

-----Original Message-----

From: Stephen R. Koontz [mailto:Stephen.Koontz@ColoState.Edu]

Sent: Wednesday, December 30, 2009 5:48 PM

To: ATR-Agricultural Workshops

Subject: Comment

Greetings,

Please find my comments as an attachment.

Thank you,

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Date: 30 December 2009

To: Legal Policy Section
Antitrust Division
U.S. Department of Justice
450 5th Street, NW, Suite 11700
Washington, DC 20001

From: Stephen R. Koontz

Re: Comments Regarding Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy

Increasing concentration in agriculture and the potential exercise of market power is one of the most important issues that agriculture faces and it has been for years. Because of the importance of this issue, it is a topic of much research. The research encompasses years and a multitude of studies. After this letter is a document that is offered to synthesize much of the research on concentration and market power in the cattle and beef industries and specifically with respect to the beefpacking and captive supplies.

I have worked on market power questions as related to the cattle and beef industry for much of my 20 year career as an agricultural economist. I have worked on the two largest and Congressionally-mandated studies. I have published the results of these works in peer-reviewed scientific journals. I also understand that the body of research on this issue is far flung and that it is hard to find a concise and useful summary of its findings. The document is offered in that spirit.

I would also offer that these comments are not mine alone. I have had this document reviewed by a group of peers, they find my summary sound and consistent with scientific research literature, they concur with my assessment, and would be willing to state this. My peers that have reviewed the document are: Clement E. Ward at Oklahoma State University, Ted C. Schroeder at Kansas State University, John D. Lawrence at Iowa State University, Gary W. Brester at Montana State University, and Glynn T. Tonsor at Michigan State University. These professionals are knowledgeable on this topic and have conducted much research on livestock and meat industries.

I hope the document is useful to the DOJ and USDA in seeking information on this important

policy issue.

A Synthesis of Market Power Research on the Cattle and Beef Industry

Stephen R. Koontz*

December 30, 2009

Comments Submitted to the
U.S. Department of Justice and U.S. Department of Agriculture
Regarding
Agriculture and Antitrust Enforcement Issues in Our 21st Century Economy

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A Synthesis of Market Power Research on the Cattle and Beef Industry

The purpose of this document is to contribute to the call for comments regarding the USDA & DOJ public workshops on competition issues in agriculture industries. The question of competition within agriculture industries is a well-researched topic. Thus, what this document will do is offer a synthesis of published research that is relevant to the cattle and beef industry. The author has an interest in public service with particular regard to the Land-Grant University mission, the economic well-being of the cattle and beef industry, and seeing facts based on scientific knowledge contribute to the discussion.

All agricultural production, processing, marketing, food, and service sectors are becoming increasingly concentrated – that is populated by fewer and larger firms. In fact, it is difficult to identify an agricultural industry of any economic size where increasing concentration is not the case. It is occurring in the agricultural production as well as processing and marketing industries. However, the meatpacking industry draws some of the most intense criticism with respect to this ubiquitous trend. Producers are concerned that the economic environment of increasing concentration results in the exercise of market power to their detriment.

This document will present a summary of research evidence addressing the question: Is there evidence that beefpackers exercise market power? Further, what evidence is there that any packer anti-competitive conduct has resulted in producers and consumers being economically harmed? A large number of studies have been conducted. This summary reviews a large portion of the research pertaining to these questions and offers some interpretive insights. The studies use alternative approaches and varying data sources. However, overall conclusions are possible.

Some of the first comprehensive research on industry organization and assessment of economic performance addressed issues in agriculture and specifically the meatpacking industry (see Nicholls 1941). Nicholls (1940) states, “Only after considerable further investigation will we know whether or not reform in the packing industry is necessary. It is conceivable that such monopoly elements as exist yield desirable results. A less extreme possibility is that results are undesirable but not sufficiently bad to bother about.” The considerable further investigation has occurred. Does the research community know the answer? We believe so.

But first there is a need to present a synthesis of the evidence from which the answer is drawn. If you are impatient then read the conclusions but how the conclusions are obtained is important and is thus the core of this document. There is a considerable amount of different research that will be categorized into four areas: 1) Structure-Conduct-Performance Research, 2) Oligopoly/Oligopsony Market Power Research, 3) Cost Economies Research, and 4) Captive Supplies Research. Of course, much research fits more than one category but much also has a main contribution. These categories also follow the timing of how research has emerged and how the thinking on market power has evolved. The synthesis here is not unique. We draw on the important previous literature reviews offered in Ward (1988), Azzam and Anderson (1996), Ward (2002), and Muth et al. (2005). Each of these is deserving of a read by anyone interested in cattle and beef industry concentration and market power.

Structure-Conduct-Performance Research

Some of the first works on industry concentration within the cattle and beef industry followed the founding Structure-Conduct-Performance (SCP) work of Bain (1968). In the cattle and beef industry research, market prices and margins were explained by structural variables. For example, variation in prices and margins were examined to see if they could be explained by variations in the number of buyer and sellers, the amount of industry concentration, and information on supply and demand. Concentration was believed to lead to collusion, and to higher prices and profits. Structure is easy to measure, performance is easy to measure, but there were few direct measures of conduct. Therefore, conduct is implied through the relationship between structure and performance.

Much cattle and beef research finds that higher concentration is associated with lower fed cattle prices and higher margins. Menkhaus, St. Clair, and Ahmaddaud (1981), Quail et al. (1986), Marion and Geithman (1995) find this in cattle prices. However, Multop and Helmuth (1980) find higher concentration was associated with higher fed cattle prices. These studies must often use annual price data as concentration measures are not available more frequently. These studies have used national prices and prices for different cattle feeding regions. Quail et al. (1986) also found that higher concentration in the cattle feeding industry was associated with higher fed cattle prices and say the result may imply countervailing power. Results from this body of research suggest that prices are lower in less important cattle feeding regions with high packer concentration.

Hall, Schmitz, and Cothorn (1979) and Multop and Helmuth (1980) found higher concentration was associated with higher wholesale-to-retail margins supporting an argument that larger firms had power to raise the beef price to consumers. Ward (1988 and 1990) found higher concentration was associated with lower farm-to-wholesale margins supporting an argument that larger packers are more efficient and pass some of these gains to producers. Ward (1987, 1988, and 1990) found no relationship between concentration and profits or between concentration and productivity. Thus, larger packers were not persistently more profitable or more innovative.

The two most recent and comprehensive looks at margins are as follows. Ward and Stevens (2000) examined price linkages between the producer-to-retail margin and found that increased meatpacker concentration did not weaken the price linkage between producers and packers or between packers and wholesalers. Most of any pricing behavior change occurred at the retail level and that increased beefpacker concentration had little effect on price behavior between producers and packers. Matthews et al. (1999) examined the effect that concentration has on farm-to-wholesale and wholesale-to-retail margins in the beef industry. Concentration has no significant effect on marketing margins. However, there were periods where increased concentration was associated with higher fed cattle prices and lower farm-wholesale marketing margins. This is evidence that economies of size in packing resulted in higher fed cattle prices.

The remainder of this section discusses studies that use transaction prices. The data are unique

because detail. Conclusions are clearly about the impact of market structure on prices received by producers. Ward (1981 and 1982), using 1979 data, found higher fed cattle prices were associated with more bids received and more buyers bidding. Also, larger buyers did not pay significantly lower prices than smaller rivals. Ward (1992), using 1989 data, examined if the beefpacker mergers through the 1980s had an impact on transaction prices. Similar results were found regarding numbers of bids and buyers. Also, the largest three packers – after the mergers – paid the lowest prices for fed cattle. But the result was not uniform between the largest three.

Williams et al. (1996) is the most recent study of fed cattle transaction prices. The data were from the Congressionally-mandated USDA GIPSA 1996 Concentration Study. All fed cattle transactions were obtained and used from the largest fed cattle slaughter plants for April 1992 to April 1993. The study found higher concentration was associated with the lower fed cattle prices but concentration is one of the least important factors. Transaction prices are primarily determined by market fundamentals and plant economics. Further, the concentration result is not similar across geographic regions. Concentration has no impact in the primary cattle feeding regions, has a negative impact as expected Pacific Northwest and the southwest U.S., but had an unexpected positive impact on prices in the Corn Belt.

The studies have clearly found that prices tended to be higher as the number of bids and bidders increased. But different studies found that larger packers paid lower prices or did not pay lower prices. Further, concentration has a mixed impact – in some regions higher concentration is associated with lower prices and in other regions with higher prices. No general conclusions can be drawn if results change across studies. Market conditions appear to be as important as structure variables and this is a weakness of the Structure-Conduct-Performance Research.

Structure-Conduct-Performance Research continues to be used and has provided important information about agricultural and food industries. But it can be subject to assumption errors, and it does not clearly deal with causality and simultaneity. For example, it may be that the less important cattle feeding regions have higher transportation costs and lower fed cattle prices but the methods associate the lower price result with the high concentration. The research has also criticized on conceptual grounds in that concentration allows collusion, but the approach does not address how this behavior manifests. The approach has the weakness that conduct is inferred from an association between structure and performance.

Oligopoly/Oligopsony Market Power Research

Starting in the 1980s, studies began attempting to measure conduct directly. Known as New Empirical Industrial Organization (NEIO), these studies measure the gap between prices and marginal costs as a conduct parameter. Conduct is not measured directly by data or a proxy such as structure but is measured by the departure from marginal cost pricing – competitive industries marginal cost price. This satisfies conceptual objections regarding a failure of SCP research to account for conduct. The conduct parameter generally and conveniently places an industry on the continuum between perfect competition and monopoly. However, there are a variety of methods to measure marginal costs and even a variety of prices. Thus, the variety of findings should not

be surprising. The NEIO research has seen the most in terms of development of economic ideas and linkages between these concepts and measures of market power. Because of this, a simple outline of works is difficult.

Schroeter (1988) was the first to apply the conduct parameter approach to beefpacking. Monopoly and monopsony price distortions were relatively small, 3% of the wholesale meat price and 1% of the farm cattle price. The degree of the distortions had decreased during the later years of the sample, when beefpacking concentration was beginning to increase sharply. Whereas, Azzam (1992) showed there was oligopsony power in the live cattle input market, but no oligopoly power in marketing beef. Muth and Wohlgenant (1999 and 1999) generalize Schroeter (1988) and find negligible market power price distortions. Interestingly, these types of results are the most common. In some cases, market power is not found. And when it is found the magnitude tends to be small – on the order of 1-3% of price.

Schroeter, Azzam, and Zhang (2000) explore the market power question in relation to interaction between packers and retailers. This study was an effort to develop a framework to test market power at different stages in the marketing channel. The work finds that retailers exercise market power in sales to consumers, packer-retailer transactions were the result of bargaining, and meatpackers had no market power in animal purchases.

Across industry studies have the tendency to produce different findings. Schroeter and Azzam (1990) measure market in the entire red meatpacking industry. Several meatpacking firms operate both beef and pork plants. The decisions of a firm in the market for one product may affect and be affected by the other market. Such joint production of substitute products is a more complex source of market power. Market power is found and estimated to be approximately one-half of farm-retail price spreads for beef and pork (55% and 37%). Basic knowledge of margins in both industries makes these magnitudes difficult to believe. The authors recognize limitations in the model. Azzam and Pagoulatos (1990) also examine the entire red meat industry and find non-competitive behavior in both the animal and meat markets. The power was higher in live animal markets than in meat markets. Bhuyan and Lopez (1997) tested for market power using farm-to-retail margins across all food and tobacco industries. The work is one of the first to allow for and find economies of size. The effort is appealing in ranking the industries with the highest market power. For example, breakfast cereal, alcoholic beverages and snack foods rank the highest. However, the work suggests that 40% of the margin in the red meat industry is due to power.

A limitation of conduct parameter studies is the extent of data aggregation across regions and over time. Azzam and Schroeter (1991) address this problem and measure price distortions in 13 regional fed cattle procurement markets. The work finds small amounts of market power, less than 1% of the price. The work also evaluated the tradeoff between market power and efficiency gains as the industry consolidates and suggested that the benefits of efficiency increases during consolidation in beef packing offset any negative effects of increased market power. Similar results are also found for Azzam and Schroeter (1995), Azzam (1997), Lopez, Azzam, and Liron-Espana (2002), and Lopez and Liron-Espana (2003).

Koontz, Garcia, and Hudson (1993) expand the conduct parameter approach through developing a measure that is consistent with a dynamic pricing game. Game theory is used to explain tacit collusion among meatpackers. The dynamic game requires that collusive behavior be expressed by a two-phased strategy: there are cooperative phases where non-competitive prices are paid and non-cooperative phases where competitive prices are paid. Market power is found in daily fed cattle prices and the price distortion is 0.5% to 0.8%. However, they found a reduction in market power when buyer concentration was higher. Koontz and Garcia (1997) extend this work to multiple regional markets. Stronger tacit collusion can be exercised by coordinating across regions. Multiple-market oligopsony behavior was found across geographic fed cattle markets and evidence indicated coordinated behavior across markets. The oligopsony finding was consistent with previous research that the extent of oligopsony was small and that the effect was smaller when concentration was higher. Koontz and Garcia conclude that oligopsony behavior in fed cattle procurement is not constant over time and space. Azzam and Park (1993) and Weliwita and Azzam (1996) also use game theory explanation of conduct. The first study finds little to no evidence of market power in cattle markets. The second finds not much evidence of cooperative behavior implied by the dynamic model and that measures of market power were small and consistent with other studies –1-3% of price.

Several studies have recognized the important interaction between market power and costs within the packing industry. Stiegert, Azzam, and Brorsen (1993) suggest beefpacking firms follow average-cost pricing rather than marginal-cost pricing. Packers appear to bid to ensure that margins cover average processing costs, and continue with the strategy in the face of anticipated supply shortfalls and unanticipated small shortfalls. However, when there were large unexpected supply shortfalls, packers competed aggressively, margins narrowed, and this occurred frequently. The study is unique in examining expected and unexpected reductions in cattle numbers. They also conclude that decreasing buyer concentration is unlikely to result in improved fed cattle prices for producers.

Economies of size suggest increased efficiencies have occurred over time in meatpacking as structural changes have taken place (Azzam 1997). Azzam and Schroeter (1995) address the tradeoffs in efficiency gains and oligopsony losses. The research suggests that consolidation leads to economies of size efficiencies and increased oligopsony pricing behavior, but that efficiency gains offset the market power losses. The later work finds that a cost savings of 2.4% or less offsets market power effects from a 50% increase in concentration. Further, the estimate of actual cost savings was 4%. Thus, they conclude structural changes have been beneficial to cattle and beef markets.

Driscoll, Kambhampaty, and Purcell (1997) test for profit maximizing behavior by beefpacking firms. The conduct parameter research assumes profit maximization by firms. Other research shows that costs are declining with volume and that average cost pricing may be followed. In this case, conduct parameters are biased measures of market power. Tests were applied to data from the 1996 Concentration Study. Results suggest plants and firms did not follow profit-maximizing behavior. Plants often operated at production levels below those needed to achieve

profit maximization. Results were consistent with use of average cost pricing. The work found very little evidence of behavior required to exercise market power. The work further concludes the conduct parameter approach is inappropriate for short-term transaction data but many require periods longer than one month.

Morrison-Paul (2001) estimated oligopoly and oligopsony power with monthly, plant-level cost and revenue data for beefpacking plants over 1992-93 – using the 1996 Concentration Study data. Cost economies and market power was measured and the findings confirmed significant economies of size. There is also little evidence of price-depressing, market power distortions for fed cattle. The findings are consistent with the previous research on tradeoffs between cost efficiency gains and oligopsony losses.

The study by Holloway (1991) examined long-run market power by allowing for changes in the number and size of firms. The work makes use of farm-to-retail margins and finds close to perfect competition. The study is part of a larger body of theoretical work on marketing margins, work that starts with Gardner (1975). Margins between the farm-to-wholesale and farm-to-retail level are often used to as evidence of market power. Gardner shows this is clearly not the case. Margins will increase as more non-farm inputs are used to satisfy consumer demand for increased food-related services. Holloway expands Gardner's work to include non-competitive behavior. Other work (Hamilton and Sunding 1997) shows how increasing margins and increasing concentration are part of a competitive process.

A conclusion from this body of research is that comprehensive empirical models estimating market power, cost efficiency, technological change, and changing consumers will be difficult and unlikely. For example, Crespi, Xia, and Jones show a link between the cattle cycle and market power in that more power can be exercised during the large supply phase of the cycle. Rather, it is important for research to break the problem down into pieces that can be empirically addressed and then synthesize the empirical works into a comprehensive view.

A conclusion also from this work is that measures of market power are quite diverse. Many types of market power measures have been constructed. There are several studies which find no market power. There is a multitude of studies which find small amounts of market power. And there are a few studies that find large measures of market power. On whole, the small amounts of market power are the main finding.

Cost Economies Research

So, if it is not market power that is driving the beefpacking to higher levels of concentration then what is it? It appears to be the substantial cost economies of larger facilities and firms. There is a large body of research documenting the economies of size within the beefpacking industry. As with other research, the cost economy research has used a variety of methods and data sources. But the finding is ubiquitous: big firms have lower per unit costs than small firms. This cost difference allows the larger firm to make larger profits than smaller firms, potentially expanding operations, and potentially paying higher prices of inputs such as fed cattle.

A variety of studies use an economic engineering approach. Packing plant costs are constructed through components and costs are developed. Duewer and Nelson (1991) is a well-known example of this approach. Economies of size are seen between large and small plants. And the incentive for any sized plant to operate at larger volumes is also seen.

Most studies make use of secondary data from which cost functions can be estimated with statistical and econometric tools. The secondary data are collected from the firm or from the Census of Manufacturing. Beginning with Logan (1963), continuing with Ball and Chambers (1982), and most recently with Morrison-Paul (2001), these studies are good examples of representative research. The final work combines cost economy information with market power measures due to captive supplies. MacDonald et al. (2000), for which MacDonald (2003) offers a summary, are some of the more recent studies of packing and processing costs. All of the research on meatpacking costs reveals that the industry and the beefpacking specifically shows economies of size – larger facilities and larger firms are able to conduct processing operations at lower cost per unit than smaller facilities or firms. We are not aware of any study that does not show that meatpacking displays strong economies of size.

A minimal number of studies have surveyed firms regarding costs. Ward (1990 and 1993) surveyed packers as to slaughter and fabrication costs and constructed a long-run industry average total cost function. Economies of size are seen between large and small plants. And the incentive for any sized plant to operate at larger volumes is also seen.

Finally, Koontz and Lawrence estimate beef packer average total cost function using plant level profit and loss (P&L) data from the four largest meat packers. This study is unique because of the data are from actual plant P&L statements. This research was part of the USDA GIPSA-RTI 2007 Livestock and Meat Marketing Study. P&L statements were obtained from the four largest packers for the 20 months of the study period: October 2002 through March 2005. Plant level P&L data reveal strong economies of size within each plant, across large and small plants, and for the representative plant that could be reported with the confidential data.

Captive Supplies Research

One of the most contentious issues regarding concentration, market power, and fed cattle prices has centered on use of captive supplies or alternative marketing arrangements (AMAs). AMAs refer to non-cash market means of procuring fed cattle. In the cattle industry, captive supplies or AMAs are formula arrangements. Forward contracts and packer-owned cattle are the other two main means of procuring that is not through the cash market and these two sources are small and predictably 10% and 5% of marketings. Formula transactions are between 30% and 50% of marketings. The cash market is between 60% and 40% of marketings.

There are two principle studies on captive supplies. Both were Congressionally-mandated which required cooperation from the packing industry. The first study was Ward, Koontz, and Schroeder (1996) and the second was Muth et al. (2007). The first study is referred to as the

USDA GIPSA “Concentration Study.” The study was the first comprehensive look at the cost of AMA use to the fed cattle industry. The second study is referred to as the USDA GIPSA-RTI “Livestock and Meat Marketing Study.” The study was the first comprehensive look at the cost and benefits of AMA use to the fed cattle industry. Research from both of these projects have been published in peer reviewed scientific journals – see Ward, Koontz, and Schroeder (1998) and Muth et al (2008), Liu et al (2009), and Koontz and Lawrence.

Both studies made use of a complete history of fed cattle transactions during the study periods. The 1996 study had data from April 1992 to April 1993 and the 2007 study had data from October 2002 to March 2005. Almost every fed cattle transaction that took place in the U.S. during the study periods was included in the analysis. Thus, there are no sampling or data aggregation issues. Captive supplies either impacted fed cattle transactions prices or not. The impacts were found to be small and depend of the type of AMA. Captive supplies were measured a variety of ways including actual deliveries and the size of inventories from which the packer could procure so there are a variety of captive supply impact measures. In the 1996 study, the maximum impact of captive supplies was to depress cash price by 1.2%. Other measures are smaller with most below 1% and with some being zero. In the 2007 study, the maximum impact of AMAs was to depress cash price by 0.3%. Both studies found that packers procured low-priced cattle from the portfolio of marketing alternatives and that there was little evidence of strategic use of AMAs to impact the market. A positive relationship between plant utilization and prices paid by packers was found suggesting that higher packing plant utilization through AMAs resulted in higher prices.

Different from the 1996 study, the 2007 study also measured the benefits of AMAs and the cost/benefit assessment is transparent. The cost of captive supplies was approximately \$4.50 per head. Improved throughput, more predictable volumes, and better other input use resulted in packer slaughter and fabrication costs being \$6.50 per head lower – these are benefits. AMAs are also shown to be associated with improved risk management, which is cost reducing, and improved animal quality, which is revenue enhancing. Thus, a major finding of the 2007 LMMS is that the benefits of AMAs substantially outweigh costs.

Another piece of notable research was the “Panhandle Study.” Schroeter and Azzam (1999, 2003, and 2004) had access to transaction data from four plants in the Texas Panhandle region from February 1995 to May 1996. Results suggest that packers expecting large deliveries of AMA cattle, paid lower prices in the cash market. However, the magnitude was small. A 10% increase in captive deliveries is associated with a \$0.021/cwt lower price. The average price for the sample was \$64.56/cwt. The authors state the finding is consistent across studies and caution that the negative relationship is not necessarily causal, nor is it an indicator of non-competitive behavior by packers. Packers simply deliver low priced cattle whether those cattle are contracted or purchased in the cash market. This research suggests that eliminating captive supplies would increase fed cattle prices approximately 0.1%.

The two earliest pieces of empirical research on captive supplies are Elam (1992) and Schroeder et al (1993). The first work examined monthly prices and captive supply volumes for Texas,

Kansas, Colorado, Nebraska, and the nation. The study period was October 1988 to May 1991. The second work was the first to examine fed cattle transaction price data. The sample was for southwest Kansas for May to November 1990. While the data and sample period are different, the impact of captive supplies on fed cattle price is at most 0.4% of the price.

Ward (2005) provided a look at trends in captive supplies, described definitional issues, and is some of the most recent research. Importantly, that work examined the data available since Mandatory Price Reporting Legislation (MPR) was implemented by USDA's Agricultural Marketing Service in 2001. Those data are both more timely and detailed than was publicly available before. MPR provides increased market transparency at both the animal and meat levels both in quantities and prices. That work also found: 1) the significant week-to-week variability in marketing methods, 2) that marketing methods do change, and 3) there was a lack of "sweetheart deals" as was much discussed in the MPR legislation debate.

Empirical work estimating price impacts from captive supplies addresses the pressing question that producers have but has lacked a theoretical framework identifying the incentives for meatpacking firms to contract cattle supplies. Other work examines these incentives. Azzam (1996), Azzam (1998), and Love and Burton (1999) are important examples. These works show that market power can be one reason packers use captive supplies. In this case, the price impacts depend on a complex combination of variables, among them the cash market volume relative captive supplies. The work suggests that non-competitive conduct is not a necessary condition for a negative relationship between cash prices and captive supplies. Thus, eliminating captive supplies may not improve fed cattle prices to the extent measured by the empirical work – this is a very important point. Further, the work shows that firms benefit from efficiency gains associated with captive supplies and these benefits improve prices for cattle producers. Thus, the exercise of market power may not be the prime motive for captive supply use.

Some of the newer theoretical research Zhang and Sexton (2000) illustrate how meatpackers can use captive supplies strategically to influence cash market prices. Meatpackers can create geographic buffer which reduces competition in the cash market. Schroeter and Azzam examined the Texas Panhandle data to see if conditions matched those predicted by the Zhang and Sexton. The two predictions implied from Zhang and Sexton were not verified.

Crespi and Sexton (2004) examine the Panhandle Study transaction data from the standpoint of a competitive bidding process and find some non-competitive conduct. The work suggests captive supplies allow packers to reduce cash bids 5-10%. However, the empirical work requires assumptions that are not tested and not likely in fed cattle bidding. And possibly because of this, the measures of market power are some of the largest in the captive supply research.

Xia and Sexton (2007) examine top-of-the-market clauses that are common in formula AMAs. This work shows if packers can secure 50% or more of supplies through captive means then the fed cattle market price can be depressed to the monopsony level and maximum market power exerted. Recent research (see Zhang and Brorsen) generalizes the model and suggests that much more of the market must be secured through captive supplies. While the original work is

interesting in that formalizes a known problem with formula pricing, the empirical captive supply research does not support the theoretical results. This suggests that it is likely that packers use AMAs for more purposes than to exercise market power. For example, to procure reliable – and therefore cost reducing – supplies, to procure higher-quality or specific quality animals, and for risk management. Other research also supports this idea.

Substantial portions of Muth et al. (2007) and Muth et al. (2005) are directed at discussions and developments of these potential benefits of AMA use – volume, quality, and risk. The 2005 report is that Interim Report for the 2007 LMMS Final Report. The interim report is a comprehensive literature review that digs into the economics, business, and supply chain literature. Alternatives to the cash market are well-used in many industries and used to the benefit of that industry. Livestock and fed cattle are simply not unique. The final report is a comprehensive look at why livestock industries – cattle, hog, and lamb – use AMAs. The conceptual justifications are examined with real world data and the existence of many of the benefits are measured and supported through the research.

Summary and Conclusions

So what is the answer to Nicholls question? There is market power exercised in the beefpacking industry. Almost every study that examines the question finds market power. However, most of these measures of market power are rather small. Most measures of market power in the cattle and beef industry are 1-3%. Most measures of market power associated with captive supplies are <1%. Further, any attempt that examines the tradeoff between market power and other benefits of larger firms – most notably the cost economies – finds that the benefits outweigh the costs. And more often than not, benefits far outweigh the costs.

The research clearly does not conclude the beefpacking industry needs aggressive antitrust action – for example that the larger packers should be required to divest. This is simply not a result found within the scientific literature. There will be some hard merger and acquisition questions in the future but the research evidence clearly shows that the exercise of market power is not a substantive problem. But not a problem does not mean not a concern. There is market power that is exercised. Currently, that market power is not large. But not substantive does not mean does not exist. The beefpacking industry is not a competitive industry in the economic theory sense of the definition and noncompetitive industries deserve regulatory surveillance.

The research also clearly says that the current policy focus – since the Johnson amendment to the 2000 Farm Bill – on legislation that prohibits captive supplies or alternative marketing agreements is misplaced. The costs associated with AMA use are minimum compared to the benefits. Such legislation would impose a substantial cost on the beefpacking industry and it is relatively simple economics that costs borne by marketers are ultimately paid by producers and consumers.

Finally, we would like to return to the fact that questions of concentration and market power in the beefpacking industry are not new and that there is a substantive body of scientific literature

which address this issue. Findings may not be popular but they are the culmination of years of research and to ignore them is to ignore what science has to say about the important question of market power.

References

Azzam, A.M. "Testing the Competitiveness of Food Price Spreads." *Journal of Agricultural Economics* 43(1992): 248-256.

Azzam, A.M. "Testing the Monopsony-Inefficiency Incentive for Backward Integration." *American Journal of Agricultural Economics* 78(1996): 585-590.

Azzam, A.M. "Measuring Market Power and Cost-efficiency Effects of Industrial Concentration." *Journal of Industrial Economics* 45(1997): 377-386.

Azzam A.M. "Captive Supplies, Market Conduct, and the Open-Market Price." *American Journal of Agricultural Economics* 80(1998): 76-83.

Azzam, A.M. and D.G. Anderson. *Assessing Competition in Meatpacking: Economic History, Theory, and Evidence.* U.S. Department of Agriculture, GIPSA-RR 96-6, May 1996.

Azzam, A.M. and E. Pagoulatos. "Testing Oligopolistic and Oligonistic Behaviour: An Application to the U.S. Meat-Packing Industry." *Journal of Agricultural Economics* 41(1990): 362-370.

Azzam, A.M. and T. Park. "Testing for Switching Market Conduct." *Applied Economics* 25(1993): 795-800.

Azzam, A.M. and J.R. Schroeter. "Implications of Increased Regional Concentration and Oligopsonistic Coordination in the Beef Packing Industry." *Western Journal of Agricultural Economics* 16(1991): 374-381.

Azzam, A.M. and J.R. Schroeter. "The Tradeoff Between Oligopsony Power and Cost Efficiency in Horizontal Consolidation: An Example from Beef Packing." *American Journal of Agricultural Economics* 77(1995): 825-836.

Bain, J.S. *Industrial Organization, Second Edition.* New York: John Wiley & Sons, 1968.

Ball, V.E., and R.G. Chambers. "An Economic Analysis of Technology in the Meats Products Industry." *American Journal of Agricultural Economics* 64(1982): 699-709.

Bhuyan, S. and R.A. Lopez. "Oligopoly Power in Food and Tobacco Industries." *American Journal of Agricultural Economics* 79(1997): 1035-1043.

Crespi, J.M. and R.J. Sexton. "Bidding for Cattle in the Texas Panhandle." *American Journal of Agricultural Economics* 86(2004): 660-674.

Crespi, J.M. T. Xia, and R. Jones. "Competition, Bargaining Power, and the Cattle Cycle."

American Journal of Agricultural Economics, forthcoming.

Driscoll, P.J., S.M. Kambhampaty, and W.D. Purcell. "Nonparametric Tests of Profit Maximization in Oligopsony with Application to the Beef Packing Industry." *American Journal of Agricultural Economics* 79(1997): 872-879.

Duewer, L. and K. Nelson. *Beefpacker and Processing Plants: Computer-Assisted Cost Analysis*. Washington DC: US Department of Agriculture, Economic Research Service, CED, April 1991.

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* 17(1992): 205-217.

Gardner, B.L. "The Farm-Retail Price Spread in a Competitive Food Industry." *American Journal of Agricultural Economics* 57(1975): 399-409.

Hall, L., A. Schmitz and J. Cothorn. "Beef Wholesale - Retail Marketing Margins and Concentration." *Economica* 46(1979): 265-300.

Hamilton, S.F., and D.L. Sunding. "The Effect of Farm Supply Shifts on Concentration and Market Power in the Food Processing Sector." *American Journal of Agricultural Economics* 79(1997): 524-531.

Holloway, G.J. "The Farm-Retail Price Spread in an Imperfectly Competitive Food Industry." *American Journal of Agricultural Economics* 73(1991): 979-989.

Koontz, S.R., and J.D. Lawrence. "Impacts of Alternative Marketing Agreement Cattle Procurement Volumes on Packer Costs: Evidence from Plant-Level P&L Data." *Agribusiness: An International Journal*, forthcoming.

Koontz, S.R., P. Garcia, and M.A. Hudson. "Meatpacker Conduct in Fed Cattle Pricing: An Investigation of Oligopsony Power." *American Journal of Agricultural Economics* 75(1993): 537-548.

Koontz, S.R., and P. Garcia. "Meat-Packer Conduct in Fed Cattle Pricing: Multiple-Market Oligopsony Power." *Journal of Agricultural and Resources Economics* 22(1997): 87-103.

Liu, Y., M.K. Muth, S.R. Koontz, and J.D. Lawrence. "The Role of Marketing Arrangements and Valuation Methods in Improving Beef Quality." *Agribusiness: An International Journal*, 25(Spring 2009): 147-163.

Logan, S.H. "The Effects of Short-Run Variations in Supplies of Cattle and Costs of Slaughtering in California." *Journal of Farm Economics* 45(1963): 625-630.

Lopez, R.A., A.M. Azzam, and C. Liron-Espana. "Market Power and/or Efficiency: A Structural Approach." *Review of Industrial Organization* 20(2002): 115-126.

Lopez, R.A., A.M. Azzam, and C. Liron-Espana. "Social Welfare and the Market Power-Efficiency Tradeoff in U.S. Food Processing: A Note." *Journal of Agricultural and Food Industrial Organization* 1(2003): Article 5.

Love, H.A. and D.M. Burton. "A Strategic Rationale for Captive Supplies." *Journal of Agricultural and Resource Economics* 24(1999): 1-18.

MacDonald, J.M., M.E. Ollinger, K.E. Nelson, and C.R. Handy. "Consolidation in U.S. Meatpacking." U.S. Department of Agriculture, Economic Research Service, Agricultural Economics Report 785. February 2000.

MacDonald, J.M. "Beef and Pork Packing Industries." Chapter in *Economics of the Red Meat and Dairy Industries*. Veterinary Clinics of North America – Food Animal Practice – Volume 19 and Issue 2. S.R. Koontz, Guest Editor. Philadelphia PA: W.B. Saunders, July 2003.

Marion, B.W. and F.E. Geithman. "Concentration-Price Relations in Regional Fed Cattle Markets." *Review of Industrial Organization* 10(1995): 1-19.

Matthews Jr., K.H., W.F. Hahn, K.E. Nelson, L.A. Duewer, and R.A. Gustafson. *U.S. Beef Industry: Cattle Cycles, Price Spreads, and Packer Concentration*. U.S. Department of Agriculture, Economic Research Service, Technical Bulletin 1874, April 1999.

Menkhaus, D.J., J.S. St. Clair, and A.Z. Ahmaddaud. "The Effects of Industry Structure on Price: a Case in the Beef Industry." *Western Journal of Agricultural Economics* 6(1981): 147-153.

Morrison-Paul, C.J. "Market and Cost Structure in the U.S. Beef Packing Industry: a Plant-Level Analysis." *American Journal of Agricultural Economics* 83(2001): 64-76.

Multop, J.R. and J.W. Helmuth. "Relationship Between Structure and Performance in the Steer and Heifer Slaughter Industry." Staff Report. Committee on Small Business, U.S. House of Representatives. Washington, D.C.: Government Printing Office, September 1980.

Muth, M.K., G Brester, J. Del Roccili, S.R. Koontz, B. Martin, N. Piggott, J. Taylor, T. Vukina, M. Wohlgenant. "Spot and Alternative Marketing Arrangements in the Livestock and Meat Industries – Interim Report." Prepared for The Grain Inspection, Packers, and Stockyards Administration, USDA Contract No. 53-32KW-4-028. Prepared by RTI International, RTI Project Number 09230. July 2005.

Muth, M.K., S.C. Cates, M. Coglaiti, S. Karns, Y. Liu, J. Taylor, C. Viator, J. Del Roccili, M.

Asher, S.R. Koontz, J. Lawrence, J. Schroeter, G. Brester, J. Atwood, J. Marsh, and B. Martin. GIPSA Livestock and Meat Marketing Study – Volume 3: Fed Cattle and Beef Industry – Final Report. Prepared for Grain Inspection, Packers, and Stockyards Administration, USDA Contract No. 53-32KW-4-028. RTI International, RTI Project Number 09230. January 2007.

Muth, M.K., Y. Liu, S.R. Koontz, and J.D. Lawrence. “Impacts of Alternative Marketing Agreement Cattle Procurement Volumes on Fed Cattle Transaction Prices and Risk.” *Journal of Agricultural and Resource Economics*, 33(April 2008): 118-135.

Muth, M.K., and M.K. Wohlgenant. “A Test for Market Power Using Marginal Input and Output Prices with Application to the U.S. Beef Processing Industry.” *American Journal of Agricultural Economics* 81(August 1999): 638-43.

Muth, K. and M.K. Wohlgenant. “Measuring the Degree of Oligopsony Power in the Beef Packing Industry in the Absence of Marketing Input Quantity Data.” *Journal of Agricultural and Resources Economics* 24(1999): 299-312.

Nicholls, W.H. “Market-Sharing in the Packing Industry.” *Journal of Political Economy* 22(1940): 225-240.

Nicholls, W.H. *Imperfect Competition in the Agricultural Industries*. Ames: Iowa State University, 1941.

Quail, G., B. Marion, F. Geithman, and J. Marquardt. “The Impact of Packer Buyer Concentration on Live Cattle Prices.” University of Wisconsin, NC-117 Working Paper 89, Madison, WI, 1986.

Schroeder, T.C., R. Jones, J. Mintert, and A.P. Barkley. “The Impact of Forward Contracting on Fed Cattle Prices.” *Review of Agricultural Economics* 15(1993): 325-337.

Schroeter, J.R. “Estimating the Degree of Market Power in the Beef Packing Industry.” *Review of Economics and Statistics* 70(1988): 158-162.

Schroeter, J.R. and A.M. Azzam. “Measuring Market Power in Multi-Product Oligopolies: The U.S. Meat Industry.” *Applied Economics* 22(1990): 1365-1376.

Schroeter, J.R. and A.M. Azzam. “Econometric Analysis of Fed Cattle Procurement in the Texas Panhandle.” U.S. Department of Agriculture, Grain Inspection, Packers and Stockyards Administration, Unpublished report. November 1999.

Schroeter, J.R. and A.M. Azzam. “Captive Supplies and the Spot Market Price of Fed Cattle: The Plant-Level Relationship.” *Agribusiness: An International Journal* 19(2003):489-504.

Schroeter, J.R. and A.M. Azzam. “Captive Supplies and the Spot Market Price of Fed Cattle:

The Role of Delivery Timing Incentives.” *Agribusiness: An International Journal* 20(2004):347-362.

Schroeter, J.R., A.M. Azzam, and M. Zhang. “Measuring Market Power in Bilateral Oligopoly: The Wholesale Market for Beef.” *Southern Economic Journal* 66(2000): 526-547.

Stiegert, K.W., A.M. Azzam, and B.W. Brorsen. “Markdown Pricing and Cattle Supply in the Beef Packing Industry.” *American Journal of Agricultural Economics* 75(1993): 549-558.

Ward, C.E. “Short-Period Pricing Models for Fed Cattle and Impacts of Wholesale Carcass Beef and Live Cattle Futures Market Prices.” *Southern Journal of Agricultural Economics* 13(1981): 125-132.

Ward, C.E. “Relationship Between Fed Cattle Market Shares and Prices Paid by Beefpackers in Localized Markets.” *Western Journal of Agricultural Economics* 7(1982): 79-86.

Ward, C.E. “Productivity - Concentration Relationship in the U.S. Meatpacking Industry.” *Southern Journal of Agricultural Economics* 19(1987): 217-222.

Ward, CE. *Meatpacking Competition and Pricing*. Virginia Tech, Research Institute on Livestock Pricing, Blacksburg, VA, July 1988.

Ward, C.E. “Meatpacking Plant Capacity and Utilization: Implications for Competition and Pricing.” *Agribusiness: An International Journal* 6(1990): 65-73.

Ward, C.E. “Inter-firm Differences Between Fed Cattle Prices in the Southern Plains.” *American Journal of Agricultural Economics* 74(1992): 480-485.

Ward, C.E. “Comparative analysis of cattle slaughtering and fabricating costs.” *Agribusiness: An International Journal* 9(1993): 441-451.

Ward, C.E. “A Review of Causes for and Consequences of Economic Concentration in the U.S. Meatpacking Industry.” *Current Agriculture, Food & Resource Issues* 3(2002): 1-28.

Ward, C.E. “Beef Packers’ Captive Supplies: An Upward Trend? A Pricing Edge?” *Choices* 20(2005): 167-171.

Ward, C.E., S.R. Koontz, and T.C. Schroeder. “Impacts from Captive Supplies on Fed Cattle Transaction Prices.” *Journal of Agricultural and Resource Economics* 23(1998): 494-514.

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*. C. Ward, T. Schroeder, A. Barkley, and S. Koontz. U.S. Department of Agriculture, GIPSA-RR 96-3, May, 1996.

Ward, R.W. and T. Stevens. "Pricing Linkages in the Supply Chain: the Case for Structural Adjustments in the Beef Industry." *American Journal of Agricultural Economics* 82(2000): 1112-1122.

Weliwita, A. and A.M. Azzam. "Identifying Implicit Collusion under Declining Output Demand." *Journal of Agricultural and Resources Economics* 21(1996): 235-246.

Williams, G.W., O. Capps, Jr., H.A. Love, H.L. Goodwin, E.E. Davis, and J.P. Nichols. *Price Determination in Slaughter Cattle Procurement*. U.S. Department of Agriculture, GIPSA-RR 96-2, September 1996.

Xia, T., and R.J. Sexton. "The Competitive Implications of Top-of-the-Market and Related Contract-Pricing Clauses." *American Journal of Agricultural Economics* 86(2004):124-138.

Zhang, M., and B.W. Brorsen. "The Long Run and Short Run Impact of Captive Supplies on the Spot Market Price: An Agent-Based Artificial Market." Working Paper in review at the *American Journal of Agricultural Economics*.

Zhang, M. and R.J. Sexton. "Captive Supplies and the Cash Market Price: A Spatial Markets Approach." *Journal of Agricultural and Resources Economics* 25(2000): 88-108.