

Information Transmission in Cattle Markets: A Case Study of the Chariton Valley Beef Alliance

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The declining share of beef in total U.S. meat consumption has motivated industry-wide efforts to improve average beef quality through more effective coordination among the various market participants. Increased use of explicit grid pricing mechanisms over the last decade represents initial efforts at improved coordination. More recent efforts include animal-specific carcass data collection, with subsequent transmission to feeders and the relevant cow/calf operations, and improved source verification procedures aimed at (among other things) reducing the overall cost of medical treatment for live animals. None of these organizational innovations is costless, and indeed a number of significant barriers must be overcome before more widespread adoption of such practices takes place. This paper takes a detailed look at one organization's attempts to overcome some of these barriers, and provides a qualitative assessment of this and other potential organizational responses.

Key Words: cattle and beef markets, information transmission, producer alliance

U.S. beef demand has increased since 1998, due in large part to a change in consumers' preference for red meat (Purcell, 2000). However, beef consumption has declined steadily over the last two decades, both in aggregate quantity and as a share of total U.S. meat consumption. Reductions in the price of pork and poultry relative to beef, and health concerns regarding the consumption of red meat in the 1980s and early 1990s, account for a large portion of this trend. Relative improvements in the quality and consistency of pork and poultry products are also cited as important contributing factors (Purcell, 2000; Schroeder, Marsh, and Mintert, 2000; Piggot and Marsh, 2004). Perhaps not coincidentally, beef has lagged behind pork and poultry in adopting mechanisms for vertical coordination among the various production stages from farm to market. Contract arrangements and direct vertical linkages are common in pork and poultry production, while beef production is still predominantly coordinated through market mechanisms (Hayenga et al., 2000).

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Whether vertical coordination of the kind observed in pork and poultry markets is necessary for further improvement in beef quality is a question that beef industry participants are currently trying to sort out. A variety of novel marketing practices have been adopted in recent years in an apparent attempt to improve quality and reduce overall production costs. At one extreme, there have been (recent) attempts to fully coordinate the beef production process with a single firm orchestrating genetic selection, feeding practices, slaughter and fabrication, and marketing. During 2004 and 2005, Smithfield, the world's largest pork producer and processor, increased vertical integration in the beef sector (*Cattle Buyers Weekly*, 2005). Long-term marketing arrangements between feedlots and packers represent a somewhat less extreme form of coordination, and have been used in some production areas for many years. Interestingly, the mostly widely adopted change in recent years—so-called grid pricing—represents an attempt to improve *market* coordination through more sophisticated quality-based pricing mechanisms. In this case, and in contrast with direct vertical coordination, there are essentially no formal vertical linkages, though there is an attempt to improve vertical coordination by sending more precise signals concerning the relative value of alternative carcass attributes.¹

Behind all these efforts is at least one common objective: to align incentives among the various specialized segments involved in beef production so that quality improvement is in everyone's self-interest. As explained in further detail in the next section, many of the traditional mechanisms for marketing live cattle (both feeder and finished cattle) are seemingly not designed with this objective in mind. In particular, there are significant restrictions on the flow of production-relevant information across the various stages of beef production. For example, feedlot operators are typically not provided detailed information on the genetic characteristics and health status of animals arriving at their feedlots, even when efficient feeding strategies may be contingent on each of these pieces of information. Similarly, ranchers normally receive, at most, lot-average information on the carcass characteristics of cattle they produce, making it impossible to evaluate the performance of individual breeder cows for improved genetic selection. Of course, removing these sorts of restrictions is not costless. Information has to be collected and transmitted, and perhaps most importantly, incentive structures (i.e., marketing arrangements) must be developed that provide the relevant parties appropriate incentives for doing so. One can only expect organizational change of this nature to occur if the associated benefits are sufficiently large relative to the costs.

To get some feel for the potential magnitude of these benefits and costs, we take a detailed look at one organization's (the Chariton Valley Beef Alliance) attempt to overcome restrictions on information flows among cow/calf operations, feedlots, and packers. This particular organization operates as a market intermediary by facilitating coordination within existing market mechanisms, and thus achieves a degree

¹ This presumes, of course, that in fact consumers are willing to pay for improved quality, and that producers can respond if given the right information. For evidence on demand for quality or specific traits, see, for example, Lusk et al. (1999) or Umberger et al. (2001). In the next section we document how producers can and do respond to better information.

of vertical coordination without formal vertical linkages. As noted earlier, this is in contrast to other types of coordinating institutions (e.g., fully integrated organizations, and other forms of formal vertical linkages). Our case study and analysis are unique in their focus on information transmission across firms and individual producers, as opposed to contract design and internal firm management.

In what follows, we begin with a brief overview of cattle production and marketing, and provide more detail on the informational barriers that exist in these markets. The activities of the Chariton Valley Beef Alliance (CVBA) are then examined in the context of these markets. Next, we analyze the relative merits of organizations like CVBA that operate largely within the structure of existing cattle markets, relative to other forms of vertical coordination involving significant consolidation of asset ownership and decision-making authority among cattle market participants. The final section concludes by examining beef industry challenges in the context of broader economic questions and in light of the proposed National Animal Identification System.

Cattle Markets and Information Transmission

Our intent in this section is not to provide a comprehensive description of cattle markets, but rather to focus on a particular set of issues having to do with the transmission of production-relevant information across the various stages of production. In particular, we examine existing barriers to the flow of production-relevant information from cow/calf operators (or ranchers) to feeders, and in reverse from packers to feeders and ranchers.

The production process for beef cattle is typically characterized in terms of a number of discrete stages starting with genetic selection and breeding, then rearing and weaning, and finally feeding to market weight (finishing) and slaughter.² Specialization in cattle markets largely mirrors each of these stages: seedstock firms control genetic selection and breed development, ranchers manage cow/calf herds and raise young calves through the weaning stage, feeders raise animals from weaning to market weight, and packers slaughter and process live animals. Although there are many variations on this specialization structure,³ for the moment our focus is directed to this particular arrangement.

One can, in principle, characterize efficient decision making at each production stage, subject to a given set of growing conditions, breed type, feed costs, and other market parameters, and subject to many other pieces of production-relevant information. For instance, a feeder's nutrition and health maintenance program for a given animal (or lot of animals) might conceivably depend on nutrition and treatment histories during the rearing and weaning production stages, thus creating the need for information transmission from ranchers to feeders. Evidence of latent

² Often the finishing stage is preceded by a "backgrounding" stage that serves as preparation for finishing.

³ An individual producer might simultaneously ranch, feed, and develop seedstock; some packers own feedlots that supply their plants; and so on.

demand for this kind of information comes from a recent survey of feedlot managers, where respondents indicated they typically receive little information about incoming feeder cattle vaccination schedules, implant or nutritional histories, and even less about genetics and feedlot and carcass performance (Behrends, Field, and Conway, 2001). This is the case even though the vast majority of respondents also indicated a willingness to pay a premium for cattle with accurate information on these criteria. More recently, Busby et al. (2004) quantified a significant reduction in feedlot performance and carcass quality of animals that were treated twice for sickness compared to those that did not require treatment.

Transmission of production-relevant information from ranchers to feeders is important for real-time decision making in feedlots, while information about management procedures and production outcomes during feeding and finishing is important for future decision making and efficient adaptation by ranchers. Thus, it may also be important to transmit information in the reverse direction, from feeders and packers to ranchers. For example, ranchers need information on feeders' management procedures, finishing performance (e.g., average daily gain, feed efficiency, health status), and post-slaughter carcass quality in order to evaluate past decision making. That such information can indeed improve decision making is documented in Hall, Parrish, and Busby (1993) where multi-year participants in steer test programs who received feedlot performance and carcass data were able to achieve a greater degree of uniformity, as evidenced by smaller standard deviations for nearly all quality and yield relevant carcass attributes. Forristall, May, and Lawrence (2002) identify important economic tradeoffs among many of these variables, and Strohbehn (1999) shows that carcass values for producers selling on a grid can vary by as much as \$350 per head within a load.⁴ Thus, information that allows producers to more carefully manage and sort cattle can be of considerable value.

While information transmission of these sorts might seem like an obvious requirement for efficient decision making in beef production systems, in fact it rarely occurs. Tracking, recording, and transmitting information is costly; precisely how costly depends in large part on how coordination is achieved. To illustrate, imagine that each production segment is represented by a single firm and these firms do business only with each other. Information transmission in such a setting is relatively straightforward, so long as the parties can control various kinds of strategic behavior that might arise. For example, depending on how prices are determined for feeder calves, ranchers may want to falsely report information about their calves in order to increase their value in the eyes of the feeder. Unless all relevant information about the calves can be obtained from visual inspection (in which case information transmission occurs trivially), some procedure is needed for verifying information reports. In the relatively simple organizational structure contemplated here, where in particular the parties are engaged in a repeated relationship, it is perhaps natural to suppose that these kinds of strategic problems can be overcome with dynamic

⁴ Most of this variation is accounted for by discounts for nonconforming cattle (Trenkle, 2000; Ward and Lee, 1999).

incentives, and without incurring the cost of third-party information verification. This might be the case when a feedlot obtains cattle from the same ranch or ranches with whom long-standing relationships exist.

Now imagine a slightly more complicated organizational arrangement with a single feeder firm, a single packing firm, and a large anonymous group of ranchers who supply weaned calves to the feeder. Because the ranchers are anonymous, the parties can no longer rely on dynamic incentives, and must depend instead on some form of costly third-party verification. We can complicate this scenario further still by supposing that there are two or more feeders who compete for the supply of feeder calves at any given point in time. Then, in addition to third-party information verification (which in practice does not exist in this setting), some mechanism (e.g., auction) is needed to allocate available calf supplies efficiently. Although it is not immediately apparent how the need for such a mechanism further complicates information transmission, it is important to recognize that once established, its proprietors may have an economic interest in restricting information transmission. Such is apparently the case for some livestock auctions. There is anecdotal evidence that traditional auction barns fear detailed information transmission and communication between feeders and ranchers (i.e., the removal of anonymity), because this might lead to private contracting and elimination of the intermediate auction market. Transacting parties may conduct their business outside the auction to avoid associated marketing and commission charges. Finally, one more layer of complication can be added: in actual markets between ranchers and feeders, it is typically the case that only *some* ranchers and feeders wish to engage in more intensive information transmission.⁵ If the cost of setting up a separate market for these feeder cattle is excessively high, then the existing market must simultaneously handle both types of animals. As will be seen below, this induces significant transaction costs.

If the previously described costs are sufficiently high, the transacting parties may choose either to forego information transmission entirely or to seek some substitute information that is perhaps not quite as detailed but is less costly to obtain. In the context of markets for feeder calves, order buyers possibly fill this role. These are specialized individuals (and sometimes firms) whose expertise lies in evaluating feeder calves through visual inspection, and aggregating cattle into larger, more homogeneous groups. Many feedlots employ order buyers to supply calves with traits that are appropriate given the expected environmental conditions, end-product markets, and management practices of the particular feeding operation.⁶ However, any such visual inspection, no matter how experienced the buyer, is an imperfect

⁵ For example, some ranchers and feeders may choose to specialize in the production of commodity beef, yet still wish to use traditional marketing channels.

⁶ Interestingly, there are also USDA established grades for feeder cattle, though they are rarely used explicitly in actual pricing mechanisms between ranchers and feeders. Twelve distinct grades classify calves into various combinations of frame size (skeletal structure in relation to age) and thickness (development of the muscular system in relation to the skeletal system) (U.S. Department of Agriculture, 2000). Importantly, these grade attributes all pertain to physical characteristics of animals—there is no assessment of health status, prior feeding regimes, or any other unobserved attributes that may be important to feedlot operators.

substitute for transmission of all production-relevant information. Specifically, vaccination, nutrition, and treatments histories cannot be observed. Feedlots conservatively assume the worst case, often expecting the need to readminister treatments, and therefore reduce bid offers.

A similar set of arguments and discussion can be applied to information transmission in the reverse direction from packers to feeders and ranchers. As noted above, information about carcass traits is important to firms upstream from packers in order to assess the impact of decisions on performance, and to update decision-making rules. Traditionally, cattle markets have functioned without explicit transmission of carcass attributes to upstream producers.⁷ Recently, however, grid pricing—where the price paid for a given animal depends on various measured quality attributes, in addition to the total weight of the animal—has become increasingly common. Relative to traditional spot markets where price is based on live or carcass weight with no explicit adjustment for quality, significantly more information is reported back to ranchers and feeders. However, the information reported back is generally not animal specific, and even if it is, it often is reported only to feeders (and not ranchers who make genetic decisions). We explain below why this is so, but for now we note only that in most grid pricing mechanisms, packers report the distribution of carcass quality for a given lot of animals,⁸ rather than the carcass quality of each individual animal. Thus, for example, a feeder might learn that 60% of a given lot graded Choice and 40% graded Select, while 70% Yield Grade 2, and 30% Yield Grade 3, but not know how individual animals within the lot graded. This is important because management decisions often vary across different animals that are priced in the same lot,⁹ and feeders may want to know the carcass traits of individual animals in order to assess the efficacy of their management decisions.

In the next section, we describe the activities of one organization that is attempting to overcome these kinds of informational barriers in an effort to improve farm-level decision making. In the subsequent section, the generic coordination issues faced by the organization are identified, and the extent to which the organization has succeeded in its endeavors is discussed. Our intent is to use the activities of this organization as a case study of organizational innovation in agricultural markets. We also hope to shed some light on the important organization-theoretic question of why markets generally seem to be poor mechanisms for transmitting nonprice information across individual producing agents.

⁷ Some information is implicitly transmitted when buyers visually inspect animals for purchase and arrive at a bid price. Indeed, Schroeder, Marsh, and Mintert (2000) note how packing plants often provided order buyers with grid sheets indicating price premiums and discounts to award (or penalize) various expected (based on the buyer's *visual inspection*) quality outcomes. Nevertheless, the information conveyed through a buyer's bid aggregates information about individual carcass attributes that may be valuable in disaggregate form.

⁸ A "lot" of cattle in a typical feeding operation represents roughly 150–200 head.

⁹ This is an unavoidable consequence of uncertainty that is inherent in the biological production process for cattle. Because animals mature at uneven rates, a feeder may need to pool cattle across heterogeneous feeding and health maintenance regimes when preparing a lot for delivery to the packer.

The Chariton Valley Beef Alliance

The CVBA, which represents a core group of about 30 cattle producers in southern Iowa and northern Missouri, has been in place since early 1998. Initial motivation for the alliance arose from an increasing use of grid pricing arrangements by area packers, and resulting producer interest in learning to effectively produce, sort, and market cattle under these arrangements. There was also general interest among area producers in “adding value” to their cattle by improving quality and identifying higher paying markets. The organization’s primary activities directly address the informational barriers discussed in the previous section.¹⁰

The CVBA legally is structured as a 501C nonprofit organization, governed by an elected board of directors. Active CVBA members are self-described as larger and more progressive than typical midwest cow/calf producers, with most ranging in size from 80 to 350 beef cows. Many producers feed their own calves to slaughter weight and may buy other cattle to feed in their small feedlots. Because they feed their own cattle, members are better able to utilize carcass data and market information services to improve genetic selection and overall management. However, their small size also makes it difficult to justify the cost of providing these services by themselves.

CVBA provides three kinds of services to member producers: (a) grid marketing support and coordination of load deliveries, (b) carcass data collection, and (c) source verification. Each of these services is discussed in detail below.

Grid Marketing Support and Load Coordination

Grid pricing greatly increases the incentive to sort cattle into relatively uniform lots that will perform well on particular grids. A typical grid offers a base price for Choice Yield Grade 3, and then premiums and discounts for quality outcomes above and below this base. However, the specific premiums and discounts offered can vary substantially across different grids.

Of course, it is impossible to know the exact distribution of quality within a given lot at the time a feeder markets his or her cattle. Relative to traditional spot markets, where buyers pay a fixed price for live animals, feeders thus bear substantial quality risk. However, this risk also entails a benefit which is the added incentive feeders have to produce high quality animals, and to carefully sort for a given distribution of quality. To the extent that producers and feeders are able to influence the quality of their cattle, and match heterogeneous cattle with the appropriate grid, these incentives can yield substantial benefit. Sellers and Bodensteiner (2001) summarize year 2000 performance for CVBA participants on roughly 4,000 cattle marketed into

¹⁰ Interestingly, none of the activities discussed below, possibly with the exception of source verification, necessarily requires a grower alliance to be carried out. However, each activity involves a substantial fixed cost, and thus may not be economically viable without sufficient scale. The CVBA and other similar alliances represent one way of achieving the necessary scale without formal consolidation and integration across farm operations.

four different grids. On a per lot basis, premiums averaged \$26.05 per head with a range of -\$40.44 to +\$79.01 per head.

The small-scale producer members of CVBA market relatively few cattle each year and do not have a basis for comparison to judge their cattle visually or with carcass data, nor do they stay abreast of grid program changes throughout the year. The CVBA assists growers in acquiring the skills to manage and sort for quality, and provides information to evaluate competing grids. This is primarily accomplished with analysis of growers' carcass data. CVBA also provides weekly grid-market reports, comparing base-price bids across grids, which include publicly available price information, and base price information collected from each packer individually. Grids commonly used in the Midwest are formula grids that pay growers a base price which is a function of the U.S. Department of Agriculture's Nebraska weighted average price, and the distribution of quality for each individual plant where a grid is offered. The specific functional relationship is composed of the USDA weighted average price report, plus a packer-specific adjustment (or cleanup) to ensure the average price paid for cattle in any given week (including premiums and discounts) is equivalent to the Nebraska weighted average price.¹¹ Such an adjustment effectively ensures that each packer pays roughly the same average cost for cattle.

Finally, given the size of most farmer feeder operations, it is often the case that a producer will have a number of cattle ready for sale on a given grid, but insufficient quantity to fill an entire truck. In such cases, CVBA also provides support for growers to coordinate in jointly filling a truckload for delivery to a particular packer. This service can result in substantial transportation efficiencies for long-distance hauls, allowing growers to sort more precisely and access grids at more distant packers.

Carcass Data Collection

As mentioned in the previous section, grid marketing involves the pricing of individual animals (rather than lots of animals) based on the measurement of various carcass-quality attributes, yet animal-specific carcass measurements are rarely transmitted back to the feeders and cow/calf producers who deliver under these arrangements. The CVBA facilitates and coordinates this transmission. Producers interested in obtaining individual carcass data pay a service fee to CVBA (\$3-\$8 per head), which then coordinates with a third party to physically carry out carcass measurement during slaughter; these measurements are then recorded in electronic form for access by the relevant producer. Packers cooperate in this process by

¹¹ For example, suppose there are just two producers, each with a single load of animals, and the relevant grid offers a price $w = \hat{w} - b + pq$, where \hat{w} is the Nebraska weighted average price for the relevant week, b is the cleanup, and p is the per unit quality premium for quality q . If one producer delivers animals with quality q_1 , and the other delivers animals with quality q_2 , then the cleanup for that week is calculated as $b = p(q_1 + q_2)/2$. Thus, the cleanup is calculated as the average premium (discount, if negative) across all animals delivered in a given week, and this amount is subtracted from the Nebraska weighted average price to yield the actual base price.

allowing third-party access to the slaughter floor to measure economically important carcass traits (beyond those reported in USDA yield and quality grades). CVBA additionally provides computational and analytic support for accessing and interpreting the relevant data. This analysis allows growers to make better marketing, nutrition, and genetic decisions.

While it might seem a trivial matter to distribute animal-specific carcass quality data to producers (given that prices are determined with these data), in fact, it is quite a complicated and costly endeavor.¹² As indicated above, doing so adds anywhere between \$3 and \$8 per head to the cost of production; Iowa State University Extension estimates a gross margin of roughly \$15 per head for Iowa feedlots, so these amounts are large. In any case, ranchers are the primary potential users of animal-specific carcass data,¹³ but are one step removed from packers. This further complicates collection of the data, because feeders must cooperate in obtaining the relevant data.

Source Verification

Assessing quality in markets for feeder cattle is a notoriously difficult task. As discussed above, quality assessment is largely carried out through visual inspection by experienced buyers. Many of the important quality characteristics of feeder calves are of course not fully expressed until the calves have been finished. Nevertheless, the bulk of cattle are sold by ranchers to feedlots through traditional market mechanisms (e.g., auctions and spot negotiations), and quality assessment at the point of sale is a highly subjective process.

One means of making this process more objective is to provide third-party verification of genetic and health characteristics of feeder cattle. While the ultimate quality of the finished animal is impossible to assess at the point of sale between rancher and feeder, it is possible to evaluate quality potential through this type of information.¹⁴ Moreover, if we define quality broadly to include potential cost efficiencies from acquisition of production-relevant information (as described earlier), then such information can be of further value. Anecdotal evidence suggests

¹² The difficulty in obtaining the data lies in the nature of the cattle slaughter and packing process. When an animal enters the plant and is slaughtered, it is immediately hung on a rail tracking system and assigned a plant identification code. However, rail outs of some animals disrupt the matching of plant IDs with growers' IDs at the point of grading. The task of the third party is to manually track animals through to the grading point using the growers' IDs, and to physically measure economically important carcass traits.

¹³ Other users of these data include feeders, breeders interested in the performance of progeny, pharmaceutical companies, university researchers, and others who want to measure carcass performance for research purposes.

¹⁴ Notably, increasing concern about food safety (and more recently, country of origin labeling) has resulted in efforts to establish systems for traceability—i.e., the tracking of firm identifications, and slaughter and packing dates associated with individual animals. In principle, there is no reason why other pieces of information, such as medical treatments, growth and carcass performance, etc., could not be added to each animal's record. However there is still the need to coordinate on the format and content of this additional information. Recent experience with efforts of the National Cattlemen's Beef Association to establish a voluntary standard for data recording suggests this is not a trivial matter (Smith, 2002).

significant amounts of excess treatment occur in feedlots as a prophylactic response to uncertainty about animal health status. CVBA assists in arranging third-party verification through its source verification program. In addition to providing an objective measure of quality, source verification provides feedlots with accurate information on the status of medical treatments that have occurred prior to the point of sale, and the genetic composition of animals in a given lot. Finally, CVBA's source verification program includes agreements by those receiving information on feeder cattle to return information on carcass quality. CVBA thereby assures that information flows in both directions.

Analysis and Lessons Learned

Barriers to Information Transmission and Incentives for Vertical Coordination

The activities of CVBA described above highlight the difficulty in transmitting information across firm boundaries and in processing information for use in actual decision making. At least three generic types of problems limit the free flow (and subsequent use) of information among the various stages of beef production:

- *Information Asymmetry.* There are opportunities for strategic misreporting of information arising from information asymmetries and differences in objectives of the contracting parties. A single rancher who sells feeder calves to a finishing lot may wish to overstate the health status of his or her animals in an attempt to bargain for a relatively high price. To the extent that health status is difficult to observe from visual inspection, full (and accurate) information transmission may require some form of documentation (e.g., treatments and test outcomes) and verification.
- *Imperfect Commitment.* In any coordination setting where there are opportunities for Pareto gain, realization of these opportunities requires full commitment from the relevant parties. In practice, full commitment is difficult to achieve because it is costly to contract on all relevant outcomes.
- *Bounded Rationality.* Individual producers (e.g., ranchers or feedlot operators) may lack the capacity to process information for use in actual decision making. Data analysis is a specialized skill, and information processing is costly.

As noted in our introduction, some authors have suggested that explicit vertical coordination is necessary for further improvement in cattle quality. This conjecture is consistent with the fact that organizational theorists often cite the generic problems enumerated above as principal motivations for vertical coordination (e.g., Milgrom and Roberts, 1992). However, there are many different ways in which vertical coordination can occur, so it is not entirely clear what specific kind of vertical coordination is necessary for further organizational improvements.

Vertical coordination may be defined in terms of the set of contractual requirements placed on sellers (e.g., the suggested use of specific inputs or management practices; product specifications), or possibly by the ownership of physical assets across multiple stages of production (i.e., vertical integration). The key feature of a vertically coordinated system that seems important in the context of cattle markets is the establishment of a long-term (potentially exclusive) relationship among the relevant transacting parties. Standard transaction cost arguments (e.g., Williamson, 1985) suggest a group of ranchers and a feedlot who commit to a long-term relationship (via an arms-length contract, or by becoming a single firm) can have confidence that any investment undertaken to establish an information tracking system will not be wasted. Similarly, committing all future deliveries to a single packer can ensure that any investments undertaken by the packer to solve the logistical problems associated with reporting (animal-specific) information on cattle quality will be fully rewarded. With a long-term relationship, the transacting parties may also avoid the need for third-party information verification,¹⁵ and can save on information processing costs by establishing a “culture” for coordinating the accumulation of firm-specific knowledge (Cr mer, 1993; Kreps, 1990).

While clearly beneficial in some respects, long-term commitments of this sort also entail costs. In particular, the parties to such an agreement limit their use of markets, which offer greater flexibility in procurement and sourcing options, enhanced price discovery, and arguably higher powered incentives toward cost-reducing activities. “Firms” inevitably involve elements of bureaucracy that can lead to inefficient resource allocation decisions, and possibly higher overall production costs. Activities by organizations such as CVBA can thus be viewed as attempts to achieve the degree of coordination and information transmission observed in firms, but without sacrificing the benefits associated with market institutions.

Chariton Valley Beef Alliance: Lessons Learned

So far, we have described the activities of the CVBA and some of the generic coordination problems these activities appear to address. Has the organization succeeded? And if not, where has it failed? What lessons can be learned from these successes and failures? In this section, these questions are addressed in relation to each of the generic issues raised above.

Overall, the organization has had great success in helping producers collect and process information. The core group of 30 growers continues to collect carcass data with the help of the CVBA, and to request assistance in evaluating grid marketing options. However, attempts to expand beyond this group have not been successful. Over the eight years during which the CVBA has been active, it has provided services to at least 350 distinct growers, but many have failed to remain active. According to Joe Sellers, the founder and lead organizer of the CVBA, many

¹⁵ In a repeated relationship, the transacting parties can rely on reputation as an enforcement device, thus eliminating the need for third-party involvement (e.g., Schotter, 1984; Bull, 1987).

producers “just lock themselves in [to one packer] and don’t want to spend the time evaluating grids on a weekly, monthly, or even yearly basis.” This comment reflects the real cost that must be incurred to process information. Careful monitoring of carcass data and of grid options simply may not pay for growers who have a high opportunity cost for their time.

CVBA’s attempts to develop a source-verified program for its members were largely unsuccessful. Two reasons are cited for this failure. First, it was difficult to get all producers to accept full *third-party* verification. Again, according to Joe Sellers, “For the producers who have 300–600 cows it’s really hard for them to do that with an external veterinarian because they can’t work all the cattle in a day. It’s really hard to get 4–5 days scheduled with our veterinarians and get that done, and some of those producers have other things besides cattle to take care of.” Second, the CVBA opted to run its source verification program within the existing market infrastructure for feeder cattle, but was never able to generate full cooperation among the organizers of this infrastructure. States Sellers, “... we wanted to work with the sale barns; we didn’t want them upset with us, so we were trying to work with them, ... but the two big ones we really needed weren’t really willing to do it. They would say, ‘it’s your deal, it’s your deal,’ and they wouldn’t help promote it and explain it to people.”

In summary, the CVBA has been quite successful in dealing with “bounded rationality” and information processing costs. Through the organization, producers have effectively spread the fixed cost of a full-time employee to assist in collecting and analyzing carcass data. It seems plausible that in a fully integrated cattle operation, one or more employees would be assigned a similar task. In this sense, the CVBA has been able to achieve some of the benefits of vertical integration via horizontal coordination.

However, the organization has mostly failed in attempts to overcome information asymmetries—and this failure is partially the result of imperfect commitment. Attempts to overcome (one form of) information asymmetry by source-verifying the health and breed status of feeder calves with a third party have failed in part because of the sheer cost of third-party verification. Moreover, strategic concerns among existing market participants have also played a role, partly reflecting the inability to costlessly enforce long-term contracts. Assuming there are efficiency gains from source verification (enough additional surplus is generated to make all parties better off), perfect contracting would allow, for example, the Chariton Valley Beef Alliance to commit to sharing some of this surplus with existing market participants, or perhaps just to a promise of continued patronage, *even if* source verification eventually led to some form of “private treaty” between the CVBA and one or more large feeders.

Whether or not the CVBA and other similar organizations will grow and overcome these problems is an empirical question that will be answered with time. In the interim, attempts to further characterize the relative costs and benefits of alternative organizational structures represent an important area for further research. For example, the discussion in this paper (and in much of the theoretical literature on

organizational design) views firms and markets as substitute organizational structures. In cattle markets, there appear to be instances of important complementarities where market prices are used within firms and among participants in vertically coordinated arrangements as a reference point in establishing terms of trade.¹⁶

Conclusions

In this paper we identify a number of seemingly obvious shortcomings in the way cattle production is organized, and discuss one organizational response to these shortcomings. Traditional cattle markets, while extremely efficient means of allocating cattle supplies across buyers, lack mechanisms for animal-specific information transmission. Given the segmentation observed in cattle production, information transmission is important for efficient decision making at each of the various production stages. The lack of information transmission represents a coordination failure. Specifically, all parties involved apparently understand the potential gains from improving communication, but lack appropriate incentives to do so. In some cases, various kinds of transaction costs must be incurred to bring about change.

The activities of the Chariton Valley Beef Alliance represent one response to this coordination failure. The alliance has attempted to aid growers with (a) grid marketing and coordinating load deliveries among multiple producers, (b) collecting and analyzing carcass data, and (c) “source-verifying” producers’ animals. Our case study indicates that the alliance has had modest success with the first and second of these activities, but has mostly failed in its attempt to develop a source-verified feeder cattle program. This failure can be attributed in part to the transaction cost associated with engaging a third party to conduct the verification, but also to a lack of cooperation among organizers of markets for feeder cattle. This latter factor may partially reflect the perception that source-verified systems represent a move toward tighter coordination, and eventual bypass of existing market organizers.

If an alliance of producers such as the one considered here is unable to achieve greater coordination within existing market institutions, some form of direct vertical coordination may emerge instead. The recent (and failed) initiative by the organizers of Future Beef Operations to form a ranch-to-market production organization represents one example of movement in this direction (*The Economist*, 2003). Recently proposed legislation to ban or limit the extent of contracting and vertical coordination in cattle markets (e.g., Schuff, 2002) clearly provides support for efforts to achieve coordination within markets, though possibly at the cost of biasing organizational evolution, and slowing the development of improved coordination systems. Finally, the proposed National Animal Identification System will provide an electronic infrastructure for tracking animals in the case of a foreign animal disease.

¹⁶ See Holmstrom (1999) for a discussion of complementarities between firms and markets where imperfect performance measurement is the key contractual friction. For recent surveys of empirical work on organizational design, see MacLeod (1995) and Prendergast (1999). Hueth and Hennessy (2002) survey recent empirical work in agricultural markets with a focus on risk.

The current USDA proposal will require that animals be identified and that their origin be traceable. This mandated infrastructure will lower the cost of transferring other economically important animal information, possibly leading to greater information transmission of the kind discussed here.

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