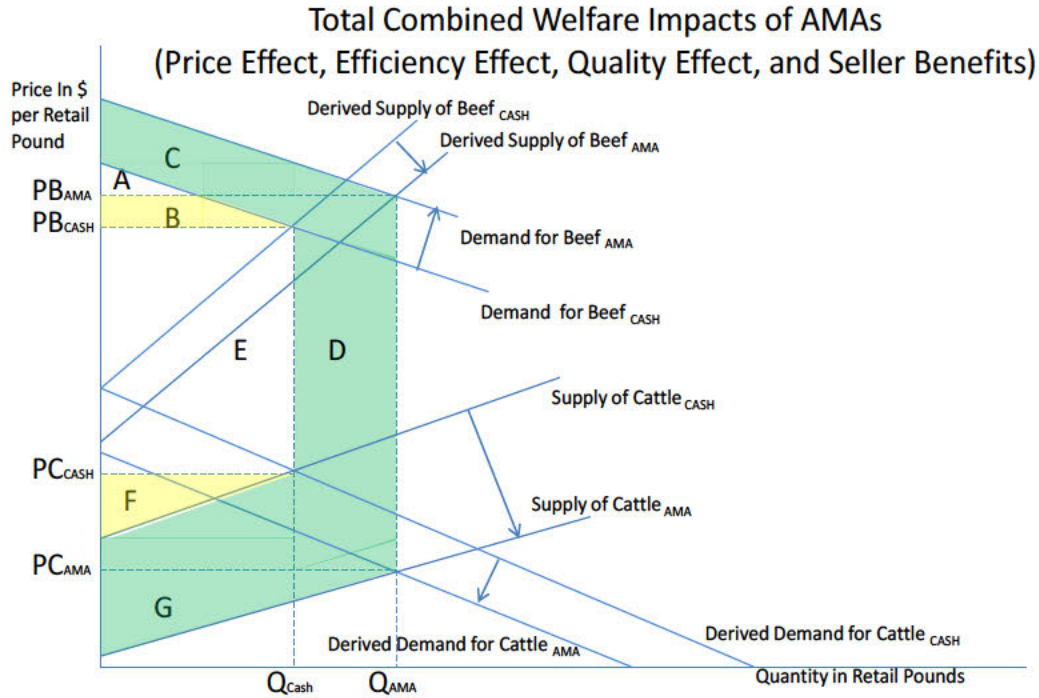
Reduction in Cost to Cattle Sellers (\$/cwt., live basis for fed cattle)	\$1.6192
Change in Retail Price (\$/lb.)	-\$0.0096
Percent Change in Retail Price due Seller Benefits	-0.225%
Change in Quantity of Beef (lbs.)	29,751,255
Percent Change in Quantity of Beef	0.194%
Change in Price of Fed Cattle (\$/Retail lb.)	-\$0.0091
Percent Change in Price of Fed Cattle	-0.484%
Change in Consumer Surplus (in Total Dollars)	\$146,832,688
Change in Packer/Marketing Revenue (in Total Dollars)	\$63,673,397
Change in Producer Surplus (in Total Dollars)	\$422,758,139
Net Change in Economic Welfare (in Total Dollars)	\$633,264,225

Total Combined Impact Estimate

Here P&SP estimates the combined welfare impacts of AMAs that have been separately estimated; 1) the AMA price effect resulting in lower prices paid to producers of cattle (-\$2.29/cwt. live basis) modeled by a downward shift in the derived demand for cattle; 2) outward shift in the supply curve of beef from cost efficiencies accruing to packers from AMAs (direct costs, volume, reduced volatility and scale effects of \$6.48 per head); 3) an increase in consumer demand due to higher beef quality (.157 percent increase in the retail price of beef) modeled by an upward shift in the demand for beef; and 4) a decrease in producer and feeder costs of \$1.62/cwt. live basis modeled by an outward shift in the supply of cattle.

Figure 7 below shows a geometric representation of the model with all the net shifts in the demand and supply curves. Note that all four of the model's demand and supply curves shift in the analysis, and the derived demand and supply curves have multiple shifts. Figure 7 is not drawn to scale. The curve shifts are exaggerated for illustration.

Figure 7



Consumer surplus (CASH) = A + B; Consumer surplus (AMA) = A + C; Net gain in consumer surplus = C - B.
 Marketing complex welfare (CASH) = E; Marketing complex welfare (AMA) = E + B + D + F; Net gain = B + D + F.
 Producer surplus (CASH) = F; Producer surplus (AMA) = G; Net gain in producer surplus = G - F.
 Transfer from consumer surplus to marketing complex = B.
 Transfer from producer surplus to marketing complex = F.
 Total net gain in welfare = C + D + G.

Table 15 below shows the point estimates of the total estimated effects of AMAs compared to an all-cash market for fed cattle at 2009 market price and production levels. The total impacts are positive for consumers, packers/marketers, and producers. Consumer surplus increases \$18.4 million, the packer/marketing complex revenue increases \$643.3 million, and producer surplus increases \$53.1 million, for a combined net increase of welfare to the economy of \$714.9 million per year at 2009 levels of prices and activity.

Table 15 – Marketing Margins Model – Total AMA Effects

Change in Quantity of Beef Produced (lbs.)	3,690,643
Percent Change in Quantity of Beef Produced	0.024%
Change in Retail Price (\$/lb.)	\$0.0082
Percent Change in Retail Price	0.193%
Change in Fed Cattle Price (\$/lb.)	-\$0.0333
Percent Change in Fed Cattle Price	-1.764%
Change in Consumer Surplus (\$)	\$18,448,709
Change in Packer/Marketing Revenue (\$)	\$643,303,901
Change in Producer Surplus (\$)	\$53,117,204
Net Change in Economic Welfare (\$)	\$714,869,813

The net change in economic welfare estimate is a positive \$714.9 million, indicating that the net impact on the economy from AMAs is positive, and there is no net harm to competition from the use of AMAs. Note that the changes in welfare differ slightly from the sum of the individually estimated changes. That is because the values in Table 15 are estimated with the effects occurring simultaneously, rather than in isolation, and there are minor interactions between the shifts in demand and supply functions.

There are several reasons that the estimates from this model should be interpreted with caution:

First, the model has assumed linear demand and supply curves through their entire lengths based on point estimates of their slope (the elasticities). In reality, the shapes of the curves throughout their entire length are uncertain. However, estimated changes in welfare measures due to shifts in linear supply and demand functions should approximate actual welfare changes, provided the shifts are relatively small.

Second, the AMA price effect was estimated by P&SP on a lot-by-lot basis, based on weekly changes in AMA use, other market prices, and various control variables. In a week-to-week time period, prices can adjust, but the benefits of AMAs to packers, feeders and consumers do not take effect so quickly. In applying short-term AMA price effects and longer term realization of AMA benefits to estimate the overall welfare effects with the MMM, all adjustments are implicitly assumed to occur within a period of one year. The MMM is a comparative static framework, so the dynamic adjustment process is not modeled.

Third, the point estimates represent industry total effects. Just because the welfare estimates are all positive does not mean that every individual market participant benefits from AMAs. It is possible some individual packers, wholesalers or retail beef marketers may be harmed depending on their cost structure and purchasing profiles. Individual consumers may be harmed by the higher beef price, particularly if they do not value the improved beef quality and variety of choice that AMAs bring to the market. Individual fed cattle sellers may be harmed based on their cost structure, and in particular, if they do not to sell with AMAs.

Finally, the estimates of these welfare effects are point estimates, based on parameters that may randomly vary. To address this last caveat on interpreting the results, this report will now present P&SP's probability analysis accounting for the estimated statistical uncertainty of selected parameter estimates in the model.

Probability Analysis

The MMM model depends on numerous estimated parameters for its results. The results presented thus far are point estimates. P&SP used all available estimates of parameter variability and conducted a probability analysis to estimate the likelihood that AMAs result in net benefit or harm to economic welfare.

The probability analysis allowed for variability in eleven of the model parameters. It was conducted using a Monte Carlo simulation of 10,000 outcomes (replications or “random draws”) using different values for the ten variable parameters that were chosen based on their estimated means and standard deviations.

For example, the point estimate of the AMA price effect coefficient was -4.17577. The estimated standard error on that coefficient was 0.061. The Monte Carlo simulation procedure chose 10,000 different values for that parameter that conformed to a normal distribution with a mean of -4.17577 and a standard deviation of 0.061. Table 16 shows the list of variables and their standard deviations.

Table 16 – Parameters Allowed to Vary in the Monte Carlo Simulations

Parameter	Point estimate	Standard Deviation
Estimated coefficient from AMA price effect model	-4.17577	0.061
Price Elasticity of Demand for Retail Beef	-0.864	0.113
Price Elasticity of Supply for Retail Beef	0.349	0.068
Price Elasticity of Demand for Fed Cattle	-0.401	0.150
Price Elasticity of Supply for Fed Cattle	0.133	0.047
Price Elasticity of Demand for Wholesale Beef	-0.584	0.105
Price Elasticity of Supply for Wholesale Beef	0.424	0.132
Estimated Packer Processing Cost per Head	\$138.61	\$13.86
Percent Change in Processing Cost due to AMAs	4.68%	0.468%
Percent Ch. in Retail Price due to AMA Quality Effects	0.157%	0.0157%
Seller Benefits measured in Dollars/cwt. (live basis).	\$1.62	\$0.26

The AMA price effect coefficient and its standard error were estimated by P&SP from the model and method described earlier in this report. The other model parameters had certain restrictions placed on their variability.

The six demand and supply elasticity estimates were derived from the LMMS.⁵¹ Applying a normal distribution to the mean values using the reported standard deviations resulted in three of the elasticities randomly varying to the incorrect sign in the outer tails of their distribution. Thus, a few of the simulations had nonsensical results. Therefore, P&SP constrained the price elasticity of demand for cattle to be less than zero, and the price elasticities of supply of cattle

⁵¹ See LMMS, Volume 3: Fed Cattle and Beef Industries, Section 6.1.2. Table 6-2 has a summary of the elasticities the Study estimated. P&SP used the short Run elasticities for its analysis. The full equations and standard errors of the coefficient estimates are presented in section 6.5, Tables 6-3 through 6-10

and wholesale beef to be greater than zero. This was done by using a beta distribution that preserved the mean and standard deviations of the estimates, while restricting the final values to the correct sign. The other variables, including the other elasticities were distributed by a normal distribution in the simulations.

The LMMS estimated the packer processing costs per head from sample data, and it reported a standard deviation for the estimate.⁵² The simulation results generated with the standard deviation reported in the LMMS were in many cases unreasonably high or low. Therefore, P&SP restricted the variability, employing a normal distribution within a range of 10 percent above or below the mean value.

The LMMS did not provide a usable estimate of the standard deviation of the estimate of percent change in processing cost due to AMAs, as it was estimated from a variety of sources.⁵³ Therefore, P&SP also restricted the variability of that parameter, employing a normal distribution within a range of 10 percent above or below the mean value.

The LMMS provided detail on the variability of the estimate of the change in retail beef price due to AMA quality effects. Specifically, the LMMS used four separately estimated coefficients to establish its price effect estimate.⁵⁴ Combining these four coefficients and their estimated standard deviations in P&SP's simulations generated price changes and welfare results that were, in many of the sample draws, unreasonably high or low. Therefore, P&SP also restricted the variability of the quality effect parameter, employing a normal distribution within a range of 10 percent above or below the mean value.

P&SP estimated a detailed range of the seller benefits and reported the results in Table 13. P&SP used those estimated ranges to allow the estimate of total seller benefits to vary by a normal distribution within a range of \$0.26 cents plus or minus the mean estimate of \$1.62/cwt., live basis.

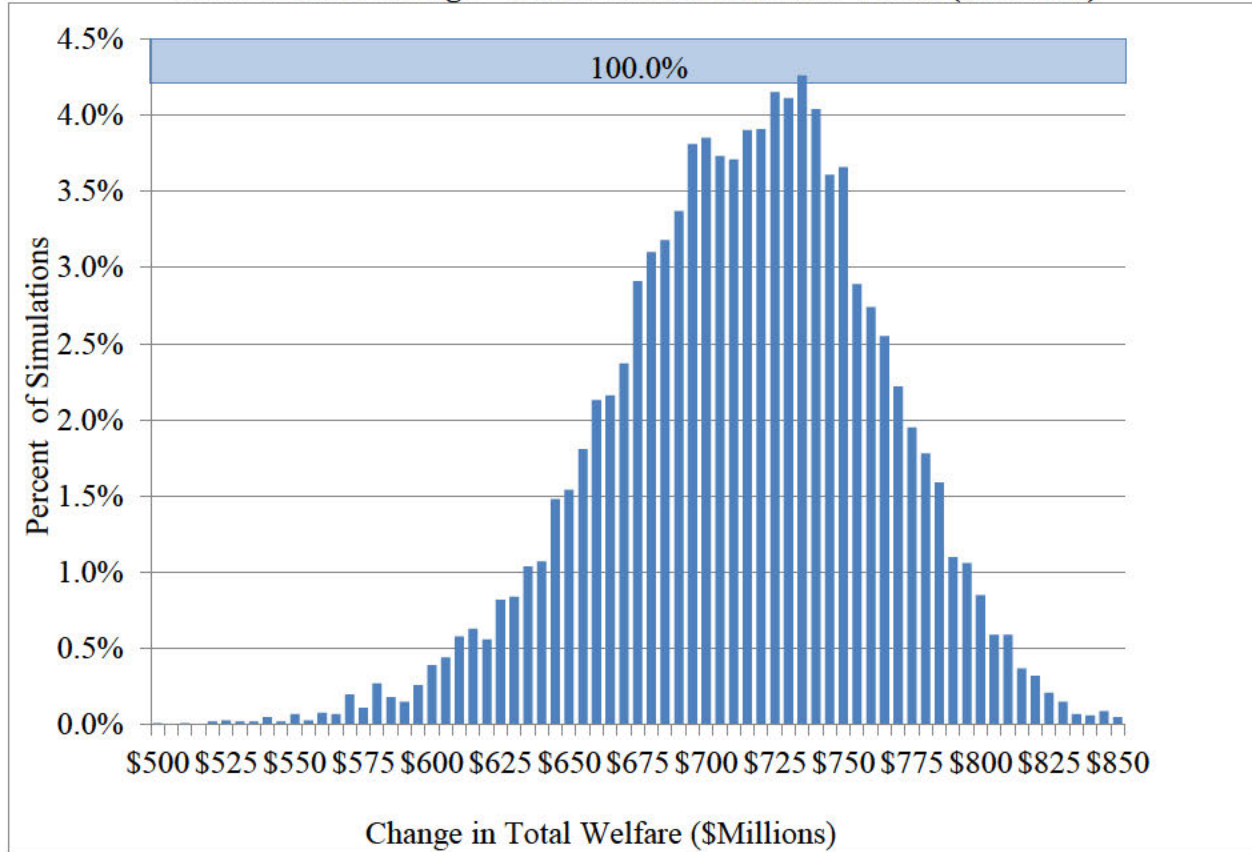
The simulation analysis applied the variability estimates of the MMM parameters and estimated a probability distribution of the model results. The analysis yielded a probability distribution of the net combined welfare impact of AMAs. As expected, the simulations had a mean welfare change near the point estimate of a positive \$714.9 million. None of the simulations resulted in a negative welfare impact. Thus, the conclusion to be drawn from the simulations is that AMAs have a virtually certain chance of resulting in a net gain to the economy. Figure 8 shows the simulation results for the combined welfare effect from AMAs.

⁵² See LMMS, Volume 3: Fed Cattle and Beef Industries, Section 3.4, Table 3-1.

⁵³ See LMMS, Volume 3: Fed Cattle and Beef Industries, Section 3.4, Tables 3-3 and 3-4.

⁵⁴ See LMMS Volume 3: Fed Cattle and Beef Industries, Section 6.7. Specifically Section 6.7.1 refers to equation 4.12, which estimates coefficients on how formula contract procurement and packer ownership affects beef quality, and equation 4.18 which estimates how beef quality, current and lagged, affects beef price.

**FIGURE 8 - Distribution of the Economic Welfare Impact of AMAs
Total Welfare Change – Monte Carlo Simulation Values (\$Millions)**



Minimum: \$481.6 Million; Maximum: \$850.7 million; Mean: \$710.8 million;
Standard Deviation: \$49.3 million; Observations: 10,000

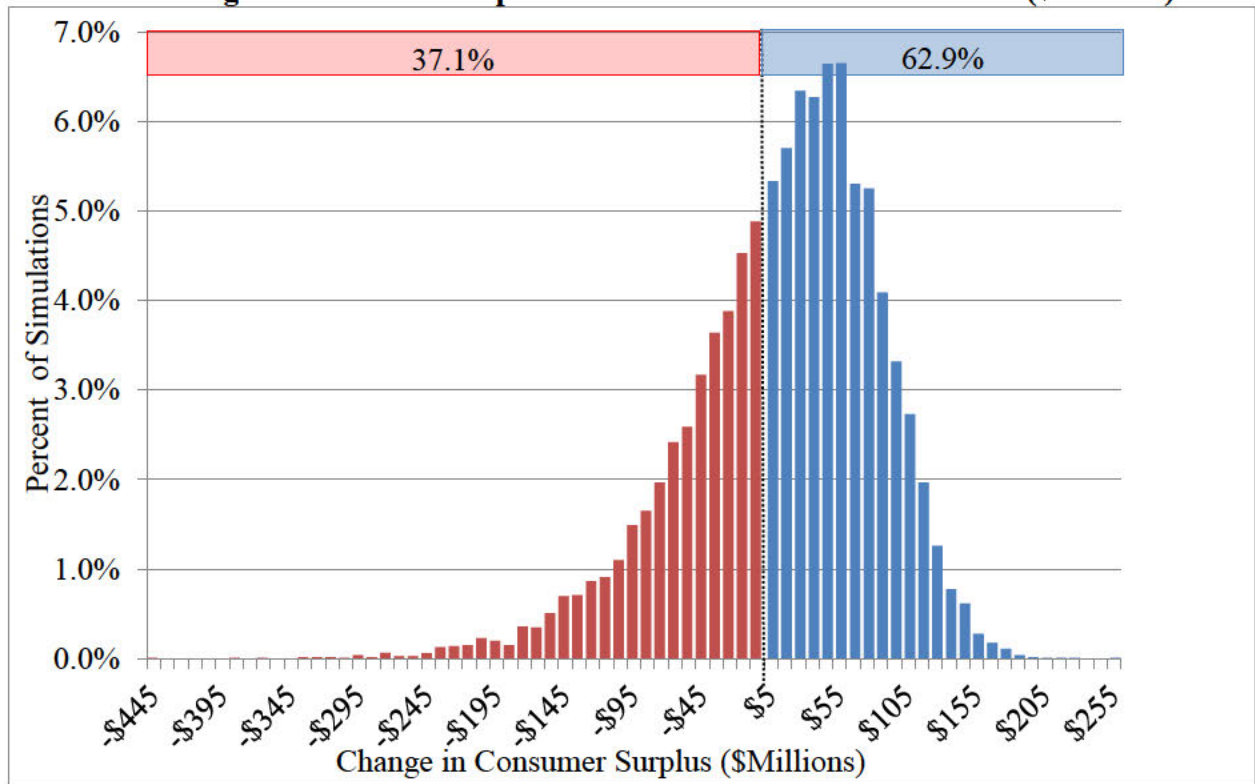
The model also generated simulation results in some of the specific welfare measures. While the means generated from the 10,000 random simulations deviated somewhat from the model point estimates, the medians were very close to the point estimates.⁵⁵ Between 35 and 40 percent of the simulations generated negative results for the consumer and producer surpluses. This is consistent with the fact that not all consumers value the added quality and choices in beef purchases that AMAs facilitate, and not all cattle sellers market their cattle with AMAs. Over 95 percent of the packer/marketing revenue change simulations were positive, and all 10,000 simulations generated positive results for the overall welfare impact of AMAs. Table 17 and Figures 8 through 11 show the summary statistics of the welfare measures from these simulations.

⁵⁵ The simulations deviate from the model point estimates in some cases because as certain elasticities get close to zero, as they do in some of the random simulations, the welfare effects can become exaggerated.

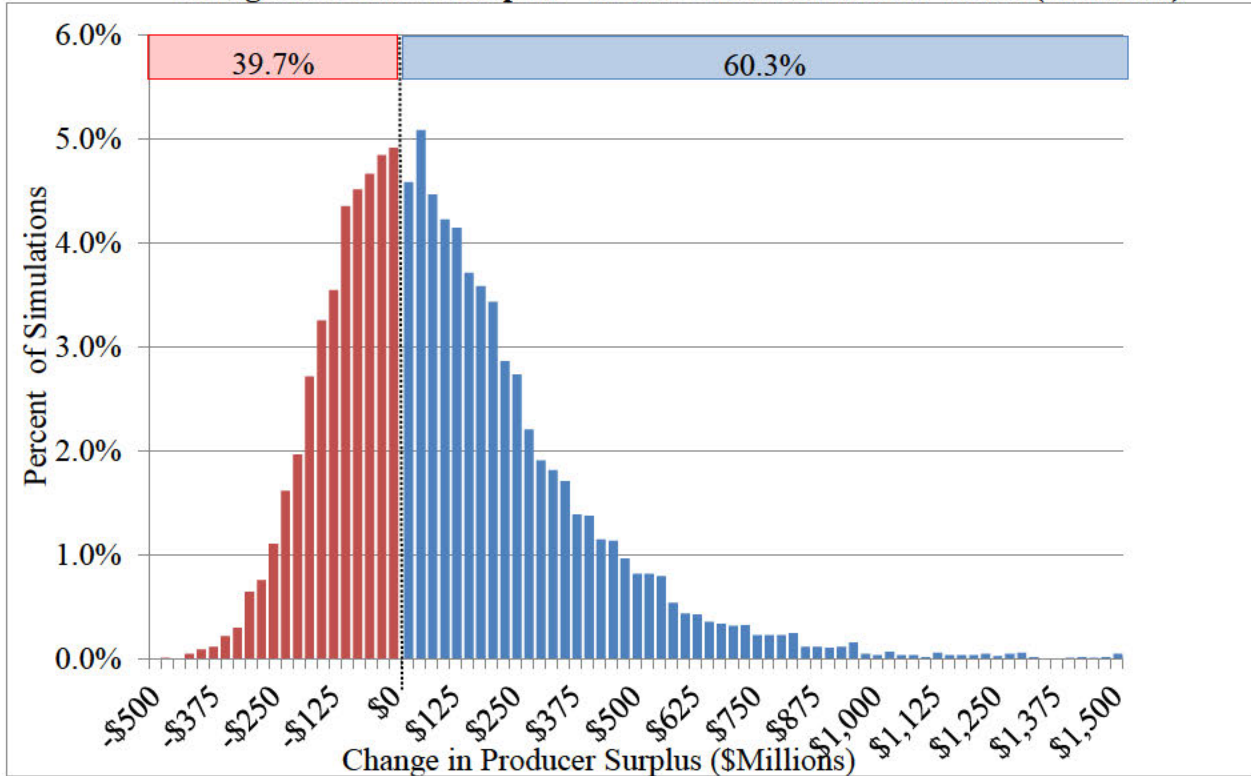
**Table 17 - Changes in Welfare from Simulations of AMA Impacts – Summary Statistics
(\$Millions)**

Change in Variable	Mean	Median	Std. Dev.	90 th Percentile	75 th Percentile	25 th Percentile	10 th Percentile	Percent Positive
Consumer Surplus	\$8.1	\$17.8	\$70.9	\$89.3	\$56.6	-\$31.6	-\$85.0	62.9%
Marketing Complex	\$604.9	\$643.5	\$287.8	\$917.8	\$798.3	\$460.0	\$246.8	96.6%
Producer Surplus	\$97.8	\$53.2	\$257.0	\$419.8	\$217.1	-\$76.7	-\$171.9	60.3%
Total Welfare	\$710.8	\$713.7	\$49.3	\$772.0	\$744.9	\$679.3	\$646.8	100.0%

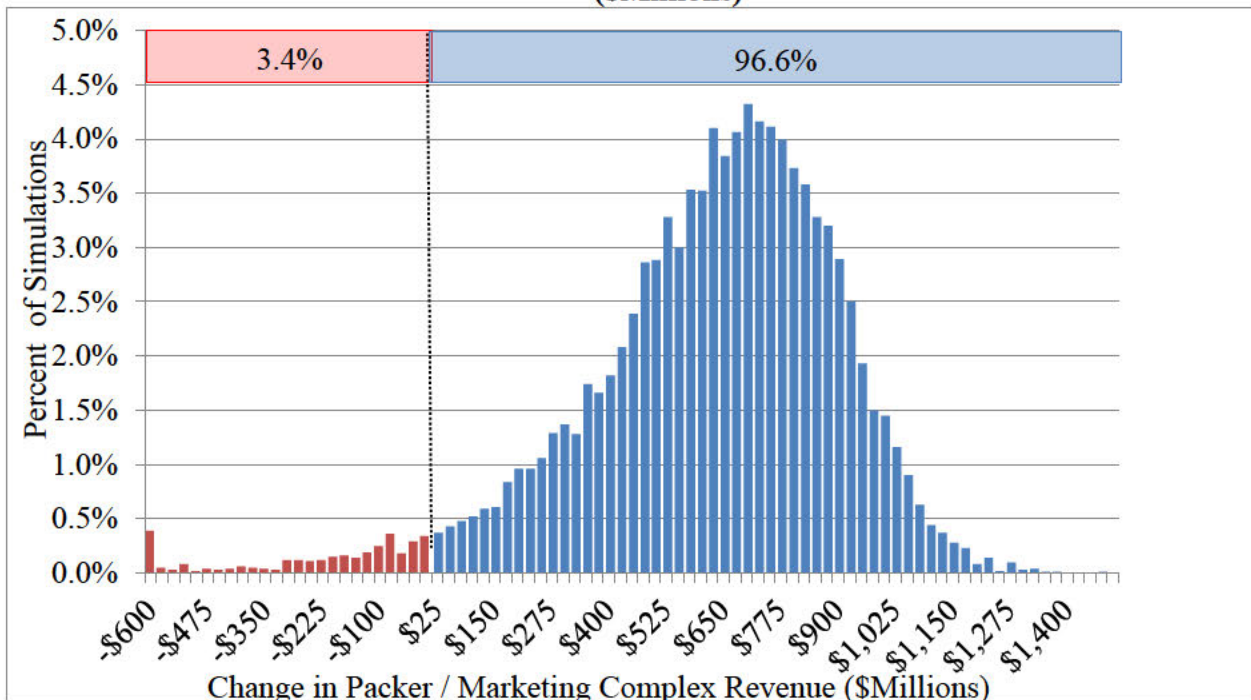
**FIGURE 9 - Distribution of the Economic Welfare Impact of AMAs
Change in Consumer Surplus – Monte Carlo Simulation Values (\$Millions)**



**FIGURE 10 - Distribution of the Economic Welfare Impact of AMAs
Change in Producer Surplus – Monte Carlo Simulation Values (\$Millions)**



**FIGURE 11 - Distribution of the Economic Welfare Impact of AMAs
Change in Packer/Marketing Complex Revenue – Monte Carlo Simulation Values (\$Millions)**



The model point estimates and the majority of model simulations show that AMAs have positive impacts for consumers, packers/marketers, and producers. The results of these simulations show that while under specific conditions, there is at least some probability of negative impacts for consumers, packers/marketers, or producers, the overall impact of AMAs on the beef and cattle industries is almost certainly positive.

Conclusion

The economic analysis has found evidence of a concentrated market structure in fed cattle beef packing. Use of AMAs makes the negotiated cash markets considerably thinner and typically makes them more concentrated. The investigation found increased AMA usage to have a negative correlation with negotiated cash prices of fed cattle. Since many packer formulas, marketing agreements and pricing methods are in some way determined by negotiated cash market cattle prices, cash prices influence the value producers receive for fed cattle marketed by most other methods. The investigation found there are likely economic benefits to packers/marketers, consumers, and cattle sellers from using AMAs. The investigation estimated these benefits, and found that more likely than not, they outweigh the negative cattle price effect when considering the entire economic effect of AMAs. The investigation found no evidence of conspiracy, coordination, deception, or predatory intent by packers.

The economic analysis has shown that all other factors being equal, packers' use of committed procurement has had a negative impact on negotiated cash prices for fed cattle. The effect varies by region, but for the United States as a whole, this analysis has estimated the effect to be $-\$0.0418/\text{cwt.}$ on a live weight basis for every percentage point of packer capacity procured through AMAs. This translates to $-\$2.29/\text{cwt.}$ live weight based on 2009 levels of AMAs (about 54.7 percent of packer capacity). This finding is generally consistent with prior econometric studies, though somewhat larger in magnitude.

The analysis failed to establish a systematic week-to-week significant negative correlation between negotiated cash prices and cash market concentration as measured by weekly HHIs and concentration ratios, or cash market participation as measured by the number of packers that actually bought fed cattle in a particular region's negotiated cash market.

Packers' exploitation of oligopsony market power is one possible explanation for the price effect. Such oligopsony market power may exist due to a combination of concentration and the thinness of the cash market. However, the price effect may be a pro-competitive outcome due to certain benefits that AMA sellers receive when they market their cattle through AMAs. Packers have consistently stated that some sellers have encouraged, promoted, and even insisted on using AMAs to market their cattle. Thus, some sellers must believe that they benefit from marketing their fed cattle through the use of AMAs. Even though some AMA sellers may believe that AMAs come with a cost (i.e. lower formula prices), they are willing to pay that cost because they receive certain benefits from AMAs.

In assessing whether the use of AMAs constitutes a violation of the Act, the investigation sought to determine whether the practice causes net competitive harm. This economic analysis applied a modeling framework that estimated the economic welfare effects of the practice. The estimation applied the following inputs.

- 2009 actual market data such as U.S. beef production, consumption, and retail prices.
- Empirical estimates of the values of relevant demand and supply elasticities.
- The estimated cattle price effect of AMAs from this analysis, of -\$2.29/cwt. on a live weight basis.
- Quantitative efficiency estimates of benefits to packers of AMAs from direct cost savings, scale efficiencies and variability benefits amounting to about \$6.48 per head.
- A benefit to consumers from AMAs improving the quality of beef and thus increasing beef demand resulting in a 0.157 percent increase in retail beef prices.
- Empirical estimates of AMAs' benefits to sellers from risk shifting, cost recovery, and improvements in market access, operating efficiency and credit terms, averaging \$1.62/cwt. across all cattle sellers.

The analysis concludes that regardless of the reason for the negative price effect of AMAs, the negative effects are more than offset by the estimated benefits accruing to packers/marketers, consumers, and cattle sellers. The model shows that in 2009, the estimated impact of AMAs is an increase in consumer surplus of \$18.4 million, an increase in producer surplus of \$53.1 million, and an increase in revenue to the beef packers and beef marketing industry of \$643.3 million, resulting in a combined welfare increase of \$714.9 million.

Caveats to the model results and methodology include the application of a short-term week-to-week estimate of the AMA price effect in a model using longer-term demand and supply elasticities to estimate longer-term welfare effects, and the assumption of linearity in the demand and supply functions, when the shape of the curves throughout their entire lengths are uncertain. In addition, many model parameters are estimates, and may randomly vary.

Because of the uncertainty associated with econometric point estimates, P&SP conducted a Monte Carlo probability analysis incorporating the statistical variability of the estimated model parameters. The results of 10,000 model simulations show that the overall impact of AMAs on the beef and cattle industries is almost certainly positive. However, there are likely some producers who sell cattle only through the negotiated cash market that may be negatively impacted by the AMA price effect without receiving the offsetting benefits of AMAs. Similarly, there are likely some consumers that do not value the improved quality and range of choices in beef purchases facilitated by AMAs that may be negatively impacted by the small (0.2 percent) beef price increase.

The investigation concludes that the use of AMAs has a negative impact on negotiated cattle prices, and that price effect by itself would have a negative impact on the economy, all else being equal. However, P&SP has estimated the total economic impact of AMAs and concludes that AMAs' benefits to the United States economy from packer efficiency gains, beef quality improvements, and benefits to AMA sellers more likely than not outweigh the negative price effect.

In light of the economic analysis, and the fact that the investigation found no evidence of conspiracy, coordination, deception, or predatory intent by packers, the results of the investigation do not support allegations that packers' use of AMAs violates the Packers and Stockyards Act.

APPENDIX I – Further Econometric Analysis

Effects by Type of AMA

P&SP further analyzed the effects of AMAs by isolating the impact of each specific type of AMA. From the packer data, P&SP was able to disaggregate AMAs into six categories: packer fed, forward contract, marketing agreement, negotiated grid, TOMP, and cash with time. The relevant features of each are described at the beginning of the Investigative Analysis and Findings section of this report. The different effects of each method on cash prices may be due to the degree of knowledge and control the packers and sellers are afforded by each procurement method.

Packer fed – Packers probably have the most control and knowledge on delivery week for packer fed cattle. They have access to detailed information on the progress of individual pens of cattle and likely know when a pen of cattle will be ready for slaughter. Packers denied having much control over the delivery week of packer fed cattle in their sworn statements. Presumably, however, packers have more knowledge and control of packer fed cattle than they do for cattle sourced from third parties.

Forward contract – While sellers specify the delivery month and day the price is set (based on futures basis contracts), packers can choose the delivery week. Thus, packers have substantial knowledge and control of cattle purchases under forward contracts as well.

Marketing agreements – While terms may vary, typically sellers choose the week of delivery, while packers generally specify the day and time of delivery. However, sellers typically notify packers two weeks in advance of how many head they will be delivering under the agreement, so packers have good knowledge of the number to be delivered the following week, but less control over the week than with packer fed cattle or forward contracts.

Negotiated cash with time – Packers have complete knowledge of the advance delivery of these cattle and their price, because the delivery week, which is at least two weeks after the agreement, is agreed upon by both parties. These have been described accurately as short-term forward contracts.

Negotiated grid and TOMP – Cattle purchased under negotiated grids and TOMP arrangements are generally not committed in advance. Packers and sellers agree usually the week before slaughter on the pens to be sold under these methods. Base prices are negotiated, but usually are determined by a not-yet published reported cash price for the current week. Negotiated grid transactions are usually based on dressed weight and have carcass quality-based premiums and discounts. TOMP transactions are typically priced on a live weight basis. Even though packers have little if any additional advance knowledge or control over the numbers of negotiated grid or TOMP cattle it will be slaughtering the following week, complainants allege that these purchases remove cattle from the negotiated cash market and thus depress prices.

Note that not all negotiated grid and TOMP purchases are individually negotiated and have their volumes determined on the spot. Many feedlots tend to sell with these methods to the same

packers week after week. Some may even have established marketing agreements with packers to sell via these methods every week. In these instances, packers are more likely to have advanced knowledge of volumes under these methods. However, it is difficult to determine which transactions identified as negotiated grid or TOMP transactions were individually negotiated and which ones were not. Therefore, the econometric analysis in this report did not attempt to differentiate transactions within either of those two categories. Both categories fall into the broad definition of AMAs.

Because of the differences among specific purchase methods, one would expect different price impacts from each AMA method on negotiated cash prices. Especially since many negotiated grid and TOMP cattle are not necessarily committed in advance, they may have a different impact than the other AMAs.

P&SP estimated the impact of each type of AMA separately with a regression analysis that disaggregated each AMA type. The equation was otherwise the same as that used in the basic model described in the Methodology and Results section of this report (except without the serial correlation and heteroskedasticity adjustments):

$$PRICE_{i,t} = \beta_0 + \beta_1 AMA_{t+1,t} + \beta_2 MKT_t + \beta_3 CHAR_{i,t} + \beta_4 D_PLANT_{i,t} + \beta_5 D_MONTH_t + \varepsilon_{i,t}$$

The difference was that *AMA* was split up into six separate similarly defined, region-specific variables, each representing one of the six component procurement methods that collectively comprise the broad definition of AMAs. The regions are determined by location of the plant.

The results on a regional basis are shown in Table AI-1 below:

Table AI-1 -- Results from the Regressions – By Type of AMA – 2009

Region Covered by Equation	Adjusted R-Squared	Top-of-the-Market	Negot'd Grid	Cash with Time	Mkting Agreemt	Fwd. Contract	Packer Fed
Total U.S.	.6488	1.12771	-3.98897	-3.51249	-4.14316	-4.72269	-0.2169*
Texas/OK/NM	.8389	-1.54789	13.2977	-28.7784	-1.94133	-7.18857	-6.13129
Kansas	.7314	-1.38506	3.16033	-18.6289	-2.67160	-5.52541	-8.23737
Nebraska	.6842	-1.3382*	-2.72275	0.2156*	-2.78116	-3.21737	1.26064
Iowa/ MN	.6456	0.8902*	-1.17296	0.6427*	-1.07445	-3.42828	-1.4014*
Colorado	.6757	-7.03840	-0.7077*	-0.4205*	-7.49721	-0.1508*	-1.5106*
Midwest	.7064	-6.9602*	-5.06731	-9.71148	-10.6222	-3.21701	2.9083*
Other U.S.	.6464	4.30020	-3.02382	-1.42008	-2.12507	-5.03126	0.57629*

* Not statistically significant at the 95% confidence level.

The regressions generally show that the use of marketing agreements and forward contracts has the most consistently large and significant negative effects on negotiated cash prices. The use of packer fed cattle has large and statistically significant negative effects in only the regions of Texas and Kansas. The effect is negative but not statistically significant in Colorado. The use of cash with time has some very large coefficients, but the practice is relatively rare, so the actual impact is small. In addition, packers tend to buy cattle under cash with time agreements in

weeks where the market has a glut (i.e. cash supplies exceed the demand or current slaughter capacity), and so when transactions appear, it is usually in weeks when prices are also depressed. Thus, even though the cash with time coefficients are large and negative when they are statistically significant, the impact would probably not be as large as indicated if cash with time was used in more normal circumstances.

The result for top-of-the-market usage is interesting because it is positive for the U.S. as a whole and “Other U.S.” but statistically insignificant in the other regions except Texas, Kansas and Colorado where it is negative. Texas and Kansas are the regions where TOMP purchases are most prevalent in absolute numbers and in percentage terms (see Tables 1 and 2 in the text).

The negotiated grid results are also mixed. This mixed or lesser impact from TOMP and negotiated grid purchases is consistent with the fact that they are less likely to be committed in advance. However, the negative coefficients on TOMP usage in Texas, Kansas, and Colorado are consistent with the hypothesis that their use may increase the negotiating power of the presumably fewer packers participating in the thinner negotiated cash market.

Since negotiated grid and TOMP methods are often non-committed, packers will need more of these cattle to fill production schedules presumably during the same weeks they also need more cattle from the negotiated cash markets. This might explain why coefficients are sometimes positive. On the other hand, if as complainants have asserted, these methods reduce demand for negotiated cash cattle just as other AMA methods do, then one would expect a negative effect. Which effect dominates is an empirical question not definitively answered by this investigation.

Lag and Lead Effects

The investigation examined whether there are significant and consistent lag or lead effects of AMA usage on negotiated cash prices. To examine this, P&SP started with the basic model described in the Methodology and Results section of this report and added variables for AMA lagged four weeks and led by four weeks to the equation. The results are shown below.⁵⁶

⁵⁶ Because of the lag and lead variables, the sample period for this analysis was reduced to only include weeks 6 through 49. Note that the results from Tables 4 and 5 covered the sample period of weeks 2 through 53. Week one was excluded because the data did not cover the full week of reporting for the week ended Saturday, January 3, 2009, and therefore, would have skewed the analysis.

Table AI-2 – Lag Effects – 2009 Data

Region Covered by Equation	Sample Size (N) in AMS Records	Mean Value of Dependent Variable	Adjusted R-Squared	AMA week (t)	AMA week (t-1)	AMA week (t-2)	AMA week (t-3)	AMA week (t-4)
Total U.S.	66,409	\$82.81	.6622	-3.11	-2.27	0.34	-0.31	1.15
Texas/OK/NM	9,767	\$83.71	.8696	-7.11	-0.39*	1.25	1.19	1.67
Kansas	12,966	\$83.45	.7501	-7.76	-2.37	1.41	1.98	2.14
Nebraska	16,269	\$83.20	.7007	-0.76	-3.28	2.51	-0.21*	0.70
Iowa/ MN	15,465	\$82.08	.6686	-1.59	-1.78	0.73	-1.29	1.05
Colorado	2,751	\$82.67	.6942	-2.66	0.54*	2.48	0.53*	0.74*
Midwest	4,661	\$81.65	.7001	-4.65	-2.45	-1.69	-0.97*	-1.96
Other U.S.	3,816	\$81.81	.6721	-2.47	-2.33	0.45*	-1.08	2.72

Narrow definition of AMA excludes Negotiated Grid and Top-of-the-Market

* Not significant at the 95% confidence level

Table AI-3 – Lead Effects – 2009 Data

Region Covered by Equation	Sample Size (N) in AMS Records	Mean Value of Dependent Variable	Adjusted R-Squared	AMA week (t)	AMA week (t+1)	AMA week (t+2)	AMA week (t+3)	AMA week (t+4)
Total U.S.	66,409	\$82.81	.6622	-3.11	-0.92	0.68	0.51	-1.36
Texas/OK/NM	9,767	\$83.71	.8696	-7.11	1.14	1.26	-0.95	1.68
Kansas	12,966	\$83.45	.7501	-7.76	0.92	-1.50	-1.18	2.72
Nebraska	16,269	\$83.20	.7007	-0.76	-2.90	1.96	0.59	-1.99
Iowa/ MN	15,465	\$82.08	.6686	-1.59	-0.19*	1.32	0.97	-0.77
Colorado	2,751	\$82.67	.6942	-2.66	-1.22*	3.13	1.38*	-0.71*
Midwest	4,661	\$81.65	.7001	-4.65	1.68	-0.50*	-0.48*	-1.23*
Other U.S.	3,816	\$81.81	.6721	-2.47	-1.42	2.13	0.33*	-2.16

Narrow definition of AMA excludes Negotiated Grid and Top-of-the-Market

* Not significant at the 95% confidence level

P&SP had little reason ex-ante to expect that AMAs during the prior or subsequent weeks have much effect on the current week's cash prices. The regressions were run as an exploratory exercise only and to test for causality as discussed below. Except for the one-week lag in Nebraska and Iowa/Minnesota all the lag terms were less negative in magnitude than the current period. Except for Nebraska, all the one-week lead terms were less negative in magnitude than the current term. Further, the only lag or lead AMA coefficient that was more negative than -2.5 was the one-period lag and lead in Nebraska.

Most of the other correlations shown in Tables AI-2 and AI-3 are likely spurious in nature. Market-wide negotiated cash prices are known to be somewhat auto-correlated, and the one-period lag effects shown here for AMA may be related to that phenomenon. In general, including the lead/lag AMA variable in the equation seems to reduce the estimated current period AMA effect. Texas and Kansas are notable exceptions. However, because the lead and lag

effects are not large in magnitude, the results indicate that lead and lagged usage of AMAs by packers do not have a significant effect on current period negotiated cash prices.

Causality

Regression is useful in establishing correlation, but often leaves questions regarding causality unanswered. However, one way for regression to address the issue of causality is to evaluate the effects of lead and lagged variables. Referring to the lead and lag effects model from Tables AI-2 and AI-3, if AMAs affect negotiated cash prices, as the complainants suggest, then one would expect the coefficients on the lag terms (but not the lead terms) to be statistically significant individually or at least as a group.

By this criterion, the data mildly support that causation runs from AMAs to cash price, but not the other direction. The coefficients are not particularly significant on either the lead or the lag (that is, their negative magnitude implies a very small negative effect), the current period coefficients are negative and except as noted above, larger in magnitude than the lead or lagged terms. However, the coefficients are a little more significant on the lagged terms (Table AI-2), than on the lead terms indicating that causality leans toward AMAs affecting negotiated cash price as opposed to the other way around.

Specifically, six of the eight coefficients on the one-period lag are negative and statistically significant, while the other two are not statistically significant. Only three of the one-period lead coefficients are negative and statistically significant, and those are smaller in magnitude than their corresponding lag coefficients. The negative effects from the majority of the lead terms are gone or positive after the first week and for subsequent weeks.

In almost all the cases, the economic significance of the coefficients, as judged by their magnitudes relative to the current period, are smaller. The data do not support that causation runs from price to AMA usage. While packers have told P&SP sellers may alter their selling patterns so that they make more cash sales as a reaction to higher cash prices, and vice versa, those actions do not appear to dominate the market.

Participation Indicators

Complainants expressed the view that participation in the negotiated cash market is a key component in the mechanism by which packers may manipulate fed cattle prices with AMAs. The reasoning is that the packers with high levels of committed cattle can stay out of the negotiated cash market, not buy, not bid, or not bid as aggressively, and thus keep cash prices (and formula prices by reference) lower than they otherwise would be. The regression analysis shows support for such a price effect by showing a negative correlation between use of committed supplies and negotiated cash prices.

The model used to estimate the negative cash price effect associated with the use of committed supply is a “reduced form” model in that it establishes a link directly from the use of committed supply to the negotiated cash price. An alternative model would be a two-equation structural model that establishes a link from the use of committed supply to a measure of the level of cash

market participation, and then a second link from cash market participation to the negotiated cash market price.

The investigation explored this structural approach. The most reliable and comprehensive data for participation available were the data on actual cash purchases. The AMS data and the packer transaction data both had actual purchase data, but did not have a way to measure bidding behavior or aggressiveness in the bidding process. Even though it is plausible that packers impact the negotiated cash market price through bidding actions without actually buying any cattle, the investigation had to use the actual purchases as a proxy for participation.

The hypothesis tested whether higher cash participation is correlated with higher prices. P&SP tried various combinations of three different participation indicators: Herfindahl-Hirschman Index of market concentration (HHI)⁵⁷, concentration ratios (CRs)⁵⁸, and number of packers participating in a regional market each week. P&SP also used seller bid data to create an index of bid behavior and tested it to see if it was correlated with cash prices.

All the specifications explored used a model similar to the main one used for this investigation, except that they added one or more participation indicators. For the CR variable, P&SP created a weekly value for each region and looked at CR1 through CR4, as well as the “marginal” CR for the Nth largest participant, where N was 2 through 5. For the packer participation count, P&SP tried two specifications: One used any non-zero purchase and the other defined participation as the cash purchase of at least 1,000 head per packer per region per week. P&SP also tried combinations of four weeks lead and lagged values for each indicator. The results were generally not supportive of the hypothesis.

The following results represent among the best and most consistent results of the specifications tested using the large sample period and AMS data. The results below used a model with the AMS data for the period January 2009 through June 2010 and included variables for AMA usage, the regional HHI, and the regional CR1. These results showed consistent negative effects from AMA usage (except Colorado), but mixed results on HHI and CR1, where only one or the other, (but not both HHI and CR1) had the negative sign that would be consistent with the hypothesis.

⁵⁷ The HHI was constructed here from AMS data, using the top four largest beef packers, and combining all other packers, treating them as the fifth packer. The HHI is the sum of the squared market shares of each packer buying cattle in the negotiated cash market from sellers located in each of the regions. A single buyer results in an HHI of $100 \times 100 = 10,000$. Five packers with equal market share results in an HHI of $5 \times (20 \times 20) = 2,000$.

⁵⁸ CRs can be for any number of participants. A CR4 is the sum of the top four participants' market shares. CR1, as used in this analysis is the largest participant's market share of cattle purchases in the negotiated cash market from sellers in a particular region in any given week.

Table AI-4 – Market Participation – Concentration Measures

Region Covered by Equation	Sample Size (N) in AMS Records	Mean Value of Dependent Variable	Adjusted R-Squared	AMA Estimated Coefficient	HHI Estimated Coefficient	CR1 Estimated Coefficient
Total U.S.	113,33	\$85.84	.9278	-0.59930	0.0002735	-1.25757
Texas/OK/NM	15,948	\$86.77	.9418	-3.16314	-.00030588	4.5549
Kansas	22,669	\$86.45	.9615	-2.89937	.00034422	-2.09236
Nebraska	28,186	\$86.24	.9472	-0.72846	.00088230	-5.50291
Iowa/ MN	25,688	\$85.21	.9311	-3.60917	.00010417	3.60979
Colorado	4,544	\$85.37	.9462	1.08167	-.0001096*	2.62015
Midwest	6,247	\$85.79	.9326	-2.22905	.00057028	-1.78079
Other North	7,761	\$84.23	.9331	-1.17353	-.0001424*	2.92642
Other U.S.	993	\$82.06	.8640	-2.59695	.00040699	-3.65748

* Not significant at the 95% confidence level

HHI is sum of each week's and regional squared market share for up to five packers

CR1 is the market share of each week's largest cash market purchase by a packer in the region.

The AMA coefficient has the same interpretation as in Table 4 in the main body of this report. That is, the Texas coefficient of -3.16 implies a ten percent increase in the use of AMAs is associated with a lower price of 31.6 cents per hundred pounds live basis. The coefficient of -.0003 for HHI in Texas implies that for every 100 point increase in HHI, the negotiated cash price declines by 3 cents. The HHI could potentially range from 2,000 (where each of the five participants had a 20 percent market share) to 10,000 (where just one packer did all of the buying). The coefficient implies that going from extremes from the most competitive to the least competitive (a range of 8,000 HHI points) would result in a price decrease of \$2.40 per cwt., live basis.

On the other hand, the coefficient of 4.55 for CR1 in Texas implies that for every 10 percent (0.1) increase in the market share of the largest buyer in a week, the negotiated cash price increases by \$0.45. The CR1 could potentially range from .2 (where each participant has a 20 percent market share) to 1.0 (where just one packer did all of the buying). The coefficient implies that going from extremes from the most competitive to the least competitive (a range of .8 in CR1) would result in a price increase of \$3.64 per cwt., live basis. A positive coefficient means that more concentrated markets are associated with higher fed cattle prices, contrary to the hypothesis.

P&SP created an index of packer participation which had values from 1 to 5 for each region each week, which represented the number of packers buying any cattle from sellers in the region in the negotiated cash market (the index covered the top four plus all others being the fifth possible participating packer). The table below shows results from the same model specification as in Table AI-4 except adding the packer participation variable. Table AI-5 shows the results which indicate a small positive price effect for Texas, Kansas, Colorado and Nebraska.

Table AI-5 -- Cash Market Participation (Participation Index) – 2009

Region Covered by Equation	Sample Size (N) in AMS Records	Mean Value of Dependent Variable	Adjusted R-Squared	AMA Narrow Definition Estimated Coefficient	No. of Packers Purchasing by Week - Estimated Coefficient
Total U.S.	76,029	\$82.74	.6444	-3.72142	-0.16465
Texas/OK/NM	10,989	\$83.64	.8373	-5.02880	0.27764
Kansas	14,847	\$83.33	.7293	-5.72095	0.07832
Nebraska	18,919	\$83.11	.6783	-1.79774	0.06211
Iowa/ MN	17,613	\$82.06	.6433	-1.52856	-0.02781*
Colorado	2,802	\$82.61	.6679	-2.54841	0.38657
Midwest	5,349	\$81.68	.7041	-4.87864	-0.29189
Other U.S.	4,653	\$81.85	.6339	-2.69589	-0.09088*
Pacific NW	186	\$79.59	NA	NA	NA
West/ SW	63	\$80.81	NA	NA	NA
Canada	608	\$78.24	NA	NA	NA

*Not significant at the 95% confidence level

NA – Not Analyzed – too small a sample of transactions to produce meaningful results.

The estimated coefficient of 0.27764 for Texas indicates that each additional packer buying in the Texas cash market any given week is associated with about a \$0.28/cwt. increase in the live negotiated cash price that week. The coefficients for the other regions were much smaller or the opposite sign except in Colorado where the effect was close to \$0.39/cwt. Texas and Colorado typically have three to five buying packers, and in a few weeks, just two. Going from two to five participants would have an impact of less than one dollar in Texas, and about \$1.16 in Colorado. The effect was negative or negligible in the other regions. In Kansas, each additional packer buying in the cash market per week only added about \$0.08/cwt. to the negotiated cash price.

P&SP also explored a measure of “significant” participation, where a packer had to buy at least 1,000 head in a week to be regarded as participating, but the results were less strong (the participation coefficients were smaller, or less significant, and more frequently negative). Only Colorado and Texas had positive and statistically significant values.

Results of various specifications and measures of participation showed either negative correlation or insignificant results or both. Therefore, the investigation was not able to find a consistent, economically or statistically significant positive correlation between measures of negotiated cash market participation created from AMS purchase data and price. An alternative is to use seller bid data to estimate the impact that participation has on prices.

Bid Data

Bid data may be a useful indicator of packer participation in a market even when the packer did not make actual purchases. For the 2009 to mid-2010 period for which P&SP had AMS price

data, the bid data, which were only available from a few sellers, were most consistently collected and useful only for analysis of the Texas region.

The data were recorded by sellers on a lot-by-lot basis. The data typically identified the date the bid was made, the amount of the bid in dollars (although sometimes the bid was an unspecified market price plus or minus a specific dollar amount), the number of head in the lot, whether the bid was live, dressed or grid, the bidding packer, and the location of the seller. No cattle quality characteristics were in the bid data and they did not indicate if the bid was accepted. It was not feasible to match the bid data to the sales transaction data.

Most often, the data showed that only one packer would bid on a particular lot of cattle each week, and a packer typically would bid on multiple lots from the same feed lot. The data showed that many times, though less often, more than one packer would bid on the same lot in a week. However, P&SP saw no instances in the bid data base where the same packer made multiple bids on the same lot in the same week. P&SP is aware that packers sometimes change their bids during the week as market conditions change or as new information becomes available. It thus appears the data collected did not capture this aspect of packer bid behavior.

Despite these limitations, these data represent better information on packer bidding behavior than other data sources and are worthy of analysis. The investigation used a basic bid index value P&SP created for each week, where the index was the number of packers (from 1 to 4) making any negotiated bids to sellers (live, dressed, or grid) in the region. P&SP constructed a second bid index which counted the number of packers (again, from 1 to 4) that bid on at least 10 lots of cattle during a week, intended to capture “significant” participation only. The analysis used the 2009 AMS data and main investigation model, and added the bid index variable. Results were as follows:

Table AI-6 – Bid Index Effect on Cash Prices (Texas only) – 2009

<u>Model</u>	<u>Observations</u>	<u>Adj. R-sq.</u>	<u>Bid Index Coefficient</u>	<u>T-value</u>
Basic bids only	10989	.8236	0.22307	11.71
AMA plus Basic bids	10989	.8335	0.14352	7.65
10-lot bids only	10989	.8215	0.05120	3.08
AMA plus 10-lot bids	10989	.8327	0.02405	1.49

Using this approach, the coefficients were small but had the expected positive sign. The largest coefficient of .22 indicated the addition of one packer bidding on at least one lot (“basic bids”) is associated with an increase in price of 22 cents per hundred weight live basis in a given week in Texas in 2009. Going from one bidder to the maximum of 4 would imply a price increase of only 67 cents per cwt., indicating a somewhat marginal impact. The effect is smaller if AMA usage is simultaneously taken into account. The statistical effect of packers bidding on at least ten lots was about one quarter as large, and not economically significant.

Showlist Data

PSP also obtained data on showlists from selected sellers. The showlist data represent the number of cattle sellers put up for sale each week regardless of whether they were sold or given bids. Using the Texas showlist data instead of the national showlist variable in the model specification did not change the results by much, and if anything dampened the estimated impact of participation:

**Table AI-6 – Bid Index Effect on Cash Prices with Showlist Data
(Texas only) – 2009**

Model	Observations	Bid Index		
		Adj. R-sq.	Coefficient	T-value
Basic bids only	10989	.8236	0.19851	10.65
AMA plus Basic Bids	10989	.8324	0.11369	6.14
10-lot bids only	10989	.8218	0.00591	0.37
AMA plus 10-lot bids	10989	.8319	-0.01565	-1.02

By comparing the sellers' showlist data to the sales data, it was possible to construct an estimate of showlist carryover from one week to the next. Adding the carryover or substituting it for the basic showlist variable resulted in a worse equation fit, and smaller coefficients on the participation variable. This model implied each additional bidder adds 20 cents to the price and going from 1 to 4 bidders only implies a 60 cent increase in price.

APPENDIX II - Inter-Regional Shipping of Fed Cattle

While conducting this investigation, P&SP received some specific complaints that packers supplemented their committed supplies by shipping cattle from other regions. Allegedly, packers procured cattle at lower prices in the source region, and shipped them to be slaughtered in regions where cattle were more expensive in order to depress negotiated prices in the destination markets. This allegedly benefited packers by depressing prices on formula cattle in the destination markets as well. Some allegations were that that this was being done despite shipping costs that made the total combined procurement costs more than that in the higher cost destination market. The complaints pertained to several regions, however they were most prevalent for cattle being shipped into Texas, so P&SP focused on that region.

The AMS data show procuring packer by plant and source state of the cattle, so P&SP used those data to verify and quantify the extent of the alleged practice. The data show that the extent of inter-regional shipping of cattle into Texas is rarely significant. During the 78-week period from January 4, 2009 through the end of June 2010, the share of fed cattle slaughtered in Texas that had been procured from outside the state was 4.4 percent. Over half (about 55 percent) of these were negotiated cash purchases. There were only nine weeks during that period when more than 10 percent of cattle reported to AMS by plants in Texas for any procurement method were from anywhere outside of Texas. The most for any one week was 16.2 percent.

It is understandable that a packer would occasionally slaughter cattle from Kansas or Colorado at a Texas plant, since there are packers who have plants in northern Texas that are either closer or not much farther to cattle that they buy in southeastern Colorado or southwestern Kansas than their plants in other states.

P&SP received a specific complaint that packers' collusive behavior during a particular period succeeded in "breaking" the market. The complainant alleged that Texas packers shipped in cattle from Kansas causing cash prices in Texas to be low enough to have made up for the extra freight packers paid to ship the cattle.

During the period, P&SP found that two packers did appear to increase their shipments of cattle into Texas from Kansas. Almost all of the increase was from cattle purchased by the negotiated cash method. Whether there was a significant effect on Texas prices, though was less obvious.

To explore this further, P&SP conducted some regression analysis to test whether increased shipping into Texas is associated with lower negotiated cash prices. The econometric model used the 2009 AMS data, and for two of the equations estimated, included the AMA variable constructed as described in the main body of this report. The results indicated a relatively small, negative correlation between the shipping variables and negotiated cash prices in Texas:

Table AII-1 - 2009 Data – Effects of Inter-Regional Shipping into Texas

<u>Model</u>	<u>Observations</u>	<u>Adj. R-squared</u>	<u>Coefficient</u>	<u>T-value</u>
Percent shipped only	10989	.8235	-5.02647	-10.18
AMA plus % shipped	10989	.8348	-6.02707	-12.58
Number shipped only	10989	.8235	-0.000051	-10.35
AMA plus # shipped	10989	.8340	-0.000048	-10.06

The coefficients were small, but had the expected negative sign. The largest coefficient of -6.027 indicated that going from zero to 100 percent shipped from outside of Texas is associated with a decrease in price of \$6.03/cwt. live basis in a given week in Texas in 2009. The largest percentage of shipping in any week of the sample period was about 16 percent which would imply a maximum negative price effect of about \$0.96/cwt. The coefficient of -0.000051 implies that for every 1,000 head shipped in from out-of-state, the live cash price would drop \$0.05/cwt. The largest weeks' shipping of cattle into Texas from other states was about 12,000 head implying that those may have depressed price by about \$0.60/cwt.

The investigation showed that significant changes in interregional shipping of cattle into Texas were rare. In the 78 weeks examined here, the average share of out-of-state cattle slaughtered in Texas was about 4.4 percent, and the percentage did not ever exceed 16.2 percent in any given week. The largest number of cattle any single Texas packer purchased from Kansas in any week was about 1.5 days slaughter capacity at one plant. P&SP estimated that the price effect in the few weeks of the largest purchases of out-of-state cattle was less than \$1/cwt. The cattle shipped were generally not purchased by AMA methods. Thus, the concern that packers shipped cattle from other regions to depress Texas cattle prices was not pursued any further in this investigation of packers' use of AMAs. Nonetheless, further investigation may be needed to determine if this alleged behavior and its effect in Texas and other regions violates the Act.

APPENDIX III - Research on Oligopsony Market Power of Beef Packers

Numerous academic studies of the meat packing industry have attempted to assess whether market power exists and whether it has been exploited. The results are mixed. In 1996, GIPSA commissioned a major study on packer market power.⁵⁹ It included an extensive literature review. In particular, it included a review of thirteen Structure-Content-Performance (SCP) studies and eight New Empirical Industrial Organization (NEIO) studies that specifically addressed beef packer market power in the U.S. fed cattle markets. Of the thirteen SCP studies reviewed, nine found evidence of market power. Of the eight NEIO studies reviewed, seven found evidence of market power in the livestock (cattle) market.⁶⁰ Nonetheless, the GIPSA study authors cited various shortcomings of the studies reviewed, and relying in part on an argument about pro-competitive causes (see discussion below) concluded: “We must, finally, reach the decision that the body of empirical evidence from both SCP and NEIO studies is not persuasive enough to conclude that the industry is not competitive.”

A recent paper using an alternative framework has concluded that packers indeed do have market power. The paper models a Markov-Switching process that estimates the intensity and duration of packer cooperative and non-cooperative purchasing regimes. Cai, Steigert and Koontz⁶¹ make the following statement:

...compared to the 1990s, we provide clear statistical evidence that oligopsony power has substantively increased since 2001. On a per head basis, we estimate that average economic profit due to oligopsony power has risen from \$0.88/head in the 1990s to approximately \$2.59/head in the period after 2001.

The researchers’ estimate of \$2.59 per head during the 2001-2010 time period is roughly \$0.20/cwt. on a live animal weighing 1,325 pounds.

Research by Azzam (1997) adopts NEIO theory to test for market power.⁶² The study uses the conjectural elasticity framework and separates the market power effect of concentration from its cost-efficiency effect. The findings support both the existence of oligopsonistic market power and of concentration-related slaughter-cost efficiencies in the industry. However, the cost-efficiency effect outweighs the market power effect. Thus, this represents one empirical confirmation of the view regarding the tradeoff between market power and cost efficiency from increased concentration.

⁵⁹ “Assessing Competition in Meatpacking: Economic History, Theory, and Evidence,” Azzeddine Azzam and Dale G. Anderson, GIPSA-RR 96-6, May, 1996, p. 124.

⁶⁰ Ibid, page 77 - Summary results of SCP concentration-Performance Studies of U.S. Meatpacking and Page 107 - summary results of NEIO Studies of U.S. Meatpacking.

⁶¹ Xiaowei Cai, Kyle W. Stiegert, and Stephen R. Koontz, “Oligopsony Fed Cattle Pricing: Did Mandatory Price Reporting Increase Meatpacker Market Power?,” *Applied Economic Perspectives and Policy*, Vol. 33, No. 4 Winter, 2011, pp. 606-622.

⁶² Azzeddine M. Azzam, “Measuring Market Power and Cost-Efficiency Effects of Industrial Concentration,” *The Journal of Industrial Economics*, Volume XLV, December 1997, pp. 377-386.

A novel framework for evaluating monopsony market power in the beef packing was applied in a paper by Schroeter (1988).⁶³ The results revealed small but statistically significant monopsony price distortions in slaughter cattle markets, but gave no indication that performance had become appreciably less competitive.

The AMA Price Effect: Heterogeneous Packer Cost Structures

A theoretical argument that explains the observed AMA price effect has been put forth that posits the observed negative price effect from fewer bidders is actually an indication of pro-competitive conditions in the cattle market. This argument is put forth by Azzam-Anderson (1996, op. cit.), and appears to be one reason they did not rule out competitive cattle markets in their GIPSA study.

The reasoning is as follows: In a perfectly competitive market the equilibrium price of fed cattle is equal to the value of the marginal product of cattle net of industry marginal processing costs. If packers have the same cost structures and thus have identical net values of marginal product for cattle, then one would expect the winning bids for cattle to approach but not exceed that net value of marginal product as the number of bidding packers increases. In this case of identical cost structures, there still may be oligopsony price distortion with a low number of bidders (as the complainants allege). But, the perfectly competitive price outcome would be more likely to occur as more packers participate in the market.

However, in the more realistic case where packers have differing cost structures, and their net values of marginal product for cattle differs (for example, all packers face the same meat prices, but operating costs differ), a larger number of bidders would increase the likelihood that a low-cost packer would be in the market and would bid a relatively high amount to procure cattle profitably, since it could do so profitably. This is not a case of oligopsony price distortion, but a pro-competitive result as an efficient low cost packer is driving prices higher.

Thus, in both cases (equal costs and different costs) there is a positive correlation between market participation and price (as the complainants allege), but in only one scenario (the equal marginal cost scenario) is there a suggestion of oligopsony price distortion.

There is no way to empirically test this theory without analysis of each packer's cost and price data, which is necessary to estimate each packers' net value of marginal product. Such an analysis is beyond the scope of this current investigation.

⁶³ John R. Schroeter "Estimating the Degree of Market Power in the Beef Packing Industry," *The Review of Economics and Statistics*, February, 1988, pp. 158-162.

*APPENDIX IV - Legal Considerations*⁶⁴

Applicable Statutes and Regulations:

As a first step in determining whether a potential administrative complaint might succeed, a review of the applicable language of the Act (and Regulations) should pinpoint what legal issues are pertinent to packer behavior concerning committed supplies.

Section 202⁶⁵ (7 U.S.C. § 192) of the Packers and Stockyards Act of 1921 (7 U.S.C. §§ 181-229c)

(Act) covers unlawful practices by packers. It appears to present broad language which may present potential violations of the Act, stating that it is unlawful for any packer...with respect to livestock...to:

- (a) Engage in or use any unfair, unjustly discriminatory, or deceptive practice or device;
or
- (b) Make or give any undue or unreasonable preference or advantage to any particular person or locality in any respect, or subject any particular person or locality to any undue or unreasonable prejudice or disadvantage in any respect; or
- (d) buy or otherwise receive from or for any other person, any article for the purpose or with the effect of manipulating or controlling prices, or of creating a monopoly in the acquisition of, buying, selling, or dealing in, any article, or of restraining commerce;
or
- (e) Engage in any course of business or do any act for the purpose or with the effect of manipulating or controlling prices, or of creating a monopoly in the acquisition of, buying, selling, or dealing in, any article, or of restraining commerce; or
- (f) Conspire, combine, agree, or arrange, with any other person (1) to apportion territory for carrying on business, or (2) to apportion purchases or sales of any article, or (3) to manipulate or control prices;

These relevant portions⁶⁶ of Section 202 provide several theories of action for examination to determine the likelihood of successful litigation should P&SP bring an administrative complaint alleging packers' use of AMAs violates the Act and Regulations.

P&SP could potentially assert that packers' use of committed supplies violates Section 201.70 (9 C.F.R. § 201.70) of the regulations issued under the Act (Regulations). Section 201.70 prohibits the restriction of competition among packers buying livestock:

⁶⁴ This investigation also considered numerous legal factors other than the ones discussed in this Appendix.

⁶⁵ Amended by acts of Congress, approved, Aug. 14, 1935, Sept. 2, 1958, Sept. 13, 1976, and Nov. 23, 1987, October 22, 1999, and May 13, 2002.

⁶⁶ Although the discussion in this appendix emphasizes Section 202(a), the investigation also examined applicability of 202(b) but could not conclude that packers' use of AMAs results in undue preferences or unreasonable prejudice.

201.70 Restriction or limitation of competition between packers and dealers prohibited.

Each packer and dealer engaged in purchasing livestock, in person or through employed buyers, shall conduct his buying operations in competition with, and independently of, other packers and dealers similarly engaged.⁶⁷

A discussion of this regulation will determine whether P&SP could file a plausibly valid complaint against packers given the results of this investigation.

Purposes of the Act and Relationship to Enforcement of Section 202 (7 U.S.C. § 192)

Courts have held that the Act was intended to supplement and go beyond existing antitrust statutes, such as the Sherman Act, Clayton Act, and the Federal Trade Commission (FTC) Act.⁶⁸ Thus, the Secretary, in theory, has broader powers to proscribe unfair trade practices which might not be prohibited by other antitrust statutes. Judge Goodwin commented in the case of *Central Coast Meats, Inc. v. U.S.D.A.*, that the FTC can “define and proscribe an unfair competitive practice, even though the practice does not infringe either the letter or the spirit of the antitrust laws... Significantly, the prohibitions of sections 202(a) and 312(a) of the Packers and Stockyards Act, 7 U.S.C. §§ 192(a)... were intended to be as rigorous, if not more rigorous, than those imposed under § 5 of the Federal Trade Commission Act, § 2 of the Clayton Act, and the various sections of the Sherman Antitrust Act.”⁶⁹

This statement calls for an examination of whether a practice is likely to be prohibited under the aforementioned other antitrust statutes. If the practice were likely to be a violation under such an inquiry, then it would seem that it would be more likely a violation of the Act.

But there is a limit as to how far the Secretary may go when seeking to characterize a practice as unfair within the meaning of the Act. The majority of Federal Circuits interpreting the Act have restricted its application to proscribing packer practices that have a likely or demonstrable adverse effect on competition.⁷⁰ In *Armour and Company v. United States*, the Seventh Circuit

⁶⁷ 19 FR 4531, Jul. 22, 1954, as amended; further amended at 24 FR 3183, Apr. 24, 1959.

⁶⁸ *Wilson & Company v. Benson*, 286 F.2d 891, 895 (7th Cir. 1961). “The legislative history shows Congress understood the sections of the Packers and Stockyards Act under consideration were broader in scope than the antecedent legislation (61 Cong.Rec. 1805 (1921)). To illustrate, Representative (later Speaker) Rayburn, emphasized that although Congress gave the Federal Trade Commission wide powers to prohibit unfair methods of competition, such authority is not as wide-ranging as that given to the Secretary of Agriculture under the language in section 202(a) and (b) of the Packers and Stockyards Act. (61 Cong.Rec. 1806(1921)).”

⁶⁹ *Central Coast Meats, Inc. v. U. S. Dept. of Agriculture* 541 F.2d 1325, 1328(9th Cir. 1976).

⁷⁰ See *Wheeler v. Pilgrim’s Pride Corp.*, 591 F.3d 355 (5th Cir. 2009) (en banc), *Been v. O.K. Indus., Inc.*, 495 F.3d 1217, 1230 (10th Cir. 2007); *Pickett v. Tyson Fresh Meats, Inc.*, 420 F.3d 1272, 1280 (11th Cir. 2005), cert. denied, 547 U.S. 1040 (2006); *London v. Fieldale Farms Corp.*, 410 F.3d 1295, 1303 (11th Cir. 2005), cert. denied, 546 U.S. 1034 (2005); *IBP, Inc. v. Glickman*, 187 F.3d 974, 977 (8th Cir. 1999); *Philson v. Goldsboro Milling Co.*, Nos. 96-2542, 96-2631, 164 F.3d 625, 1998 WL 709324, at *4-5 (4th Cir. Oct. 5, 1998) (unpublished table decision); *Jackson v. Swift Eckrich, Inc.*, 53 F.3d 1452, 1458 (8th Cir. 1995); *Farrow v. United States Dep’t of Agric.*, 760 F.2d 211, 215 (8th Cir. 1985); *DeJong Packing Co. v. United States Dep’t of Agric.*, 618 F.2d 1329, 1336-37 (9th Cir. 1980), cert. denied, 449 U.S. 1061 (1980); and *Pac. Trading Co. v. Wilson & Co.*, 547 F.2d 367, 369-70 (7th Cir. 1976).” *Terry v. Tyson Farms, Inc.* No. *Terry v. Tyson Farms, Inc.*, 604 F.3d 272, 277 (6th Cir.

stated, “Congress gave the Secretary no mandate to ignore the general outline of long-time antitrust policy by condemning practices which are neither deceptive nor injurious to competition nor intended to be so by the party charged.”⁷¹ This language encapsulates at least two considerations for actions brought under section 202 of the Act where there is no clear *per se* violation: (1) harm to competition or the likelihood thereof, and (2) predatory intent.⁷²

Therefore, where some packer procurement practices, as examined in detail by this investigation, disadvantage some livestock sellers, most Federal Courts will not likely prohibit them unless the plaintiffs make a showing of collusion, predatory intent and / or harm to competition. This is especially true when the facts and circumstances fail to provide evidence of predatory intent, or reveal practices—such as collusion among the packers—that are deemed *per se* unlawful.⁷³

Court precedents suggest that there is inherent difficulty in automatically condemning a practice which has a sound basis in contractual relationships between parties and that claims beneficial efficiencies over negotiated cash cattle marketing methods. To help clarify the approach by which committed supplies and their effects are likely to be treated by courts interpreting the Act, it is helpful to examine the basic blueprint of antitrust principles to view how courts have interpreted words such as “unfair,” “deceptive,” and “unjustly discriminatory.”

Standards for Application of Section 202(a) of the Act⁷⁴

The words “unfair, unjustly discriminatory or deceptive practice or device” are not defined in the Act itself. Their meaning must be determined by the facts of each case within the purposes of the Act.⁷⁵

Given that the Act is to be interpreted in accord with general antitrust principles, it is helpful to look to how different practices are labeled under antitrust law. Generally practices or agreements in business are examined under either a “*per se*” inquiry or an application of a “rule

2010). In four of the above-cited cases, the Courts reviewed the Order of the Secretary to determine whether the administrative rulings were supported by substantial evidence. The other cases involved private plaintiffs who brought action under Section 308 of the Act (7 U.S.C. § 209), where the Circuits reviewed *de novo* motions for judgment as a matter of law, while one Circuit reviewed for abuse of discretion following a jury verdict.

⁷¹ *Armour & Co. v. U. S.*, 402 F.2d 712, 720-721 (7th Cir. 1968).

⁷² See *Schumacher v. Cargill Meat Solutions Corp.*, 515 F.3d 867, 871-872 (8th Cir. 2008). The investigation examined the element of intent in considerable detail, but did not find sufficient evidence of predatory intent stemming from packers’ use of AMAs.

⁷³ *Id.*, at 722: “The legislative history of the Packers and Stockyards Act fully supports our conclusion that Section 202(a) was not directed at this type of promotion unless there was some intent to eliminate competition or unless the effect of the promotion might lessen competition. Thus the Senate Committee Report makes it clear that this part of the legislation was promoted primarily by fear of monopoly and predation, but even so, caution was expressed against stifling the initiative of the industry. Senate Report No. 429, 66th Cong., 2d Sess. (1920), pp. 1, 3. In turn, the House Committee said that the legislation was aimed at halting ‘a general course of action for the purpose of destroying competition’. See House Report No. 1297, 66th Cong., 3d Sees. (1921), p. 11.”

⁷⁴ The narrative in this section is predominantly presented in terms of subsection 202(a) of the Act, but the analysis, particularly the *per se* vs. rule of reason analysis, would also apply in 202(b), (e) and (f), since these subsections require intent or effect for price manipulation or monopolization or a restraint of commerce.

⁷⁵ *Swift & Co. v. Wallace*, 105 F.2d 848 (7th Cir. 1939); cf. *Pan American World Airways, Inc. v. United States*, 371 U.S. 296, 83 S.Ct. 476, 9 L.Ed.2d 325.

of reason.” Courts have applied a continuum of intermediate approaches between the two. Various standards apply to help a court examine a practice to determine whether it should be prohibited as inherently unreasonable or whether a more involved analysis should be applied to determine its reasonableness.⁷⁶

If a court does not find a *per se* fact pattern, then it will apply some version of the rule of reason to determine whether a practice causes competitive injury or whether its efficiencies outweigh any competitive harm. This can be determined through an analysis of market power and / or whether benefits sought by the practice could be obtained less restrictively. If both efficiencies and competitive injury are present, the practice will be examined to see whether the net effect is consumer injury (or in the context of the Act, injury to livestock sellers, and consumers, or net harm).⁷⁷ Generally a rule of reason inquiry involves an analysis of whether the practice unreasonably interferes with competition.⁷⁸

Courts will evaluate practices to determine antitrust violations, including those brought under the Act, under the rule of reason except in some limited circumstances.⁷⁹ If a practice is inherently unreasonable it will generally be readily condemned under a *per se* analysis. Another way to view practices as *per se* unlawful is to describe them as “naked” restraints on trade.⁸⁰

These “naked” restraints have little inherent social value and are sometimes prohibited as a class of conduct. Price fixing is one example of a naked restraint. Still other particular, uncategorized agreements or restraints might be described as naked if they are formed with the objectively intended purpose or likely effect of increasing output prices or of reducing output in the short term.

Congress has characterized certain practices under the Act as “unfair” as a class of conduct within the meaning of Section 202(a). One example is a violation of the payment provisions of Sections 409 and 410.⁸¹ Payment practices prohibited by these statutory provisions are explicitly labeled as unfair and unlawful and generally do not require proof of harm to competition to be prohibited under the Act.⁸²

Some practices, while not specifically enumerated by the Act as unfair, have been deemed by courts to have no intrinsic value to commerce. These include agreements among livestock purchasers not to compete. This is what occurred in the 1963 case *Swift & Company v. United*

⁷⁶ See *Broadcast Music, Inc. v. CBS, Inc.*, 441 U.S. 1, 99 S.Ct. 1551, 60 L.ed.2d 1 (1979).

⁷⁷ *Id.*, at 19-20.

⁷⁸ See Posner, Richard A, *Antitrust Law*, 2nd Edition, 2001 The University of Chicago Press, Ltd., Chapter 2, Pg. 39.

⁷⁹ See *In Re Pilgrim's Pride* 728 F.3d 457, 462 (5th Cir. 2013): “When evaluating competitive injury, we ordinarily rely upon a “rule of reason” analysis: in light of all the relevant facts, an action is unlawful only if it is likely to suppress or destroy competition.”

⁸⁰ See Phillip Areeda and Herbert Hovenkamp, *Fundamentals of Antitrust Law*, § 1501 (3d Ed. 2010).

⁸¹ See Section 409(c) (7 U.S.C. 228b) of the Act: DELAY IN PAYMENT OR ATTEMPT TO DELAY DEEMED UNFAIR PRACTICE. Any delay or attempt to delay by a... packer purchasing livestock, the collection of funds as herein provided, or otherwise for the purpose of or resulting in extending the normal period of payment for such livestock shall be considered an "unfair practice" in violation of this Act.

⁸² *Id.* See *FTC v. Indiana Federation of Dentists* 476 U.S. 447, 457 (1986).

States.⁸³ In that case, Swift and another hog buyer who had been in competition agreed to bid on and buy together all top grade hogs sold at a local market. The Court concluded the “essential nature and the necessary result of this arrangement or practice was to eliminate competition.”⁸⁴ Commercial bribery is also a well-established offense violating section 202 of the Packers and Stockyards Act.⁸⁵

Still other cases brought under Section 202(a) have examined practices that, while not being purely naked restraints of trade, have been prohibited by the courts without the need for a detailed rule of reason inquiry.⁸⁶ Due to the remedial purposes of the Act, these practices have been prohibited under 202(a) without the need for a detailed rule of reason analysis.

For example, in the 1968 case *Swift & Company v. United States* (a different set of facts than the 1963 *Swift* case), two meat packing companies with buyers in a local lamb market were found to have agreed to refrain from bidding against the area’s principal dealer in violation of Regulation 201.70 and Section 202(a).⁸⁷ The Seventh Circuit concluded that the action of the packers might be characterized as a simple refusal to deal (with lamb producers), conduct which would be permitted by the Sherman Act.⁸⁸ Nevertheless, the Court upheld the Judicial Officer’s finding of a violation. The Court found “[t]he lack of competition between buyers, with the attendant possible depression of producers’ prices, was one of the evils at which the Packers and Stockyards Act was directed.”⁸⁹ Where, as in the *Swift* case cited above, the circumstances infer the existence of an agreement not to compete—that packers agreed to use one buyer for their procurement—a court will more likely find a violation on a *per se* basis without the need to prove market power or harm to the output market.

Courts have also found violations of the Act under 202(a) and (b) where there is evidence of predatory intent to harm competitors by employing practices such as below-cost price-cutting.⁹⁰ However, these courts have also set aside the Orders of the Secretary interpreting the Act as prohibiting price discrimination or discounts where the price discounts or price-cutting result from fair and vigorous competition resulting from the exigencies of the marketplace.⁹¹

This case of committed supplies demands two circumstances that would more likely provide grounds for a packer practice to rise to the level of a violation without the need for a complete application of the rule of reason. These circumstances are bad faith or predatory intent, and

⁸³ *Swift & Company v. United States*, 308 F.2d 849 (7th Cir. 1962).

⁸⁴ *Id.* at 853.

⁸⁵ *In re Corn State Meat Co.*, supra, 45 Agric. Dec. at 1012-13; *Holiday Food Service, Inc. v. Department of Agriculture*, 820 F.2d 1103 (9th Cir. 1987); *In re National Beef Packing Co.*, 36 Agric. Dec. 1722 and cases cited at 1728 (1977), aff’d, 605 F.2d 1167 (10th Cir. 1978).

⁸⁶ See *Swift & Co. v. U.S.*, 317 F.2d 53, 55-56 (7th Cir. 1963) and *Wilson & Company v. Benson*, 286 F.2d at 895-896 (7th Cir. 1961), where the Court upheld the Secretary’s finding that targeted, aggressive resale price-cutting was injurious to competition.

⁸⁷ *Swift & Company v. United States*, 393 F.2d 247 (7th Cir. 1968).

⁸⁸ *Id.* at 253.

⁸⁹ *Id.* at 254.

⁹⁰ *Wilson & Company v. Benson*, 286 F.2d 891 (7th Cir. 1961).

⁹¹ See *Swift & Co. v. Wallace*, 105 F.2d 848, 862 (7th Cir. 1939) and *Armour & Co. v. U.S.*, 402 F.2d at 717-720 (7th Cir. 1968).

concerted action or collusion by packers to use AMAs to drive down cattle prices. This investigation failed to find any evidence of these circumstances.

In the absence of bad faith, predatory intent or concerted action, the general rule for many courts is that a practice is “unfair” under Section 202(a) (7 U.S.C § 213(a) if it injures or is likely to injure competition.⁹² More specifically, the 8th Circuit has stated that “a practice which is likely to reduce competition and prices paid to farmers for cattle *can be* found an unfair practice under the Act, and be a predicate for a cease and desist order.”⁹³ Therefore, actual injury, or the likelihood of injury to competition should be demonstrated to prevail on the theory that committed supplies, as used by packers in the manner revealed by this investigation, is an unfair practice.

***Application of Unfairness Standard to Committed Supplies
Standard for Analysis of Marketing Agreements for Unfairness under IBP v. Glickman***

The question of defining unfairness under 202(a) involves assessing what is considered under the Act to constitute harm to competition. The *IBP v. Glickman* 8th Circuit Court, as quoted above, at least indicated the possibility that a practice which reduces prices to farmers can be found to be an unfair practice. A further question, however, is whether a reduction to competition necessarily follows from a reduction of prices paid to producers.

The Court in *IBP v. Glickman* answered this question. The 8th Circuit in *IBP v. Glickman*⁹⁴ also quoted the 1968 *Swift* decision, indicating that a lack of competition among buyers and the attendant possibility of the lowering of producer prices was intended to be prohibited under the Act⁹⁵ This statement indicates that courts will look to a reduction of input prices as evidence of actual reduced competition among buyers.

However, in the absence of evidence of actual harm to competition, examination of the alleged practice itself to determine whether or not it fosters a competitive process will establish what a likelihood of harm to competition is. This is what was done in *IBP v. Glickman*, where a marketing agreement between the packer and a group of cattle feeders called for a process where the packer had a ‘right of first refusal’ if another packer increased its bid. The Court in that case found that there was a sufficient competitive process where IBP, the packer, had a right to match a bid from another packer for cattle, and where the feeder could go back to the original bidder to see if it would raise its bid and then IBP could then match that bid. Despite the appearance of an advantage to IBP, the Court found this process to be a competitive process such that the agreement in question was not likely to injure competition.

With most alternative marketing arrangements (AMAs), once the seller agrees to commit the cattle to the packer, any competition for purchasing such cattle is extinguished. While packers

⁹²*London v. Fieldale Farms Corp.*, 410 F.3d 1295 (11th Cir. 2005), *Farrow v. U.S. Dept. of Agr.*, 760 F.2d 211 (8th Cir. 1985), citing *De Jong Packing Co. v. U.S. Dept. of Agriculture*, 618 F.2d 1329, 1336-37 (9th Cir. 1980).

⁹³*IBP, Inc. v. Glickman*, 187 F.3d 974(8th Cir. 1999), quoting *Farrow*, 760 F.2d at 214. (Emphasis supplied in 8th Circuit opinion.)

⁹⁴*Id.*

⁹⁵ Quoting *Swift & Co. v. United States*, 393 F.2d 247, 254 (7th Cir. 1968).

possibly compete to secure the marketing arrangements for cattle prior to the commitment of the cattle, the base price of an AMA is typically set using the cash market price or some derivation thereof.

Thus, those cattle committed under AMAs are removed from any competitive process for price discovery as they approach slaughter-ready condition. This may be, among other factors, why this investigation has observed a negative price effect associated with the use of AMAs. But the investigation has concluded that due to other market dynamics, AMAs do not create a net harm to competition.

Nonetheless, some may argue that this price effect provides evidence of harm to competition. Even if a court entertains the position that the price effect associated with AMAs provides apparent evidence of harm to competition, this is not the end of the inquiry under the rule of reason.

Finding harm or potential harm to competition is only part of the equation for a detailed rule of reason analysis under the Act. A further analysis of any legitimate business justifications compared to any harms found also becomes a part of the calculus for determining whether a particular practice violates the Act. Courts have already examined AMAs under rule of reason principles, and have examined their alleged harms and benefits.

Pro-Competitive Justifications in IBP v. Glickman

The Administrative Law Judge (ALJ) and Judicial Officer *In Re IBP* found the Act applies to agreements between packers and feedlots, and that these agreements can be prohibited if they result or might result in the harm the Act was designed to prevent.⁹⁶ The Judicial Officer then went on to agree with the ALJ that non-price terms of the agreement, such as extended delivery times, and the right of first refusal benefitted IBP, whereas the extended time for which feedlots under the agreement were able to respond to a bid benefitted those feedlots. The Judicial Officer found that the right of first refusal under the agreement had the potential to harm competition.

On appeal, the 8th Circuit reversed the Judicial Officer's finding that the agreement violated 202(a) and was an unfair practice. Not only did the Court reverse on the basis that competition was not harmed by the nature of the agreement itself, but it also cited pro-competitive justifications in finding that the agreement promoted efficiency. The Court stated that "The record demonstrates that the right of first refusal is an effort by IBP to have a more reliable and efficient method of obtaining a supply of cattle.... The [Act] was designed to promote efficiency, not frustrate it."⁹⁷

In this investigation, packers have also presented business justifications for use of committed

⁹⁶ *In Re IBP*, 57 Agric. Dec. 1353, 10(1998). Reversed on other grounds by *IBP, Inc. v. Glickman*, 187 F.3d 974(8th Cir. 1999).

⁹⁷*IBP, Inc. v. Glickman*, 187 F.3d 974, 978, (8th Cir. 1999) quoting *Jackson v. Swift Eckrich, Inc.*, 53 F.3d 1452, 1458 (8th Cir.1995): ("We are convinced that the purpose behind § 202 of the PSA, 7 U.S.C. § 192, was not to so upset the traditional principles of freedom of contract. The PSA was designed to promote efficiency, not frustrate it.")

supplies, and the investigators have considered these as part the economic analysis. Among these alleged benefits, packers have cited the need for a consistent, reliable supply of cattle, reducing transaction costs associated with negotiated cash transactions, and meeting the needs of their customers for particular kinds of beef that those customers require as some of the benefits associated with AMAs. Tyson asserted these and other benefits to justify its use of AMAs in the case of *Pickett v. Tyson Fresh Meats*.

Discussion of Pro-Competitive Justifications in Pickett v. Tyson

In *Pickett vs. Tyson Fresh Meats*⁹⁸ cattle producers filed a class action suit against Tyson, alleging that Tyson used marketing agreements as an unfair practice under Section 202(a), primarily for downward manipulation of cash cattle prices, which would also violate Section 202(e).⁹⁹

At the trial court level, after the jury returned a verdict in favor of Pickett, the Judge granted Tyson's Federal Rules of Procedure 50(b) Motion for Judgment as a Matter of Law and entered judgment for Tyson. The judge apparently agreed with Tyson that Pickett was required to prove by a preponderance of the evidence that Tyson lacked any legitimate business justification for its use of committed supplies in order to prove that the use of committed supplies had an adverse effect on competition. The case, then, turned on Jury Instruction 16, which stated,

To prove that IBP's conduct constituted an unfair practice or device, plaintiffs must also prove that IBP's conduct did not have any legitimate business justification or competitive benefit. IBP has asserted that captive supply arrangements have legitimate business justifications and benefits for competition. IBP has introduced evidence regarding its claimed business justifications and/or competitive benefits. You must determine whether such justifications or benefits actually exist. If the beneficial effects on competition outweigh the harmful effects on competition, or if the net effect on competition is only slight or insubstantial, you may find that IBP's conduct has competitive benefits. If you believe that IBP has legitimate business justifications for using captive supply, you may indicate as such on the verdict form. (Emphasis added).^{100, 101}

The Court's instruction called for the Jury to weigh the competitive benefits and harms relative to Tyson's use of marketing agreements. However, the Court also instructed the jury that the plaintiffs were required to prove no legitimate justification existed for Tyson's use of committed supplies.

During arguments on jury instructions, Tyson successfully argued that the applicable standard under the rule of reason under Section 202 of the Act was that a plaintiff was required to prove

⁹⁸*Pickett v. Tyson Fresh Meats, Inc.*, 420 F.3d 1272 (11th Cir. 2005).

⁹⁹ Section 202(e) prohibits a packer, with respect to livestock from engaging "in any course of business or do any act for the purpose or with the effect of manipulating or controlling prices, or of creating a monopoly in the acquisition of, buying, selling, or dealing in, any article, or of restraining commerce..." 7 U.S.C. § 192(e).

¹⁰⁰ See Court's Charge to the Jury, Case 2:96-cv-01103-LES -CSC Document 647 Filed 02/11/04 Page 20 of 27(M.D. Ala. 2004).

¹⁰¹ Tyson Foods acquired IBP, Inc. in 2001 for \$3.2 billion in cash and stock, forming Tyson Fresh Meats, Inc.

“(1) an anticompetitive effect of the defendant’s conduct on the relevant market, and (2) that the conduct has no procompetitive benefit or justification.” Tyson cited *Maris Distributing Co. v. Anheuser-Busch, Inc.*, 302 F.3d 1207, 1213 (11th Cir. 2002), *Levine v. Central Florida Medical Affiliates, Inc.*, 72 F.3d 1538, 1551 (11th Cir. 1996), *Southern Card & Novelty, Inc. v. Lawson Mardon*, 138 F.3d 869, 876 (11th Cir. 1998)¹⁰² in support of this argument.

Pickett argued that this Jury instruction is an incorrect standard for a rule of reason analysis (See Pickett’s filing of a trial Memorandum.)¹⁰³ Nonetheless, Tyson successfully tied 11th Circuit standards under the Sherman Act to what Pickett needed to prove: that Pickett was required to show that Tyson’s use of marketing agreements lacked any legitimate business justification to prevail under the Act. Tyson argued, “Many PSA cases... have held conduct cannot violate the PSA if it is supported by a valid business justification.”¹⁰⁴ It cited *IBP v. Glickman, Armour & Co. v. United States*, *Swift & Co. v. Wallace* (7th Cir. 1939), *Griffin v. Smithfield Foods, Inc.*, and *Jackson v. Swift-Eckrich, Inc.*

In affirming the trial Court’s ruling in favor of Tyson under the trial Court’s standard, the 11th Circuit echoed the standard adopted by the trial Court, stating, “If there is evidence from which a jury reasonably could find that none of Tyson’s asserted justifications are real, that each one is pretextual, Pickett wins. Otherwise, Tyson wins.”¹⁰⁵

The *Pickett* Circuit Court relied heavily on its decision in *London v. Fieldale Farms Corp.*¹⁰⁶ in adopting the trial Court’s rule of reason standard when affirming the trial Court’s judgment as a matter of law for Tyson:

Tyson, of course, urges a contrary reading of the PSA...Pickett must establish more than that the use of marketing agreements have decreased the price for cattle. He must establish that their use has adversely affected competition, which requires showing that marketing agreements have no pro-competitive justifications.

The district court resolved this issue in Tyson’s favor. After it did so, this Court resolved the meaning of “unfair” practice in PSA § 202(a) in the same way. In *London v. Fieldale Farms Corp.*, ...we held that “in order to succeed on a claim under the PSA, a plaintiff must show that the defendant’s unfair, discriminatory or deceptive practice adversely affects or is likely to adversely affect competition.”¹⁰⁷

¹⁰²Defendant’s Response to Plaintiffs’ Reargument of Jury Instructions, Case 2:96-cv-01103-LES -CSC Document 648 Filed 02/11/04 (M.D. Ala.). See also Civil Action No. 96-A-1103-N 2/10/2004 Trial Transcript Volume XIX pages 3130-3138 Charge Conference.

¹⁰³Plaintiff’s Trial Memorandum Regarding Rule of Reason Analysis, Case 2:96-cv-01103-LES -CSC Document 646 Filed 02/10/04 Page 4 of 8 (M.D. Ala. 2004).

¹⁰⁴See *Defendant’s Response to Plaintiffs’ Reargument*, Case 2:96-cv-01103-LES -CSC Document 648 Filed 02/11/04 Page 2 of 4.

¹⁰⁵*Pickett v. Tyson Fresh Meats, Inc.*, 420 F.3d 1272, 1281 (11th Cir. 2005).

¹⁰⁶*London v. Fieldale Farms Corp.*, 410 F.3d 1295, 2005-1 Trade Cases P 74,866, 18 Fla. L. Weekly Fed. C 604(11th Cir. 2005).

¹⁰⁷*Pickett*, 420 F. 3d at 1279.

The *Pickett* trial Court overturned the Jury's finding that committed supplies had no legitimate business justification. The Court found that the plaintiffs had failed to call into question any of the asserted pro-business justifications, such that no reasonable jury could make the finding that committed supplies completely lacked pro-competitive benefits. By imposing this standard, the trial Court avoided balancing the benefits versus the harms of committed supplies under a thorough rule of reason analysis. The 11th Circuit upheld the standard adopted by the trial Court.

Tyson presented ten legitimate business justifications in its motion for judgment notwithstanding the verdict to the trial Court in *Pickett*. They are as follows:

1. Marketing agreements provide IBP a reliable and consistent supply of fed cattle, which in turn permits IBP to operate its plants at an efficient level of capacity.
2. Marketing agreements and forward contracts allow IBP to compete with other packers who offer similar agreements to producers.
3. Marketing agreements reduce the transaction costs associated with the cash market.
4. Marketing agreements and formulas permit IBP to individually pay for each head of cattle, rather than buy "on the average" in the cash market.
5. Marketing agreements and formulas reward cattle producers for producing more consistent or higher quality cattle.
6. Marketing agreements assure that cattle producers can market their cattle when they are at their peak condition to meet the packer's criteria, thereby providing increased consistency to the packer.
7. Marketing agreements give cattle producers information or feedback about cattle quality, which may permit them to produce more consistent or higher quality cattle over time.
8. Forward contracts provide a legitimate business advantage of allowing the price to be locked in before the cattle are ready for slaughter.
9. Forward contracts allow cattle producers to secure financing because the producers and their lenders are assured of a sale.
10. Marketing agreements provide the benefits of producing more consistent or higher quality beef.¹⁰⁸

In *Pickett*, the plaintiffs in their opposition to Tyson's motion for judgment as a matter of law called into question albeit unsuccessfully most of these benefits.¹⁰⁹ For example, regarding number one above, the 11th Circuit Court stated "Tyson's...competitive justification for marketing agreements is that their use provides the company with a reliable and stable supply of cattle for its packing plants. This is an unquestionably legitimate justification."¹¹⁰

¹⁰⁸See Memorandum of Defendant Tyson Fresh meats, Inc., In Support of Its Motion for Judgment as a Matter of Law or for a New Trial, Case 2:96-cv-01103-LES-CSC Document 665 Filed 02/25/2004 Page 27-40 of 58 fn 1 (M.D. Al. 2004).

¹⁰⁹Plaintiffs' Post-Verdict Brief (1) In Opposition to Tyson's F R Civ. P. 50 JML Motion, and (2) In Opposition to Tyson's Motion for New Trial, Case 2:96-cv-01103-LES -CSC Document 678 Filed 04/01/04 Page 32-39 of 53.

¹¹⁰*Pickett*, 420 F.3d 1272, at 1281-1282. The Court cited the Glickman case *See IBP, Inc. v. Glickman*, 187 F.3d at 978 ("The record demonstrates that the [business practice] is an effort by IBP to have a more reliable and efficient method of obtaining a supply" of cattle. The [PSA] was designed to promote efficiency, not frustrate it." (quotation omitted)).

The exception was number two above, the “meet the competition” justification, which was cited by the 11th Circuit in *Pickett* as an invalid justification.¹¹¹ Most of the rest of benefits are supported in this investigation either by statements of packers (including the other large packers besides Tyson) or by the academic and research literature.

Even if some of the asserted benefits of committed supplies might, in fact, be less beneficial than is claimed when subjected to some scrutiny, it is difficult to assert they do not have any legitimate benefits, and a court is likely to say they do have measurable benefits, as the 8th and 11th Circuits did in *IBP v. Glickman* and *Pickett v. Tyson Fresh Meats*.

As for the charge of price manipulation, the recent Fifth Circuit case of *In Re Pilgrim’s Pride*¹¹² states:

Because the protection of natural price levels is the object of prohibitions against anti-competitive conduct, § 192(e) is clearly directed at conduct that is anti-competitive... The express wording of § 192(e) bolsters this conclusion. Section 192(e) does not forbid all conduct which might affect prices, but only conduct that is designed to *manipulate* or *control* prices. In the absence of statutory definitions, “manipulation” ordinarily requires the use of deceptive or unfair means to accomplish something...

Even though the facts showed that Pilgrim’s Pride intended to reduce output to increase chicken prices, the Fifth Circuit indicated that this is only a violation if Pilgrim’s colluded with others to do so. In this investigation, all packers engage in the practice of using AMAs, but each of them does so unilaterally. The investigators found no evidence of intent, neither collusive nor unilateral, to manipulate prices through use of AMAs.

If the standards of *Pickett*, *IBP*, and more recent cases control, where AMAs are asserted to have certain legitimate efficiencies, even an initial showing of harm may not ensure that courts would conclude that use of AMAs violates that Act. Under these standards, even though AMAs negatively affect cash prices, the cited legitimate benefits for packers, consumers, and some producers likely does not support a violation of Section 202(a) nor Section 202(e) of the Act.

Legal Standard Under 201.70

Removal of bidder

The appearance that one packer may engage in the cash market while others remain on the sideline focuses attention on the allegation that packers fail to compete with one another in the cash markets. Regulation 201.70 has been used in the past to address situations where packers and dealers have failed to compete. In *Swift & Co. v. U. S.*¹¹³ the 7th Circuit upheld a finding that packers had violated Section 202(a) of the Act and Section 201.70 of the Regulations, by having qualified buyers in the lamb marketing area near Craig and Montrose, Colorado, but refraining

¹¹¹*Pickett*, 420 F.3d 1272, at 1281-1282.

¹¹²See *In Re Pilgrim’s Pride* 728 F.3d 457, at 461-463 (5th Cir. 2013).

¹¹³*Swift & Co. v. U. S.*, 393 F.2d 247, 256 (7th Cir. 1968)

from bidding on fat lambs against that area's principal dealer, and purchasing them in substantial quantities from that dealer-competitor instead of from the producers. The Court also found that the lamb prices in the areas were depressed as result of the arrangement, and upheld the inference that the packers had an agreement not to compete.¹¹⁴

Section 201.70 requires packers to conduct their procurement operations independently and in competition with one another. This language puts the burden on the packer to do both. The results of this investigation did not find that packers conducted buying operations together, sharing a common agent, as was case in *Swift & Co. v. U. S.* However, it could be argued that, by using committed supplies at levels seen by the results of this investigation, packers have failed to compete. For instance, when one packer offers top-of-the market pricing but is not significantly participating in the cash market, it relies on those packers participating in the cash market to set the prices it pays for cattle. In this way, the first packer may avoid competing on a bidding basis, and may not procure its cattle completely independent of the other packers' price-setting purchases.

This investigation, however, does not conclusively show that a reduction in the number of buyers significantly depresses regional cattle prices.¹¹⁵ While the investigation found that higher AMA levels were associated with lower fed cattle prices, it did not find that packers' lack of participation or failure to compete in the cash market resulted in lower fed cattle prices. This, combined with the lack of evidence of any common buying scheme connected to packers' use of committed supplies precludes the investigators from concluding that packers failed to compete under Regulation 201.70.

Conclusion:

In the context of Section 202(a) of the Act, while the economic analysis showed that packers' use of committed supplies likely lowered fed cattle prices, it did not show that committed supply caused a net harm to competition. Thus, under applicable legal standards, the use of committed supplies without a showing of predatory intent or net harm to competition would not be considered by a court of law to violate the Act.

When use of committed supplies is evaluated to determine whether packers manipulated cattle prices under Sections 202(d) and (e), the investigators cannot conclude nor infer from the findings of this investigation any predatory intent or anticompetitive effect. Also, the economic analysis did not support the theory that packers' lack of participation in the cash market resulted in manipulation of cash market prices as the complainants claimed.

¹¹⁴*Id.*, at 255. The Court also indicated in a footnote that even if packers independently refused to deal directly with producers, and only bought through a common buyer, they would violate 201.70. Here, the packers do not use a common buyer, but a different method of procurement that does not involve active bidding.

¹¹⁵See discussion in Appendix A-I, and the econometric results shown in Table AI-5. Also, as Table 3 shows, each of the top four packers and at least one of the smaller packers bought at least one head of cattle in the cash market somewhere in the United States and Canada during every week in the 18 month period, and bought at least 1,000 head in every week but one. Thus it may be difficult to argue that packers totally avoided the cash market.

In considering whether committed supplies created a monopsony in fed cattle procurement, while a single packer sometimes held high market shares for cash-based cattle procurement for some weeks, the investigation did not find that these high market shares had an anticompetitive effect, or that such a transitory monopsony was persistent and achieved through anticompetitive means.

Since the investigation did not find that lack of packer participation in the cash market resulted in lower regional fed cattle prices, and did not find any common buying scheme connected to packers' use of committed supplies, the investigators cannot conclude that packers failed to compete under Regulation 201.70.