Price Discovery Research Project – Interview Findings Summary

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This interview findings summary is a deliverable on the Price Discovery Research Project conducted for the National Cattlemen's Beef Association. A majority of fed cattle are marketed through alternatives to the cash market and the proportion of cash marketings are continuing to shrink or thin. The causes are numerous but all translate into bottom-line economics. A thinning cash market is the result of market participants not using the cash market and making use of alternative marketing arrangements (AMAs) because it is economical for that business. For the fed cattle industry AMAs are largely formula cattle and forward contracts.

Cash markets have great appeal – and take a lot of effort and have a lot of risks. The economic efficiency and economic welfare properties of cash markets that function through the invisible hand are well known and valued. It is also well-known that transactions costs associated any market-based trade can be mitigated through other means of coordination. Price is but one mechanism of coordinating economic activity in a capitalist economy. Therein are today's livestock and downstream product markets, the concern for cash market thinning, and the reasons for such.

The changes that are happening in fed cattle markets are occurring in downstream beef product markets. These changes will determine the structure of fed cattle and beef markets observed in the future. Documenting the change and discussing the economic incentives causing the change is useful. In this context, results from interviews with cattle and beef industry members are presented. For the past two-plus years, I have interviewed producers and major packers in the cattle and beef industry. I will describe what these businesses say motivates their behavior and describe what firms are doing. In short, cash markets are disorganized and have large costs of use. Cash markets can be too disorganized for producers and processors with a focus on supply chain management. So there are strong incentives to not use the cash market. However, there remains strong interest in maintaining the cash market and in the need for cash price information. Industry members are well-aware of thinning cash market and interviews were conducted with an objective of also identifying potential solutions to the problem.

The interviews were conducted to accumulate information on three main issues. First, what are the businesses reasons for marketing method choice? Why did the firm use the cash market or an alternative to the cash market? Inherent here is valuing the cash market relative to alternatives to the cash market. What is the cash market worth – in terms of information and opportunity? And what is marketing through a formula worth and/or what is marketing through forward contracts worth?

Second, what is the impact of the thinning cash market on the business and on the marketplace? What are the interviewee's perceptions? Thin markets research also assumes some parameters to make the assessment of how-thin-is-too-thin and those interviewed were asked their perceptions of those parameters – as well as an independent assessment of the functioning of fed cattle markets. Third, participants in the interviews were asked about acceptability of some proposed solutions to thin markets problem. Participants were asked about the acceptability of possible industry level changes and were asked what individual businesses were doing to specifically address the issue.

Participating in the cash market is not free – free markets are not free – as there are costs associated with using them. Using cash markets consumes scarce resources. Discussions with cattle feeding industry members reveal that the opportunity costs of participating in the cash market are high. Making use of formulas or forward contracts reduces these costs. In short, fed cattle are marketed in a timelier manner so that animal performance is improved and cattle feeding enterprises are also more efficient in operations. Fed cattle also have a known buyer and may have market price risk well-managed. Cash markets can be relatively disorderly.

There are also risks associated with participating in the cash market – and all risks can be thought of and converted into cost measurements. The main risk from participating in cash markets is the risk that the cattle will not be marketed in the most optimal week or in the predicted week. Larger cattle feeding enterprises communicated this and small cattle feeding enterprises communicated this. Packers communicated similar perceived risks. The predictable flows of AMA cattle and the additional communication in the AMA marketing process allow for improved scheduling of packing plant operations. This improved efficiency translates into reduced costs. Likewise, program cattle – and cattle associated with brand marketing or value-added – tend to be marketed through AMAs. Cattle feeding enterprises and packing enterprises count on the prices for these value-added beef products to be tied to the underlying cattle and beef market and not due entirely to the relative supply and demand balances of the program cattle.

Fed Cattle Marketing Institutions and Trends

Formula trades of fed cattle have become the most prevalent marketing method that is an alternative to the negotiated cash market. Formula transactions are transactions valued using prices discovered by individuals not involved in the transaction. Formulas have historically used plant-average prices (the formula cattle are valued at a base price that is the same as packer paid on all other cash transactions), USDA AMS regional prices (the formula cattle are valued at a base price that is the same as all packers in the region paid on cash transactions), averages of regional prices, and the national average price. It is difficult to find a formula that is based on live cattle futures prices or the downstream wholesale boxed beef composite value but there are examples. In addition, with the thinning cash trade then formulas may use averages of or changes in neighboring region prices. Most formulas have head-minimum requirements for a reported price to be used as a base. This base price is what is first reported by AMS. Formula transactions then have to stand premiums and discounts. Almost all formulas pay premiums and access discounts for higher and lower quality carcasses. There is a final reporting of the net value of formula transactions by AMS that reflects this post-slaughter information.

Formula trades do no price discovery and make use of the information provided, and resources expended elsewhere, on prices discovered by others. Formula trades use both base prices and premiums and discounts discovered through other means. Formula trades are approximately 60% of fed cattle transactions in all the major cattle feeding – and price reporting – states. The negotiated cash trade is about 25% and the balance is forward contracts. In the USDA AMS reporting region of Texas, New Mexico and Oklahoma, formula trade is 90% of the transactions. With less than 10% of the volume of trade in the negotiated cash market then it is unlikely that TX-OK-NM, a historically important cattle feeding region, will contribute much to price discovery for fed cattle. This is a substantial change – but something which has happened in hog markets. There is no cash hog market outside of the Iowa and Southern Minnesota region. And it is a trend in the beef product markets as well. A significant volume of trade in beef products is transitioning to being valued through formula arrangements.

Contrasting regions, the following is observed in Kansas, Nebraska, and Iowa along with the Texas region. Kansas is on a similar path with Texas. While Texas was always a region that made heavy use of formula methods, the move to substantial formula use within Kansas is more recent. Further, more forward contract cattle are observed and more variation in forward contract cattle is observed in Kansas. Feeding and packing businesses that procure in Kansas do more forward contracting. The recent increases in reported forward contracting with the Texas region and Kansas likely include some of the basis bid and ask that transitions into the cash window. Nebraska shows a modest increased use in formulas. Iowa displays no clear trends or shifts. The norther regions use traditional cash markets and forward contracts. There are some increases in formula use in Nebraska but that method is not predominant. It is likely that the substance of price discovery with the U.S. cattle feeding regions has shifted away from the southern plains to the northern plains.

Interview Findings

For the thin markets project, I interviewed individuals that represent over 60 firms. Three of the four major packers where interviewed and this included personnel in procurement and management. Large formula operations were interviewed as were operations that extensively forward contracted. Large and small negotiated cash market operations were interviewed. Many of the individuals represented multiple feeding entities, some were active in industry associations, and all were asked to identify the information that they provided that was unique to their operation or that which was representative of the industry as they understood it – the idea here was to leverage contacts. Several individuals that negotiated cash trade for their business also marketed cattle for a network of other feeding operations. Confidentiality was promised to interview participants. Many interviews where coordinated through state cattlemen's associations: individuals were sought that would be forthcoming, representative, which were thoughtful and innovative, and important to that region. Much discussion was reinforced across participants. And in many cases these interviewees were individuals from large long-term businesses.

Formulas have the following structure. The cattle feeding organization contacts the beef packer to schedule anticipated marketings at least two-to-three weeks in the future. Often there is longer term coordination of marketings – and procurement. The packer has the choice of day of the week for pen

slaughter. Feedlots have essentially all, and packers have little-to-no, control over the marketing decision. In this sense the idea of formula cattle as being "captive supplies" is incorrect. Formula transactions are paid a base price and then there are meat quality premiums and discounts that are faced by the cattle owner after the cattle are slaughtered. The packer may or may not own a share of the cattle in the transaction. In the past, packers have provided some level of financing which translated into partial ownership but this is currently less prevalent. Nonetheless, formulas can and are constructed to create risk and return for the packer in terms of animal performance. There is communication between the cattle feeder and packer in these relationships but it is not price related. The packer agrees to pay "the market" and the cattle feeder agrees to receive "the market". Then there are premiums and discounts for good and poor cattle management. The communication is about anticipated future availability of animals. Formula feeders communicate expected marketings and change that information as animals do better or worse during the feeding period – which is largely determined by animal potential, nutrition – or the feeding program – and weather. Packers use this information to manage the cash buy and forward sales of beef.

A conceptual difference within formulas that is not apparent in USDA AMS price reporting is long-term versus short-term formulas. Long-term formulas are evergreen agreements between cattle feeding enterprises and beef packing enterprises. The arrangement developed so that the cattle feeding enterprise could implement supply chain management. The packer had a similar goal in terms of managing meat quality, slaughter and fabrication costs, and plant utilization. Frequently, the long-term arrangements were to develop supplies of particular production methods and develop a path to market consistent supplies of those products. In addition, formula cattle feeding enterprises have conducted extensive cost-cutting exercises. These exercises showed substantial innovation.

Short-term formulas have no long-term supply chain based relationship. They are most frequently used by a smaller packer or plant to procure high-quality or pens with specific characteristics needed to satisfy marketing of program meat. For example, several packers have cattle breed based programs – for example, Angus – without formal long-run arrangements. The packer will often bid and the feeder will accept something like $2.00/cwt over the USDA AMS regional market practical-top price. The buyer and seller are pricing the value of the pen characteristics relative to that market base. And because the total price is not negotiated the transaction is reported as a formula. These short-term formulas have been used extensively in the southern plains – and are emerging in the north. The appeal of these short-term arrangements was the ability to price any unique aspect of the pen and the ability to be paid or pay "the market price." Both cattle feeders and packers wanted the cattle sold and bought and both are concerned about discovering a market price that sets the market and does so at a disadvantage.

Practical top prices are likely used relatively frequently because fed cattle prices for a given week can be negatively skewed. Thus, a high base is used for most cattle formulas as opposed to the variety of bases – high, low, and middle – that are used with hogs. For example, the trading range for a given week and region may be $152-158/cwt with the majority of trade in $156-157/cwt and the weighted average being $156.65/cwt. The practical top is then $157/cwt. That is the price that would be reported for that type of formula trade the following week. (The $2 over the market formula transaction of $159 would be included in the weighted average price that is reported.) Then almost all formula transactions – live

weight or in-the-beef – have to stand for discounts and premiums. Long-term formulas appear to always face premiums and discounts whereas short-term may not. The beef characteristics underlying the premiums and discounts are almost entirely the standard USDA Quality Grade and USDA Yield Grade. Premiums and discounts prices may then be unique to the plant, packer, or may be based on USDA AMS reports. This net price is then provided in AMS net price reports. Longer-term programs and formulas have then been designed to pay premiums to compensate for nonstandard and non-USDA-graded practices such as beef tenderness protocols, natural protocols, cut size and yield protocols, and other retail programs.

There are a variety of examples of formula arrangements where cattle feeder owns a portion of the meat. Some of these arrangements have persistently struggled and others have been very successful but most are usually only some small portion of the packer and feeder volumes. Some formula transactions are valuations within a vertical integration arrangement – both the cattle feeder and the packer own the cattle on feed and the beef meat products sold. And from that perspective, the price is a transfer price. However, these vertical integrated relationships tend to be unique.

One purpose of the interviews with formula operations was to determine the value of formula arrangements. Use of formulas allowed the cattle feeding industry to supply-chain-manage. Animal and meat quality was increased and production costs were reduced. Further, it was innovated by the cattle feeding industry. It is interesting that research tends to approach alternatives to the cash market in the context of market power and not as a technology change. Interviews find one main impetus behind the increased use of formulas and that is that marketing method choice is largely driven by the feeding industry's cost cutting exercises. The use of formulas allows operations to increase quality and value of sales and decrease costs of feeding. More notably, formula operations run at excess of 90% of capacity whereas cash operations historically run at high-70s to low-80s in terms of percent capacity. Well-run cash operations can be in the high-80s to low-90s. (One formula feeding enterprise that was interviewed ran in excess of 100% of capacity.) This level of capacity can result in a substantial reduction in fixed costs across the animals produced and marketed.

There are also risks associated with participating in the cash market. The main risk is that the cattle will not be marketed in the most optimal week or in the predicted week. Use of the cash market results in the risk that negotiations will fail and pen marketing will be delayed. Larger cattle feeding enterprises communicated this and small cattle feeding enterprises communicated this. Large enterprises stated that they could not risk having significant portions of the showlist not delivered the week that the animals needed to be marketed or the week that management planned on the animals being marketed. Small enterprises stated that they could not risk not having what they perceived as effective bids for a given week. This was very common thinking in the southern plains. This thinking was less common in the northern plains with more packers and more plants. Interesting, packers communicated similar perceived risks. The predictable flows of AMA cattle and the additional communication in the AMA marketing process allowed for improved scheduling of packing plant operations. This improved efficiency translates into reduced costs. Many packing firms had reduced procurement staffs by half to two-thirds with increased use of AMAs. There is also a bit of a self-fulfilling prophesy here. Increased use of AMA cattle in a region by packers increases the risk to the remaining cash marketers of not being

able to market timely. Perceived imbalances in packing capacity relative to cattle feeding capacity were much discussed in the south and less so in the north. Further, program cattle – and cattle associated with brand marketing or value-added – tend to be marketed through AMAs. Cattle feeding enterprises and packing enterprises rely on the prices for these value-added beef products to be tied to the underlying cattle and beef market and not due entirely to the relative supply and demand balances of the program cattle.

Formula operations achieved efficiency and value from formula arrangements relative to using the cash market. These operations could routinely construct $25 per head values associated with formula marketing during the interviews. Animals and pens were more efficiently managed while on feed. Business operations were more efficient with less overhead. Throughput of animals – percent capacity utilization – was higher. Animals and pens were paid more premiums and fewer discounts associated with carcass characteristics. Costs were lower and revenues were higher. The amount of $25 per head is a conservative figure. Businesses that made substantial use of cash markets disbelieved this evidence. And well-run cash operations could have similar efficiencies, animal valuations, and overhead reductions but the complete system was less formal in the cash market business model.

Formula operations communicated a necessity to move away from cash market use. Participating in the cash market disrupted operations. Cash market information was often important but participating in that market was a detriment to the business and the cash market information value was substantially less than the value of the formula. Very rarely did any formula operation express an interest in returning to the cash market or in marketing any animals through cash markets. A very small number of businesses suggested additional fed cattle could be marketed through the cash market to generate price information. Mainly, formula operations viewed selling in the cash market as at least a $25 per head cost. The cash market had value in terms of price information but not in terms of opportunity. Within cash operations interviewed, individuals communicated a skill set, interest, and a strong perceived need for continuing to participate in the cash market. These business models, the individuals that create them and are attracted to them, are different from formula operations. Cash operations believed the work they did negotiating price had value. Further, these operations expressed dissatisfaction with doing the price discovery work that the formulas then used. They clearly understood they were the residual market, there were fewer businesses in this portion of the market doing the work, and were dissatisfied. More than one cash operation stated that they bid and ask a cash price and then converted the agreed to market price to a futures basis price knowing that the basis realization would be by default reported by the AMS as a forward contract price.

The other type of business model interviewed that made minimal use of the cash market was those that extensively forward contracted. There are a number of these operations. The forward contracting here is not hedging. Price risk management was an integral part of all feeding organizations. The only operations that did not communicate the importance of price risk management were diversified with farming and crop enterprises. But forward contracting here is negotiating a price for fed cattle outside of the cash market window. Ownership transfers from the cattle feeder to the packer with an agreed to forward contract price. Forward contracting operations were integrating upstream to feeder animal and calf suppliers, were sourcing cattle early, and had well-coordinated systems for sourcing based on

pricing opportunities. Many long-term formula operations did this as well: the process of sourcing cattle was an integral part of the business model. Similar to formulas, forward contracting was indispensable to the business and more valuable that the cash market. Again, cash market information was important but it was the risk management was essential to the firm. The cattle needed to be sold. Forward contracting operations tended to have younger independent owners, more borrowed money and less investment capital.

Forwarding contracting operations were asked to value that marketing method. What was that method worth relative to, for example, returning to cash market use? This was a difficult question for all interviewed. Forward contracting was how the business operated. Interviewees had difficulty envisioning operating any other manner. This was unlike formulas which were often used specifically to decrease costs and increase revenue. Dollar amounts could be constructed by formula operations through benchmarks. Forward contract operations did not have similar benchmarks. But values less than the formula $25 per head – $15 to $25 per head – could be constructed through risk management and size-of-business assessments. Thus, the value of forward contracts is less than formulas but still substantial and higher than valuations of the cash market.

Sourcing decisions for both forward contracting and formula operations were coordinated with growing operations both within the cattle feeding enterprise and with contractors providing growing services. AMA organizations appeared to be integrating upstream to secure supplies as animals and forage resources were available. This is where the cattle feeding businesses innovated and invested time. There was less integration downstream between cattle feeding and meatpacking operations – formal integration and not just separate cattle feeding and meatpacking profit centers owned by a parent company. However, there is some formal integration and some innovative relationships. The valuing of most transactions between cattle feeders and meatpackers are based on price and in terms of live or carcass weight. With valuation based on price, profits of the cattle feeding and meatpacking businesses are not combined. Price creates separation. Most formally integrated operations valued based on price. However, others valued based on proportional ownership of animals. In these quantity-shared relationships, feeding organizations produced animals that make the packer money as well as the feedlot. And packers ran operations to make the feedlot money as well as the packer. These quantity-shares do not require fed cattle price information – only wholesale beef price information. The interviews demonstrated that these relationships also required substantial communication of financial information and trust not needed in arm's length price-based transactions. These quantity-share arrangements are present but not prevalent.

Interviewees were asked if fed cattle markets were too thin: what proportion of cash trade is too thin? And too thin implied the formula operation would not use the price from that market or the cash operation would discount the usefulness of the price information. There were marked differences between businesses that use the cash market and those that used alternatives. Cash market traders wanted to see 30-50% of trade in a regional market as cash trade. Formula operations were less concerned about thinning cash trade (10% was more than acceptable) as long as the resulting prices in the thin region mirrored prices in other regions. Forward contracting operations viewed themselves as not contributing to the thin markets problem. Clearly with the AMA operations, the focus of concern is

on information revealed by price and not the price discovery process. Price discovery is the changing of price to reflect changing market conditions. It is work. There was little recognition of this function – learning which markets discovered new market conditions first – as long as prices were not out of line with other markets then there was no perceived problem. This is a striking finding: an understanding of price discovery is not common.

With the cash trade in Texas-OK-NM effectively approaching zero in late 2014, formula operations in those areas and packers procuring through formulas were asked how they changed the pricing of those arrangements and what they would consider in the future. There were volume contingencies for the price used in every formula. There were volume minimums requiring additional communication and possibly the price used would change. Different neighboring USDA AMS regions were used instead or to form an average. Likewise, the price change in the neighboring region was used with the previous reported base in the too-thin market. The USDA 5-Area weighted average price was also used in raw form and with adjustments based on history to the thin region. A surprising result was the willingness to transition to futures contract based pricing or basis pricing of formulas – considered but not much used. Futures contract prices and averages of prior days – and future days – were being considered for formulas. Futures based basis pricing were also used for cash trades. And basis trades that were hedged by the cattle feeder were often converted to a hedged position for the packer buyer.

Formulas and forward contracts clearly have value. So what's the negotiated cash market worth – in terms of opportunity for use and information provided? Information on the value of price information, which can be interpreted as the value of the service of those that perform price discovery, plays a role in potential public good market interventions. Some of the industry members that were interviewed expressed a willingness to pay others to discover price that is then used in formula transactions. Many formula operations recognized the need for price information in current – very successful and valuable – business models. The missing market is the market for price information. Price information is ubiquitous in a market economy. However, its abundance is shrinking while it remains needed to value fed cattle transactions. This information is also needed in the context of risk management. All formula operations conduct substantial risk management. And they recognize with less price information there is less historical basis information upon which risk management programs depend.

In addition to valuing formula and forward contract marketing methods, AMA operations were asked to value cash market price information. What is having cash market price information worth? What would they be willing to pay and similarly what would they be willing to be compensated to do the work of price discovery? The calculus hinges on how much greater is the value of AMA methods than the value of price information? Cash price information is not worth zero but is significantly less than the value of AMA methods. When pressed, interviewees communicated that cash price information was worth $1-$3/head. There were a few larger valuations but all were less than $5/head. (Many businesses approached the question that the information was worth the value of current – and possibly future – Beef Checkoff. The current checkoff is $1 per head and discussions are to increase that amount to $2 per head.) These are willingness to pay measures. Willingness to accept measures were comparable for operations that negotiate in cash markets. Cash market operations in fact often started their answer with that cash information was indispensable – implying very high value. However, cash operations

reversed themselves and made more reasonable arguments when asked what to pay amount for access to price information. Reasonable assessments were by both cash and AMA operations once the issue was framed as willing to pay and willing to accept. Further, formula and forward contracting operations were simply almost always not willing to do this activity – they were willing to pay but not willing to be compensated. Cash operations were willing to accept almost any amount recognizing that they were paid zero now but were also not willing to sacrifice the ability use to short-term formula.

Interviewees were then asked about the value of cash price information in combinations of regional markets – for example, southern (TX-OK-NM and KS) and northern markets (NE and IA) – and the value of information at the national level of the 5-market weighted average. Combinations of markets were worth more and the national market was the most valuable but valuations did not escalate. Interviewees were relatively unwilling to value multiple and national markets – "it's more" – but cooperating with this thought experiment was not much done. Further, all recognized that the value of cash is clearly and directly limited by the fact that there is a futures market and it will simply do more of the price discovery work. They also recognize that the performance of the futures market would be at issue with a thin cash market to which it is tied. But it was communicated that it was a problem for the Chicago Mercantile Exchange. (Maybe not after the fall of 2015.) The cash market valuations clearly suggest formula marketing will be the dominant method and that cash market use will continue to thin. This is a clear result of these interviews: AMA marketing methods are valued higher than that of marketing through the negotiated cash trade. It is in the best interest of the individuals within the fed cattle industry to use AMAs and to make less use of the cash market.

Thin markets price discovery research makes use of two parameters which are assumed in all past applied work. The method is based on the Chebyshev inequality that communicates a sample size (number of transactions) needed to assess a population parameter relative to a sample statistic (this is sampling error) with a certain probability. The unknown parameters are the sampling error and the probability. With these two parameters then the number of transactions needed can be calculated. Questioning interviewees about these two assumed parameters was a difficult exercise. The questions are almost unanswerable even for interested and informed participants. (They are certainly unanswerable outside of an interview format.) Prior research uses $1/cwt or substantially less and 90-95% for the probability. These two parameters were too small and too large for those interviewees willing to continue the discussion. The $1/cwt error was the lowest figure suggested and 75-80% of the time was a more typical probability. These elicited parameters imply that industry member's working knowledge of markets say that effective price discovery can happen with historically small cash trade before it is a problem. The bigger issue to the industry was the longer term persistence of the problem and the impact on business profitability. No interviewee was concerned that thin markets had negatively impacted business profitability over a significant time period. Although some cash businesses communicated that their work had moved prices higher week in and week out. If an impact on profitability was the case then interviewees said they would act. I followed up with, "What would you do?" Discussion was vague after that. Frequently, that question was then posed back to the interviewer, "What should we do?" In short, the industry is aware of the issue, concerned that it may be a problem, and is to be open to prescriptions for industry action.

The information above gives a hint as to the direction the discussions went regarding, "What should the industry do about it?" There was an interest in almost any means of addressing the thin markets issue – except legislation and regulation. However, it was not apparent that specific actions being taken by businesses. Actions that might impact discovery, price information, and price reporting being considered by businesses interviewed were all in the best interests of those doing them and minor consideration was given to the impact on the marketplace.

Interviews progressed through the acceptability of the proposed policy prescriptions. There were interests in participating in industry discussion, electronic trading, using marketing firms, and even compensating price discovery providers. But there was nothing specifically being done to address the thin markets problem. There were vertical integration arrangements that eliminated the need for a cattle price. But vertical integration was done for business reasons and not due to fed cattle pricing concerns. Again, reasons were internal and not due to problems valuing fed cattle.

Anything and everything was not acceptable, as there was no interest in government intervention and regulation. And little interest in new information sources. There were no technical fixes being used. There were those that were concerned for price discovery, and especially in the southern plains, but there were no actions to specifically improve it. The interest in electronic markets displayed the first-mover concern: they would want to see it work before they joined. It was well-recognized that, unlike financial services, overcoming transactions – primarily transportation – costs associated with trading cash fed cattle would be a problem for development of new or electronic markets. Many individuals talked about the need for trust and that there are high transactions costs in trading cattle – there are things that can impact the profitability of a transaction that may not be easily measured beforehand. Many other individuals talked that this was not an issue in that they had extensive databases of animal performance and profitability and that they established trust based on long proven histories. There was interest in using market makers such as those commission based firms that trade cattle for members.

I do not believe volume will return to cash markets outside of industry direction – or policy legislation. There are strong incentives for individuals to market fed cattle through methods other than negotiated cash trade. Interviews revealed the value of alternatives to the cash market. Marketing fed cattle is a technology with different short-run and long-run costs and different abilities to adjust or substitute. Formulas and forward contracts are too valuable relative to the value of a thickly traded cash market. For those that use that business model, the overwhelming individual economic incentive is to use formulas and forward contracts more and use the cash market less. The cash market has value – in terms of opportunities and information – but that value is small. There was interesting and impressive innovation in cattle feeding business models. There was a strong use of technology and effort to coordinate upstream. But no similar level of innovation in valuing fed cattle. Forward contracting businesses were doing the most. They had accumulated basis bid/ask history for cattle placed and to be marketed in certain windows. This information is not well known to firms that do not do something similar at substantial volumes. There were a few current formula businesses that stated a willingness to trade more fed cattle in cash markets. That they could and would do this if they perceived markets were too thin. This was not a common position.

But the value of the cash market is not zero. Many formulas use information from efforts of those that negotiate cash prices. Likewise, forward contracts can require historical information on cash prices to construct basis estimates – or a history of basis bids and basis trades which are not public. Further, it has public good characteristics. Price information is a good needed by many in the industry and in upstream and downstream firms. However, alternatives to the cash market make use cash market information but do not contribute to its provision. This is the classic public good problem. To protect the commons – the value of the cash market opportunity and its information – the cattle and beef industry must do things to help the remaining cash market work better, offset incentives to not use the cash market, and/or create a market for the price information. These are the policy prescriptions for the industry to consider. Further, approaching the problem from this perspective will result in the problem being fixed as opposed to it being a much-discussed persistent problem.

Conclusions

The thinning cash fed cattle market is the result of participants making use of alternative marketing arrangements (AMAs). For the fed cattle industry AMAs are largely formula cattle and less so forward contracts. Participating in the cash market has costs. There are strong incentives for individual businesses to move away from using the cash fed cattle market. Discussions with cattle feeding industry members reveal that the costs of participating in the cash market are high. Making use of formulas or forward contracts reduces these costs. In short, fed cattle are marketed in a timelier manner so that meat quality and animal performance are improved and these enterprises are also more efficient in management and operations. Businesses could construct $15-$25 per head values associated with AMA use. Fed cattle pens have a known buyer and will have market price risk well-managed. Cash markets can be relatively disorderly. Negotiating in the cash market has the risk that the effort fails and fed cattle are marketed at higher costs later. These positions were reinforced by interviews of packing businesses. Coordinating the marketing of fed cattle allowed lower costs, better plant management, and improved flows of quality-differentiated products. Alternatives to the cash market were found to be more valuable relative to the value of thicker cash markets. Cash market information and possibly opportunity was worth $1-$3 per head. Further, marketing method use, from discussions with the industry, have the appearance of changes in combined production and marketing technology.

The cash market is not as valuable to those that have business models based on formulas or forward contract. But cash market information is often important. It is valuable to those businesses that use formulas and forward contracts, and also to all those upstream businesses that produce seedstock and feeder cattle as well as all those downstream businesses that provide beef food products and services. But the individual incentives are clear and we will have thinner fed cattle price discovery in the future.

The incentive that benefit the individual does not, in fact, benefit the overall marketplace in terms of the quality of price discovery. Cash fed cattle price discovery in 2015 was effectively conducted in the northern plains. There is some price discovery in Kansas and arguably none in Texas. As important as the southern plains are in the production of fed cattle there is relatively little work conducted there to determine the value of those fed cattle.

To date, the thin markets discussion has not recognized the public good aspect. Formula and forwarding contracting operations use information provided through the efforts of negotiated cash market participants. Cash market price information is used in many formula operations and is decision support information for forward contracting operations. The extent of the using but not providing information has become problematic in some regional markets – in particular the southern plains. The solution to the problem: what to do about thinning cash markets involves mechanisms known to solve public good problems. The solution involves selective or some combinations of: communication, institution development, technology, information, market making, or legislation. But to date, only legislation has been proposed and that solution is most opposed by industry members.