



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

378.755  
R47  
R01-1

# **Risk Sharing and Compensation Guides for Managers and Members of Vertical Beef Alliances**

by

**William T. Hudson and Wayne D. Purcell**

**August 2001**

Waite Library  
Dept. Of Applied Economics  
University of Minnesota  
1994 Buford Ave - 232 ClaOff  
St. Paul MN 55108-6040

SP-01-01  
Department of Agricultural and Applied  
Economics  
Virginia Tech  
Virginia Cooperative Extension  
Virginia Tech and Virginia State  
Virginia's Land-Grant Universities

Research Bulletin 1-2001  
Research Institute on Livestock Pricing  
Agricultural and Applied Economics  
Virginia Tech – Mail Code 0401  
Blacksburg, VA 24061

377 755

R47

RC1-1

# **Risk Sharing and Compensation Guides for Managers and Members of Vertical Beef Alliances**

by

**William T. Hudson and Wayne D. Purcell\***

**August 2001**

\*Research Assistant and Alumni Distinguished Professor, Virginia Tech, Agricultural and Applied Economics, Blacksburg, VA 24061, (540) 231-7725, purcell@vt.edu.

## Introduction

The beef industry is going through significant changes in terms of how the various activities along the supply chain are coordinated. Traditionally, there has been a pattern of separate profit centers with the price system assumed to be the mechanism that would ensure coordination between what is produced and what the consumer wants and is willing to pay for. As the demand decreases that started in 1979 or 1980 continued and the negative economic impact accumulated, the decade of the 1990s saw rapid growth in efforts to find some other way of providing the needed coordination and quality control. Some analysts have said that the price system has failed and that a continued divergence between what is being produced and what the consumers want in some important beef attributes, such as tenderness, is being allowed. If the price system has failed and is not capable of prompting the needed coordination, then it is not at all surprising that decision makers in the industry are looking for some alternative and non-price means of coordination.

In the final analysis, the product that is produced, processed, and prepared for consumption needs to fit what consumers want. It is widely known from surveys and focus work that the consumers want a consistent, high-quality eating experience in beef, and they want convenience in preparation. That desire for and willingness to pay for convenience is arguably the primary reason that we have seen a resurgence of steakhouses and steak chains. Consumers have had money in their pockets in the 1990s and they have been willing to pay for the experience and the event of eating out. That has not meant, necessarily, that the beef entrées served at the steakhouses were meeting the needs and desires of consumers. Meat scientists who have conducted three quality audits across the past 10-12 years have concluded that up to 20-25% of the Choice grade steaks and roasts were too tough to chew. Such a horrific product failure rate could not be tolerated in the long term, and non-price means of providing vertical coordination and quality control, such as vertical beef alliances, have emerged as possible answers.

Where there had been separate profit centers and adversarial relationships between those centers, the vertical alliance tries to bring the different players in under one management umbrella. It is not surprising that this has been a somewhat volatile and difficult process. Driven by a need to be compensated for value if they are producing quality cattle with desirable attributes of marbling, tenderness, and palatability, producers come to the alliance looking for solutions. Representing a sector that has always been at the end of the beef cycle whip in terms of volatile returns, the producers often look for stability where there has been primarily variability in the past. Many alliances start out talking about possibilities of compensating cow-calf producers for their calves and yearlings, whether they are sold or whether ownership is maintained, on some sort of cost-based determination. That same logic often extends up through the system and the feedyards that are finishing the cattle or the packing plant that is doing the slaughtering and fabricating either look for or are offered a constant per-head fee for their services. The beef business is a volatile and uncertain business, and it is not surprising that participants in an alliance are looking for relief from the risk associated with highly variable margins.

The cost-based strategies for compensation and remuneration have not worked. In terms of basic economic reasoning, it is illogical to impose constancy in a sector that historically has been characterized by extreme volatility. Any attempt to cost-plus-price a calf, for example, will inevitably lead to periods in which other players in the alliance will be subsidizing the cow-calf producer. An extreme example of this was seen in 1996 when alliances that were assuring calf producers \$.85 or \$.90 per lb based on some cost-plus formula, with credits given for pre-conditioning in some instances, were offering essentially double what the calf was worth in the marketplace. Record high corn prices in the spring and summer months of 1996 in response to a partially failed corn crop in 1995 pushed weaned calf prices below \$.50 in some markets. If you are paying \$.90 per lb for a 500-lb calf when the outside market value is \$.50 per lb, that \$200 (500 x \$.40 per lb) per head has to be pulled from somewhere else in the system to keep the \$.90 cost-based price to the producer.

One of the questions that started to emerge immediately from those sitting on advisory boards for the alliances or those attempting to manage the alliances involved how to compensate the cow-calf producer. Intuitively, the cost-based system was not working, even though it might have seemed logical at first. What were the alternatives, and how can a compensation plan be structured such that it will reward value and keep all participants satisfied with the results?

Trying to satisfy everyone who seeks to come into an alliance is a tough task, and in some instances the reasons for coming are wrong based on simple economic logic. If the reason for coming to an alliance is to try to escape the volatility and the variable selling prices in the calf and yearling market, that aspiring alliance member is probably going to be disappointed. The alliance cannot eliminate and cannot offset the pain of the risk coming from variable prices without transferring revenue or income from some other participant in the system. Trying to escape market-based volatility, if this is the only reason, is the wrong reason for coming to an alliance. What can work is a motivation that recognizes and understands the cattle business is volatile and comes looking first for compensation in accordance with true value and secondly, perhaps, for some protection against price risk. Risk management strategies can be applied by the alliance and some of the risk in the business can be mitigated or margins might be shared in some programs, but the primary reason for vertical alliances is to correct the problems associated with a failed pricing system. *Everything at all levels and at all weights and grades has tended to be priced on averages, and there has been little or no price discrimination either up or down to compensate for high or low value.* The alliance structure should be able to compensate at true value if it can determine the final breaking-table value of a carcass based on what it can be merchandised for in a wholesale or retail market. Even if it has to be a spreadsheet approach or some other accounting approach to determine value to the producer, this can be done. There are non-price ways to find this value, ways of moving away from the average pricing tendencies in the open exchange marketplace.

Moving up through the system, it may be somewhat more tolerable and acceptable to use constant fees. Many custom feedyards, for example, provide their capacity, access to feed, and management ability and are looking for a per-head, per-day fee or a daily fee plus some mark-up on feed. Feedyards that get involved in an alliance may be asked to do some sorting in pens and scan the cattle trying to pinpoint optimal slaughter dates and, in the process, incur costs that they have not been exposed to in the old price-based system. Thus, even a constant daily charge per head might need to be higher for the feedyard to be able to provide added services that require labor, time, and management ability. But if the feedyard is, in fact, providing a service and charging for it at about the same daily fee that is available in the general marketplace, there need not be any major distortion by going to a constant or cost-plus compensation basis at the feedyard level.

At the packer level, the situation will be more problematic. On the surface, it would sound as if paying a packer a constant per-head fee for slaughtering, fabricating, and merchandising would work. But upon reflection, that approach gets in the way of the communication the alliance is trying to accomplish. If a packer is paid \$90, \$100, \$110 per head, or whatever the constant fee might be, they will always be at variance from the gross operating margin being earned by packers outside the system. If packers outside the alliance are earning a gross margin of \$150 per head because cattle have backed up in the feedyards and fed cattle prices have been pushed down to stretch that gross margin out to \$150, then the alliance packer who is paid a constant \$100 is suffering a significant opportunity cost. But the \$50 per head opportunity cost imposed on the packer is not necessarily the big problem. The big problem with the constant fee at the packing and fabricating level comes in the form of distortions in the communications to cattle owners.

If packers are receiving a \$100 fee for their services and they could be earning \$150 if they weren't in the alliance, there is \$50 per head that is reflected in the "price" paid to the cattle owner that

has little or nothing to do with the true quality of the cattle. On a 1,200 lb steer, that \$50 means \$4.00 per hundredweight or more, and it is important to recognize that *the high price "paid" the cattle owner because of the constant packing fee can seriously distort the very messages that the alliance is trying to provide*. How do you determine whether this premium is due to transferring revenue from the packer to the cattle owner or whether these are high quality cattle that deserved a premium? Obviously, if you have detailed feedback on individual animals in terms of dressing percentage, yield grade, quality grade, and whether they qualified for premium outlets within the Choice or Prime grades, the true message can be sorted out. But that takes time, and the data can be difficult to manage in terms of getting a clear message. What the cattle owner is receiving is far above what they would be receiving for fed cattle if they were selling in the open marketplace outside the alliance, and the true message on the value of the cattle is distorted.

Obviously, the other problem occurs when the packer is being paid \$100 and the best packers outside the alliance can do in terms of a gross margin is \$50 per head. This will happen on occasion when the showlists are short, packers need to keep their doors open, and they bid up the cattle to maintain operating levels. This is what the contracting and captive supply issues are all about. In this instance, the transfer runs in the other direction. The \$50 per head is essentially taken from the cattle owner and transferred to the packer, and the message in terms of quality and true value of cattle is again distorted.

It can be difficult to manage so as to find the true message with regard to cattle value and how the alliance is doing in terms of profitability and various performance measures. There is clearly a need for guidelines for alliance management and compensation within the alliance. In an attempt to generate some of that information, this research examines various compensation strategies in terms of margin sharing between cattle owners and packers and focuses on the distribution of the premium pool that can be created if a significant percentage of the cattle qualify for premium and branded product lines. Some vertical alliances use what they can earn in the wholesale and retail marketplace for a particular quality of cattle and pay a fixed per-hundredweight premium to the cattle owner. Those premiums may be adjusted quarterly as the market relationships change. Other alliances extend to the cattle owner exactly what they can do in merchandising premium lines in the marketplace. This direct exposure to the marketplace is based on prices and values at which the product can be merchandised but also adds an element of risk to the cattle owner. There may be instances when a carcass would qualify for a premium line, but for various reasons in the market that week, the packer/processor may not be able to merchandize the product at a premium.

What is needed, then, is assistance to alliance managers and guidelines for producers and packers who are interested in alliances. In particular, there is need to see the extent to which producers should seek to share in packer margins and vice versa. Producers are often interested in margin sharing arrangements with packers, and the alliance structure can facilitate such sharing. Packers may also be interested in sharing in feeding margins coming to the cattle owner. The margin sharing arrangement that is increasingly discussed is one way to share risk and perhaps reduce the volatility of the revenue streams to the alliance in its entirety. It is not unlike what has happened in the swine sector where market windows have been established with producers giving up some of the peak prices during price cycle highs and packers protecting the producers from extremely low prices when the cycle is in the excessive slaughter phase. It will be important to look at what happens to the revenue level and risk level for cattle owners and packers' respectively in the various margin-sharing arrangements.

Arguably, the much more important consideration is the premium pool. *Changing the way that the combined feeding and packing margins are shared reallocates the same set of dollars. If the alliance can motivate production of more high-quality cattle that qualify for premium lines and increase the number of dollars being secured from the final consumer or buyer, then the economic pie to be shared can be larger.*

There will clearly be interest in how these premium pools should be allocated. Both the packer and the producer would logically want to have as much of the premiums as possible, and both would have legitimate claims. The packers will point to the extensive investments involved in building, developing, and protecting brands and premium product lines. Producers will point to the added money, technology, and management know-how that has to go into changing genetics and changing management regimes that help to ensure high-quality cattle. Then, there is the question of to what extent margin sharing and sharing of the premium pool complement or compete with each other. In other words, what type of guidelines could be generated to help a participant determine how much margin sharing they might give up if they get more premiums or vice versa.

## **Objectives**

The overall objective of this study is 1) to conceptualize the issues involved in management and compensation strategies in vertical beef alliances; 2) to hypothesize ways of managing and compensating; and 3) to test empirically the impact of various strategies on revenue level and risk to each alliance participant. It is an effort designed to start the process of generating more theoretically driven and empirically based guidelines to the forming and management of effective vertical alliances. As the failed pricing system loses favor and as entrepreneurs and decision makers turn to non-price means of providing vertical coordination and needed quality control, the vertical alliance is one mechanism that may be widely used.

## **Methodology**

The first need is a conceptual framework within which to think, in a rigorous way, about these issues. There are theories and conceptual frameworks that can be pulled from the literature and adapted to this need. A review of the existing literature is included for this reason.

Based on the literature review, a conceptual framework for analysis of vertical alliances is then presented. Various constructs are pulled from the historical developments in the literature and adapted to the vertical alliance in beef.

Empirical analysis, limited in scope by data availability, is then conducted. Emphasis is on analysis of various margin-sharing possibilities for cattle owners and packers. The concept of a premium pool is then introduced and analyzed in terms of premium sharing and interactions with margin-sharing possibilities. On the basis of this analysis, guidelines to effective vertical alliances in the beef system are introduced.

## Review Of Literature

The search for literature applicable to solving the problems of beef alliances can become overwhelming. The vast majority of available literature focuses on vertical coordination as an organizational form. At least three major theories of vertical coordination have been advanced.

*Transactions cost theory*, as defined by Williamson's advancement of Coase's pioneering work, is the most widely used framework for analyzing the variety of governance structures employed in vertical coordination. *Agency theory* has also been used extensively as a theoretical framework for understanding and researching organizational structures (Jensen and Meckling; Eisenhardt). *Resource-based theory* is another branch of organizational economics concerned with the explanation of vertical coordination (Mahoney and Pandian; Conner).

Narrowing the literature search for guidance on the problems of beef alliances leads to a vertical coordination within agriculture subsection. The seminal piece discussing vertical coordination in agriculture came from Mighell and Jones. Heeding Mighell and Jones' call for more extensive knowledge of the causes and implications of vertical coordination within agriculture, researchers have produced a plethora of work. Using the theoretical frameworks described above, researchers have attempted to explain vertical coordination specifically within agriculture (Sporleder 1992; Barry, Sonka, and Lajili). Likely due to the high levels of coordinated contractual activity within the poultry and swine sub-sectors, a large majority of vertical coordination research focuses specifically on analyzing contracts (Knoeber; Knoeber and Thurman; Sheldon; Sherrick).

Literature on vertical alliances per se is relatively sparse compared to the broader vertical coordination literature. Little analysis has been performed on specific examples that fall between open markets and total vertical integration on the coordination continuum, especially for strategic alliances and partnerships. In the strategic management literature, qualitative information exists on how to manage alliances (Spekman et al.; Stafford), and there has been some advancement on how to view alliances within a combination of theoretical frameworks (Borys and Jemison; Ramanathan, Seth, and Thomas). Literature specifically on beef alliances is lacking. Popular industry literature regularly promotes the opportunities of marketing and production alliances within beef industries. Academic researchers have, to date, failed to provide in-depth analysis of this latest trend.

The theories that have been developed do help to frame the issues vertical alliances will face. The theories also lay a foundation on which alliance management guidelines can be developed.

### ***Transaction Cost Approach***

The transaction cost approach to vertical coordination began with Coase's 1937 article regarding the nature of the firm. Coase analyzed costs of using the price mechanism in exchange markets. These costs included writing, executing, and enforcing contracts and were collectively termed transaction costs. Coase argued that firms were designed to minimize these transaction costs of doing business. Williamson (1979, 1985, 1989) expanded the definition of transaction costs to include the behavior of economic agents and sought to understand how vertical transactions are coordinated by differing governance structures.

Williamson's approach argues that minimizing of transaction costs is the primary motivation for adopting different governance structures. The *transaction cost approach* identifies the characteristics of transactions that firms could internalize at a lower cost than relying on open-market price transactions.

In general, there are three critical dimensions of every transaction: (1) the level of transaction-specific investment (or asset specificity) required, (2) frequency of occurrence, and (3) uncertainty of the



transaction. Those transactions that require an extremely high level of specific investment are termed "idiosyncratic" transactions. An example is the need to purchase expensive specialized capital in order to produce a particular good. After purchasing the asset, the supplier becomes locked into a relationship with the buyer of the specialized product. The value of producing some other non-specialized output would be much lower. The buyer is also locked into a relationship with the supplier. The cost of finding the specialized output elsewhere could be high to the buyer. The specialized asset need not be a production asset. Investments in human capital may be needed for a transaction between parties, and specialized training or knowledge facilitates the exchange relationship.

Williamson categorized the frequency of transactions and level of specific investments into subgroups. Frequency of transactions was divided into one-time, occasional, and recurrent categories. Investments were described as *non-specific*, *mixed*, and *idiosyncratic*.

Williamson finds traditional open markets to be an appropriate governance structure for nonspecific transactions of both occasional and recurring frequency. With recurring transactions, both parties to a transaction only have to decide whether or not to continue their relationship. There is little transactional cost to switch to an alternative partner since no specific assets are required and the market is full of homogeneous, well-defined, standard suppliers. If transactions are only occasional, agents cannot rely on their personal experiences alone to guard against opportunistic behavior by partners. Firms then often rely on rating services or the personal experiences of others. When there are many alternatives, there is less worry about opportunistic behavior by buyer or seller. Efforts to sustain a particular relationship with a buyer or a seller are not made because the relation is not highly valued since alternatives abound.

When transactions demand mixed or idiosyncratic investments and are occasional in nature, contracting with arbitration agreements is an appropriate governance form. Both parties in this situation have strong incentives to see the contract through due to specialized investments. The supplier would lose a buyer for a specialized product. The buyer would incur higher costs finding a new supplier of the specialized product. Setting up contracts to guard against opportunism in these situations is costly, and traditional price-based governance cannot always sustain such agreements. Therefore, third-party assistance (arbitration) instead of litigation is relied on to settle conflicts. More advanced business governance in the form of agreements and coordinated efforts are too costly if the frequency of transactions is only occasional.

For recurring transactions demanding mixed or high levels of transaction-specific investment, partnerships/alliances and vertical integration are appropriate governance structures. The non-standard nature of exchange means reliance on open markets is hazardous. Frequent occurrence makes the investment in a more specialized governance structure worthwhile. Partnerships and alliances are examples of bilateral structures. The identity of each firm is maintained. Vertical integration is the extreme unified structure, where the transaction is removed from the market and organized within the firm.

Bilateral structures are often employed where asset specialization is less than idiosyncratic, and transactions occur frequently. Problems arise, however, when the arrangement must be adapted or contracts changed. Since the need for change cannot always be foreseen, these adaptations must be made by mutual agreement, and therein rests the potential conflict. Both parties want to see the agreement continued when adaptations are needed because they would lose their transaction-specific investments in highly specialized capital. To make needed adaptations, the parties must have guidelines to identify acceptable adjustments. These guidelines include recognizing the hazards of opportunism and how it varies by type of adjustment, restricting adjustments to those where hazards are low, and performing adjustments with an attitude that is conducive to a long-term relationship.

As recurring transactions become more specialized or idiosyncratic, attempts to achieve more formal vertical coordination are likely. With vertical integration, the most rigid form of coordination, adaptations can be made without having to consult, mediate, or change inter-firm agreements where costs of change may be high. Price adjustment is more complete under internal organization because ownership occurs on both sides of the transaction and joint profit maximization can be reasonably assumed. Likewise, quantity adjustments can occur at any needed frequency to maximize the joint gain of a transaction.

Uncertainty is the final dimension of transactions that influences governance structure. Non-specific transactions have little need for continuity since new relations can easily be arranged. Uncertainty does not alter that fact, so open market exchange continues and laws govern all transactions regardless of the level of uncertainty. For mixed or idiosyncratic investments, uncertainty is important because parties have a larger stake in working out mutually agreeable contract terms. As uncertainty increases, unified (vertical integration) replaces bilateral governance (partnerships/alliances) in recurrent transactions.

While the transaction cost approach to explaining vertical coordination has been widely used, debate has continued over whether it is the correct theoretical framework to guide analysis of vertical alliances and similar arrangements. The primary concern involves empirical support of the theory. Research results have been mixed because transaction costs are by nature hard to identify and measure. Works by Frank and Henderson and Hobbs claim support for transaction costs as a reason for certain vertical structures, while others such as Fahlbeck find little evidence. *But the idea of what the literature calls idiosyncratic investments fits the vertical beef alliance. Investments in new technology to identify and scan individual animals have few alternative uses, and these types of investments both bind the participant to the alliance and make effective management of the alliance very important. Potential participants in a vertical alliance must consider the implications of investments in capital that will have few alternative uses and how that capital investment ties them to the alliance structure.*

### **Agency Theory**

There are two main branches of agency theory: principal-agent literature (Holmstrom; Rasmusen) and positive agency theory (Jensen and Meckling; Fama and Jensen). Principal-agent theory is concerned with designing optimal contracts between two parties (Mahoney 1992b). The majority of principal-agent research centers on developing models using a range of quantitative variables and defining the optimum contract solutions (Sauvee).

The basic principal-agent problem seeks the optimal contract (compensation scheme) which maximizes the principal's expected utility, given that (a) the agent will act in a manner to maximize their own utility given the compensation scheme, and (b) the agent is willing to accept the contract. Two main impediments to optimal contract design exist: (1) adverse selection, and (2) moral hazard. Both arise due to information asymmetries between the contracting parties. Adverse selection occurs when one party is better informed than the other about the transaction (Sauvee). For example, adverse selection would occur if a cattle feeder contracted with a packer for regular deliveries of fed cattle at specific times and knew in advance that he would most likely not be able to deliver all cattle in a timely manner. Moral hazard refers to the lack of effort, shirking, or opportunism of the agent as a result of the task not being completely observable (Sauvee). A cattle feeder not following agreed upon management specifications while feeding a client's cattle represents an example of moral hazard.

Eisenhardt depicts the principal-agent problem in terms of measurement and control over the agent's actions. Two states of nature exist: complete information, where the principal can observe the

agent's behavior, and incomplete information, where the agent is aware of their own actions, but the principal is not. In the case of complete information, a behavior-based contract is optimal because the principal is fully aware of the agent's actions. When incomplete information exists, however, the principal cannot reward the agent based on their behavior since behavior is unconfirmed and the agent may shirk.

Faced with incomplete information, the principal has two primary options. The principal can make investments in behavior monitoring devices, or the principal can reward the agent based on outcomes like profitability. When rewarded on outcomes, agents may face outcomes not completely dependent on their own efforts. For instance, the principal may be profitable despite poor performance by the agent, or be not profitable even though the agent performed very well.

Instead of focusing on contract design between two parties, positive agency theory seeks to explain the firm and its organizational characteristics. In positive agency theory, the firm is seen as a nexus of contracts (Jensen and Meckling). In addition, the firm is characterized by team use of inputs among agents (employees) with a centralized contractual agent (the employer) and not by the presence of authority relationships (Alchian and Demsetz). *Agency theory proposes that the firm comes into existence to exploit advantages of teamwork while controlling agency costs.* Team production is characterized by the use of several types of resources (not all owned by one party) that generates a product that is greater than the sum of separable outputs of each input (Ramanathan, Seth, and Thomas).

In order to reduce shirking by agents who provide inputs for team production, monitoring costs are typically incurred. In particular, one person may be designated as the monitor of all agents' performance. In order to align the monitor's goals with the team's, Alchian and Demsetz propose assigning the team's net earnings to the monitor after payments to other input agents. The monitor of each team member's efforts becomes the claimant of the residual rents or net earnings created by the team. The monitor has little incentive to shirk in his duties as monitor since an incentive system is in place that rewards superior performance. Team members maximize their returns by employing the monitor who reduces shirking not only by the prices he agrees to pay owners of the inputs, but also by observing and directing the actions or uses of these inputs (Alchian and Demsetz).

Positive agency theory also allows for differing ownership structures. For the firm in classical economic thinking, the residual claimant of profits is defined to be one individual who bears the most uncertainty associated with the operations of the firm. The risks of most agents in the classical firm are limited because fixed payoffs are specified in their contracts. Residual risk is the risk of the uncertain cash flows minus promised payments to agents and is borne entirely by the residual claimant who is typically the owner of the firm (Ramanathan, Seth, and Thomas). Ownership of the firm can be split among individuals, where the residual claims as well as the residual risks are shared. Diffusion of risk among many participants may be preferred, but it may become inefficient for each owner to directly contribute to management decisions. Therefore, a separation of ownership and decision-making may be sought. Ownership by many also increases the likelihood of inefficient monitoring activities. When only one residual claimant exists, all costs of shirking are borne by that individual. When many owners exist, all owners bear the cost of shirking in proportion to their ownership stake (Ramanathan, Seth, and Thomas).

The positive agency theory appears to be a useful framework for thinking about and analyzing vertical alliances. In these relatively new vertical structures, *the way the alliance is organized may be as important as the relationships between and among the participants.* Agency theory would support paying the alliance manager such that there are clear incentives to keep costs down and to manage the various participants to ensure actions will be as intended and in the best interest of the alliance as a whole.

## Resource Theory

In the resource theory view, the firm's primary objective is to capture economic rents that are above average returns where selling price exceeds average total costs of production (Barney). Mahoney and Pandian provide a useful classification of different rents. Owning a valuable resource that is scarce provides the firm with a Ricardian rent. Ricardian rents can take many forms including copyrights, patents, valuable locations, or natural resources (Ricardo). Risk-taking and innovative thinking in an uncertain environment may capture Schumpeterian rents. Finally, firm-specific rents can be captured through unique resource ownership.

According to Conner, the ability to capture rents requires that (a) the firm's product is distinctive to buyers, or (b) the firm selling the same product as competitors must have a comparative cost advantage in its production. Therefore, firms must either maintain distinctiveness of their product or realize a low-cost position. Because output distinctiveness depends largely on input distinctiveness, the firm seeks a unique and often costly-to-copy portfolio of resources. These resources may include physical assets, capital goods, technology, or location. The uniqueness of resources allows the firm to capture sustainable competitive advantage because they are unique (Cozzarin and Westgren).

The resource-based approach is somewhat unique in three important ways: (1) persistent above-average returns are possible; (2) there is no given production algorithm (firms differ in their combination of inputs and can derive rents from alternative methods of production); and (3) there may be advantages to different size and scope of firms (Conner). *The emphasis in resource-based theory is on how the firm manages to capitalize on its given resource capabilities.* This capitalization is accomplished through the selection of an appropriate firm strategy. According to Cozzarin and Barry, a firm may achieve rents not because it has better resources, but because it uses resources in a more productive management strategy.

The resource-based approach thus provides a theory of the firm that fits well within the organizational economics literature (Barney and Ouchi). The resource-based view is aligned with agency theory because how a firm combines its resources is influenced by (minimizing) agency costs (Castanias and Helfat). Similarly, the resource-based view is linked to transaction cost theory because the firm deploys resources in a manner to minimize transaction costs. Resource-based theory seeks to advance a new theory of the firm, understand why some firms may perform differently than others in the same industry, and develop the motivations for non-traditional control structures.

Cozzarin and Westgren, Cozzarin and Barry, and Westgren all discuss manners in which resource-based theory can be expanded to encompass vertical integration and alliance formation. Westgren maintains that the resource-based approach to vertical integration emphasizes firms pooling their resource portfolios and the resulting expected rent streams. Given two firms with their own specialized asset holdings (physical, financial, human, and organizational), vertical integration will occur if returns from the newly pooled portfolio exceed returns from the separately held original portfolios (Cozzarin and Barry).

Alliance formation is explained in the same manner. Rather than one firm internalizing the other because it seeks the returns from a jointly held portfolio, both firms may find it advantageous to combine only part of their resources and maintain their separate identities. *Returns from the alliance must exceed each firm's individual returns prior to joining the alliance* (Cozzarin and Barry; Westgren). By creating the jointly held portfolio, a unique resource is created with the ability to provide the alliance with a competitive advantage. Drawing from transaction cost logic, the high level of idiosyncratic investment resulting from pooled resources increases the costs of leaving the alliance. High costs of disassembling the alliance may provide incentives for the alliance to last (Cozzarin and Westgren). *Vertical alliances in beef are an attempt to combine resources in such a way that returns above all costs are possible, a profit*

*level that could not be reached by simply summing production, processing, and merchandising efforts conducted by separate firms.*

### ***Vertical Coordination in Agriculture***

Mighell and Jones are traditionally credited with first focusing on vertical coordination within agriculture. As they saw it in 1963, agriculture was beginning to witness an economic innovation of organizational design that could impact the industry even more than future technological innovations. They called the new organization methods *vertical coordination*, and included under that term all ways in which the vertical stages of production are controlled and directed. One of the subsets of coordination is vertical integration, defined as the vertical structure associated with internal coordination where two or more stages of production join together in one firm under common ownership. At the other end of the continuum, the traditional open market price system was a means of coordination via price signals.

In addition to formally introducing and defining the concepts of vertical coordination and integration, Mighell and Jones picked up where Collins ended by noting the failure of open market prices to successfully guide adjustments in production and distribution. The organizational reaction of the agricultural industry to the failure of price as a vertical coordination mechanism provided the stimulus for their research effort: the explanation of alternative and more nearly non-price coordination mechanisms (vertical integration and contracting in particular) in a broad theoretical context. Mighell and Jones asserted that there is no single simple theory for why firms integrate or coordinate via contracts, that there are many economic and non-economic considerations to aid in explanation. Among them are reducing risk, changing exposure to uncertainty and costs, improving management, improving market position, gaining bargaining power, developing new technology, or obtaining financing.

Building on the seminal work by Mighell and Jones, and noting changes in consumers' demands, Barkema emphasizes the need for the food system to quickly adjust to changes in tastes and preferences. As the system becomes more responsive, traditional relationships among producers, especially how they communicate consumers' demands, must also change. Barkema argues the emergence of contracting and integration creates new communication methods that increase the ability to transmit consumer demands to food producers. As a result, markets are shifting from coordination by pricing mechanisms toward vertically coordinated contracts, integration, and other non-price means of coordination.

Boehlje and Schrader focus their efforts on the changing nature of linkages in the food chain from market to vertical coordination, the constraints on this transition, and on determining who will exert control in the coordinated system. Boehlje and Schrader emphasize the need for more exacting quality control in specially designed products, flow scheduling and capacity utilization to control costs, reduction of price risk exposure with input and product sales, and dealing with food safety concerns which will strain the ability of cash price markets to coordinate the food chain. In place of open markets, other options, such as contracts, integration, or joint ventures, will be used.

While they expect to see increased use of contracts, Boehlje and Schrader present some constraints to increased coordination by contract. Where more variation in inputs is tolerable, buyers will continue to sort through the available input supplies. In addition, there may be high transaction costs associated with coordination, costs that exceed the benefits of that coordination. Inability to agree on contract terms, inaccurate transfer pricing between divisions of a company or alliance, and disagreement on proper sharing of risks and rewards between partners all increase transaction costs.

Boehlje and Schrader also discuss the control of coordinated systems. Specifically, they question who will determine the performance of a system and the sharing of risks and rewards in a system that has traditionally seen power exerted by those firms with large size. They argue that there are two

fundamental control points in the coordinated system: (1) end users and firms that have intimate contact with consumers; and (2) raw material suppliers whose offerings cannot be easily substituted (e.g., owners of unique genetics). These control points have knowledge of consumer wants and needs and purchasing power, in addition to know-how of the needed basic raw material to provide the consumer's desired product. The source of power is therefore knowledge, not size. Firms at these two control points will be able to extract larger rewards and transfer risk to other participants in the system. Boehlje and Schrader argue that more power and control can be exerted by those parties that know the consumer best.

Barry, Sonka, and Lajili recognize the theoretical developments in vertical coordination, and review the economic organization and financial structure of agricultural firms with respect to transaction costs, agency relationships, and contracting. In contrast to traditional analysis of firms integrating and seeking to capture monopolistic rents, the research focus now must center on agency relationships, contracting, transactions costs, the boundaries of a firm, and the linkages between vertical coordination and a firm's financial structure.

Agency relationships are central to understanding today's agricultural firm. As vertical linkages expand between participants in the food industry, firms will seek to keep agency costs of doing business low in order to ensure continued success. These agency costs will be incurred while each firm attempts to structure, administer, and enforce contracts that closely align the interests of both principal and agent (Barry, Sonka, and Lajili).

Barry, Sonka, and Lajili also argue that transaction costs must be considered when discussing the motivations for increased vertical coordination. Specifically, as firms invest in more specific assets to produce more specialized products, they will incur greater opportunity costs if there is a need to use those assets elsewhere. Increased transaction costs thereby create a greater tendency towards long-term contracting and vertical integration. Barry, Sonka, and Lajili argue that asset control is an important management decision because holding residual rights of control to assets will determine relative bargaining position in negotiations and allocation of profits.

Barry, Sonka, and Lajili also propose that financing arrangements may impact the choice of governance structure. Financing through a contractor may sustain a relationship between producer and contractor, or even help to expedite incentive alignments between the parties. Credit through a contractor may decrease the market access risk faced by producers, meanwhile enhancing producers' credit worthiness to potential outside lenders. Barry, Sonka, and Lajili emphasize that agricultural economists must begin to analyze the performance characteristics of alternative contractual arrangements among producers, agribusinesses, and creditors.

Knoeber provides an example of Barry, Sonka, and Lajili's call for framing discussions of vertical coordination in a theoretical context. Noting the absence of spot or cash markets in the poultry industry, Knoeber uses transaction cost logic to reason why broiler production is characterized by contracts. To control opportunistic behavior and ensure continued performance in the exchange relationship, either contracts or vertical integration will be used to organize production. However, transaction cost theory also asserts that as uncertainty increases, contracts must become more complex and thus move participants toward complete vertical integration. Knoeber seeks to understand why broiler production still uses contracts, rather than vertically integrated company farms, in an industry characterized by rapid technological change.

Knoeber finds that by compensating growers through a tournament style system where their performance is rewarded relative to their peer's performance, the cost of contracting to the integrator is decreased. Since contract growers must provide large amounts of capital in the form of chicken houses, their performance is automatically bonded. The relationship becomes long-term and self-selection by

high-quality growers occurs. Knoeber found that hired managers of a company owned broiler production unit performed less well than contract growers.

Vukina and Foster frame broiler contracts in a standard principal-agent context. They cite critiques of contracts by growers as a chance to apply principal-agent theory in redesigning contracts to better align incentives and to capture efficiency gains. In theory, the broiler contract is designed to provide growers incentives to manage the poultry farm in a manner that maximizes returns to the integrator. When neither grower nor integrator is maximizing their returns, redesigning contracts to better align incentives should result in gains. Vukina and Foster model the grower's decision-making process and observe how it changes with alterations in the contract design. Simulations over three contract parameters (base payment, bonus factor, and utilities cost allocation) indicate that switching part of the utilities cost from grower to integrator holds promise for increasing satisfaction of both producer and integrator.

Outside of traditional agriculture, the strategic management literature offers information on strategic alliances. While most of the information available is qualitative in nature, the discussion provides useful starting points for understanding how to define alliances and understand the critical dimensions of alliance formation and function.

Koenig and van Wijk provide a working definition of alliances. They define an alliance as independent firms cooperating with little or no "hard" control, sharing assets in order to achieve a mutually beneficial outcome. Without "hard" control, formal ownership or binding agreements, an alliance more nearly resembles a willful cooperation than a basic formal agreement.

Stafford places strategic alliances in the middle of a continuum ranging from infrequent "arms length" transactions to fully integrated relationships involving mergers and acquisitions. Stafford presents three basic relationship types that can tie partners closely together for a long time: contracts, creative joint ventures, and acquisitive joint ventures. Contracts are non-equity agreements describing the contributions and powers of each partner. The non-equity nature of contracts causes investment into the alliance to be less. Partners have greater autonomous decision-making power, and the alliance is easier to break up if it fails to achieve stated objectives.

Creative joint ventures involve the combination of resources by partners to create a separate subsidiary jointly owned by the partners. The creative joint venture requires substantial capital and resource investment from partners, and is subsequently harder to dissolve. Further, partners in a creative joint venture must make significant time and effort investments in negotiating resource, management, and technology control.

Acquisitive joint ventures exchange equity between partners, but no separate entity is created. Instead, one partner acquires partial interest in the other, and they work together with joint management and assets. Under the acquisitive joint venture, much closer coordination is needed. One partner may have significant bargaining power over the other as a result of acquisition, and the autonomy of the minor partner can be threatened if objectives are not met.

Das and Teng contribute to the understanding of alliances by exploring types of risk. Relational risk involves alliance partners not fully committing themselves to the alliance purpose. Performance risk is caused by market factors outside of the partners' control. Das and Teng propose that relational risk perception by an alliance partner will be increased by believed pay off inequities and higher levels of difficulty in protecting one's proprietary knowledge. Relational risk perception will be lower the greater the number of previous alliances between the partners. Performance risk is inherently higher for alliances creating and marketing new products and technologies, establishing an international presence, or alliances

characterized by highly specific or idiosyncratic investments where the cost may be non-recoverable. Das and Teng find that inter-firm alliances are likely to be equity based under high levels of relational risk, and non-equity based under high levels of performance risk. Equity alliances allow for a control on potentially opportunistic behavior by partners, while non-equity structures allow for quicker dissolution if the alliance fares poorly.

Koenig and van Wijk stress the importance that trust plays in the emergence and performance of alliances. Trust is a key component for emergence of an alliance because it reduces uncertainty about a potential partner's actions. Trust supplements formal contract agreements while allowing the needed flexibility for adjustments. As an alliance grows, trust is gradually replaced by administrative fiat and formal rules. Trust without formalization leads to unstable situations where the potential cost of opportunistic behavior by partners is high. Therefore, *successful alliances need trust to grow and develop optimally, but that trust must be eventually replaced by formal controls over time to avoid potentially destructive situations.*

Stafford identifies partner selection as important when uncertainty is high and the alliance will involve complex forms of coordination. In particular, a firm should evaluate the strategic goals, resources, and culture of each potential partner before committing to a cooperative relationship. Shared vision of alliance objectives is essential for success. If partners do not act in expected ways to unforeseen circumstances, mutual trust may be harmed. Strategic goals that are compatible also foster a sense of cooperative spirit that builds mutual trust between firms.

Spekman, Isabella, MacAvoy, and Forbes *view the alliance manager as the essential ingredient to alliance success.* The alliance manager is responsible for guiding the alliance through each stage of its life cycle, sometimes requiring different roles at different times. Spekman et al. insist that the manager must be a sponsor and outright advocate of the vision for the alliance in order to foster cooperation among managers and employees. In addition, the manager must be able to mediate conflicts between partners, balancing the needs and concerns of both parties. Foremost, the manager must be adept in management skills. Without skilled knowledge, alliance managers cannot ensure that the alliance will maintain course and achieve its goals and objectives. Spekman et al. emphasize that alliances are 'unnatural' organizational forms requiring special care and that it is unwise to place key alliances in inexperienced hands.

### ***Agricultural Economics Literature on Strategic Alliances***

Despite many calls for research on organizational forms falling between traditional open markets and complete vertical integration, only limited agricultural economics literature exists. The small number of pieces dealing with "alliances" or similar organizations have been mostly qualitative in nature. Researchers have moved towards defining alliances, provided reasons for their existence along the agricultural production/marketing chain, and extracted from strategic management literature information on choosing partner firms.

Sonka emphasizes that the exact form and nature of strategic alliances is difficult to define due to their varied and evolving nature. Unique to most alliances is the presence of bilateral negotiation as a way to allocate resources and govern exchange. While contracts often formalize agreements, written and legally enforceable contracts are not always present. Van Duren, Howard, and McKay argue that a successful strategic alliance is characterized by partners that share the goal of achieving that relationship, the desire to achieve it, and an understanding of the processes required to achieve it.

In 1992, Sporleder noted that strategic alliances were becoming more common in agricultural commodity marketing channels. As a possible reason, Sporleder noted that managers may be discouraged



from complete vertical integration by the high levels of idiosyncratic investment resulting from asset specificity. By using transaction cost logic, Sporleder asserts that alliances offer managers the opportunity of vertical coordination and control in the presence of idiosyncratic investments.

Sporleder's features of alliances include mutual obligation through asset specificity. While most alliance arrangements allow for flexibility in the original objectives, partners tend to still be committed to the original goals. This sustainable feature is brought about by mutual asset specificity of partners who would realize a high opportunity cost if they left the alliance (Koenig and van Wijk). In 1994, Sporleder classified these highly specific assets held by partners in alliances as "hostage assets."

In an effort to strengthen newly forming agricultural alliances, both Winter and Ziggers provide guidance on creating successful partnerships. Winter presents a new way to view partners within a supply chain alliance--as customers. In most supply chains, each successive stage takes the skills and inputs of the previous supplier and reassembles or otherwise adds value to pass on to the next stage, ultimately the final consumer. Therefore, the long-term viability of the alliance depends on the long-term customer satisfaction at the next production level. For beef alliances, to illustrate, the feeder-packer partnership will only last as long as the packer (the feeder's customer) is satisfied with the feeder's output. Likewise, long-term success will depend on the feeder (the packer's customer) being satisfied with the packer's payment and risk-sharing performance.

*The ability to satisfy partners in an alliance will depend in large part on making sure the risks and rewards are present so that all partners have an incentive to make the partnership work.* Each partnership must pursue mature, long-term thinking about profit sharing, especially if partners are asked to share in risk exposure. When the profit sharing is on a long-term basis, a partner's loyalty to serve and drive the overall alliance will be important (Winter). Partners must expect a change in the level of control as well. Conflict may result if a partner performing functions for the alliance behaves in an opportunistic manner, so safeguards in the management of the alliance should be established to minimize the incentive to shirk. Winter argues that the most successful partnerships will be those that permit each firm to jointly determine a strategy that: (1) fits the environment and needs of the consumer; (2) requires each firm's distinctive competence and abilities; and (3) generates actions and/or products each firm would be unable to do on its own accord.

Ziggers continued the identification of requisites to success of alliances. He identifies four primary needs to create successful alliance partnerships: (1) clear benefits for all partners; (2) a good strategic fit of partners; (3) the involvement of all management levels; and (4) organizational flexibility.

Cozzarin and Barry provide the only known conceptual model for an alliance relationship, a three-firm swine production alliance. Their goal was to understand and compare the performance characteristics of different organizational structures in the hog industry. Since contracts are proprietary, empirical information is scarce, and conceptual models offer an alternative method for researching these organizations. Cozzarin and Barry found that the integrator organizational form (one party as sole residual claimant) might be preferable to an alliance. The reason is that the integrator pays the managers less than alliance partners would likely demand, and therefore achieves a higher net return. The integrator also has a higher incentive to reduce transaction costs because it is the sole residual claimant. Cost saving could have occurred in the alliance being examined, but the benefits would have to be split across the three firms in the alliance.

### ***Literature on Beef Alliances***

Research on beef alliances can be divided into four pieces: (1) Schroeder et al.'s comments on the emergence and industry perception of beef alliances; (2) Ward, Fuez, and Schroeder's analysis of

pricing grids, a common feature of most value-based marketing alliances; (3) Anderson and Trapp's empirical measurement of the value of non-price means of coordination between cattle feeder and packer; and (4) Weimar and Hallam's analysis of risk and risk sharing between cattle owners and feedlot operators under alternative custom feeding contracts.

The first arrangements between feeders and packers were collectively called marketing agreements. Later on, the terms strategic alliances, alliances, and partnerships became popular and the pricing mechanism in marketing agreements was termed formula pricing or grid pricing. As a result of a project managed by the NCA (National Cattlemen's Association, 1993), the terms strategic alliances and alliances became more widely used (Schroeder et al. 1998). Sartwelle categorized the alliances into four types: (1) breed association-sponsored carcass alliances, such as Certified Angus Beef; (2) commercial beef carcass alliances, such as Farmland Supreme Beef Alliance; (3) natural/implant-free carcass alliances, such as Coleman's Natural Meats; and (4) other vertically oriented cattle and beef marketing programs, such as U.S. Premium Beef.

Schroeder et al. present the main incentives for the formation of exclusive marketing agreements or alliances (1998):

- Improving the price signaling function between stages of production, processing, and distribution;
- Eliminating problems with pricing on averages; and
- Reducing the adversarial relationship between feeders and packers.

Nearly every incentive relates to the movement towards value based pricing. Overall, these incentives are aimed at improving the beef price discovery process.

By pricing fed cattle on carcass characteristics, alliances seek to improve overall cattle quality by rewarding better cattle and penalizing poorer cattle. Packers return slaughter summaries and other carcass performance data to producers and feeders to provide information on how their cattle performed. This information allows for adjustment to genetics and/or management to maximize future returns. The information provided by the alliance is not usually available to producers in cash market transactions where price is determined on a live-weight basis. Marketing agreements and alliances also eliminate the risk of pricing cattle on a specific day, possibly a thinly traded day with high price variation. Alliances also ensure market access for producers who are increasingly concerned with captive supplies of packers, with some even allowing for feeder determined delivery scheduling that improves fed cattle performance on the grid (Schroeder et al. 1998).

Schroeder et al. also relay industry perceptions of alliance organizations and their future in the beef sector. Nearly all packers and most feeders expect alliances and grid pricing to increase in the future, expanding to about 30% of fed cattle slaughter. Reasons cited for the increase include a better relationship between feeders and packers, clarification of the signals needed to be sent from retail to packer to feeder to cow-calf to the genetics provider, and shared information that allows for all partners to understand value and make changes to increase it.

Industry participants have some problems with alliance structures. First, cattle marketed through alliances bypass traditional live weight marketing and price reporting stages, thereby becoming "captive supply cattle." Some cattle producers feel that increasing levels of captive supplies will result in packers becoming less aggressive for non-alliance cattle, adjusting their bid prices downward. Other producers and cattle feeders have concerns with the base price used in a grid or formula price to determine fed cattle

value. They believe that if only high quality cattle are marketed through alliances, poorer quality cattle may be forming the base price to determine the value of these higher quality cattle. Overall, however, industry caveats about the emergence of alliances were relatively minor, with most packers, cattle feeders and producers expecting alliances and grid pricing to increase (Schroeder et al. 1998).

For the vast majority of beef alliances, pricing via grids and/or formulas has become the most common method of determining cattle value. Ward, Fuez, and Schroeder provide the most in-depth analysis of formula pricing and grid pricing of fed cattle to date. The authors emphasize that grid pricing sends clearer price signals and improves beef market coordination relative to traditional marketing methods. Average live weight or dressed weight pricing methods fail to identify and price the value difference between high and low quality cattle, resulting in a pricing error estimated to be \$30/head or more.

Ward, Fuez, and Schroeder also note, however, that grid pricing has important characteristics of which producers should be fully aware. First, the base prices used in the calculation of cattle prices are important. Extreme variance in, or the incorrect choice of, a base price to use in a grid pricing system may send the wrong signals to producers or fail to reflect current market conditions. Second, along with premiums, producers should understand the full effect of discounts within the grid. In some instances, discounts for a few poor quality cattle can more than offset the premiums from a larger number of high quality animals. Third, producers must understand that grid prices vary significantly more than live weight or dressed weight prices. The authors' research indicated that grid prices frequently vary by \$2 to \$6 cwt., carcass weight, or \$15 to \$45/head. The grid price variation will inevitably lead to higher producer revenue variation. In conclusion, Ward, Fuez, and Schroeder emphasize that grid pricing, when used correctly, is a step towards value-based pricing. Simply targeting a given group of cattle to the best grid, however, does not induce the type of changes in genetics and breeding needed to move the beef industry forward. "Only when genetic and management changes result from grid pricing information can long-term value-based marketing be achieved (Ward, Fuez, Schroeder, 1999, p. 55)."

Citing Den Ouden et al., Anderson and Trapp noted the absence of quantitative literature on vertical coordination's effects on either an entire production chain or an individual stage of that chain. Anderson and Trapp empirically estimated the value of coordinated marketing/purchasing between cattle feeders and meatpackers. They found that packers could realize substantial cost savings by reducing the variation of fed cattle supply into their plants, allowing large plants to run near full capacity. Steady daily flow of cattle into their plants near optimal processing capacity could save packers \$2-5/head. Packers could realize \$1/head savings if they simply removed the up to 15% variation in daily slaughter rates that are now normal in the industry. Anderson and Trapp found that feedlots could realize higher profits by coordinating sales of cattle within an optimal 2-week time period. Selling cattle within one week of optimal sales time can increase profits for feeders by \$2-5/head. Selling cattle one week before optimal time can result in \$2/head profit reduction, while selling one week after optimal time can cost \$6/head in reduced profits.

Anderson and Trapp note that feeders generally prefer marketing strategies where they "keep their showlist current" by selling cattle early in the optimal time window to capture the highest feed efficiency and too reduce total pounds on the market. Packers tend to prefer strategies that "back cattle up" and generate a steady volume of relatively heavy cattle, increasing their ability to operate at their optimal processing volumes. As expected, the packer's strategy resulted in the lowest processing costs per head, but increased feedlots' cost of gain by \$25/head. The feeder's preferred strategy had the lowest cost of gain and the least price discounts, but raised processing costs \$2/head. Neither the feeder nor the packer preferred strategy resulted in the highest possible total industry profit. Under coordinated efforts between feeder and packer, however, the optimal strategy for the industry produced \$37/head of added profit. Through coordination, packers would receive their optimal weights whenever possible, but cattle

were never sold above the feedlot's optimal selling weight. Coordination anticipated supply gluts and sold cattle early at lighter-than-optimal weights when needed.

Anderson and Trapp emphasize that in reality, it would be nearly impossible to find replication of \$37/head profits due to real-world situations and administrative costs. In addition, realizing those profits would involve unprecedented levels of cooperation. Coordination strategies that raise industry-level profits are not cost minimizing to packers. However, the authors believe that there is room to add \$5-15/head of industry-wide profit through the use of non-price coordination, such as contracts and agreements, that stabilize flows of cattle and more nearly provide for optimal slaughter weights and days on feed. Gains in industry-level profits more than outweigh increased costs for packers. Therefore, a redistribution of profits could adequately compensate packers for their higher costs and all participants in the industry could benefit from higher profit levels than under non-coordinated strategies. Alliances, of course, could provide for and manage this redistribution.

Weimar and Hallam provide the beef alliance literature with research on optimal contract design in custom cattle feeding operations. In particular, their research analyzes the risk and returns associated with three types of custom cattle feeding contracts: yardage fee contract, yardage fee plus feed markup contract, and the guaranteed cost-of-gain contract. Weimar and Hallam's research adds information on two main points: that risk and return levels may in fact be stochastic in nature requiring contract redesign; and that possibilities exist for contracts that significantly reduce risk for one party while only slightly increasing the risk faced by the other party. As alliances seek to use contracts among partners, Weimar and Hallam's work can help outline the method for assessing risk faced by each party and methods for managing it.

The first contract analyzed by Weimar and Hallam was the yardage fee contract. The yardage fee contract transfers price and performance risk from the feedlot operator to the cattle owner. The fee is based on a constant per diem charge, in addition to charges for the amount of feed consumed. Under this contract, the cattle owner assumes the risk of changing cattle prices, changing feed prices, and variable performance of the cattle. The yardage fee plus markup contract is the same as the yardage fee contract, but includes a percentage markup on feed costs. The guaranteed cost-of-gain contract requires that the feedlot owner provide all inputs, except the feeder animal, in return for a guaranteed payment per pound. This contract's risks are primarily determined by animal performance. If cattle have poor feed conversion and take longer to finish, the feedlot operator assumes the risk that the per pound payments may not be enough to cover all costs.

What sets these various contracts apart is their relative distribution of risks. The guaranteed cost-of-gain contract transfers all performance risk to the feedlot operator, while the yardage fee contracts transfers almost all risk to the cattle owner. For risk averse cattle owners, the guaranteed cost-of-gain contract would be preferred while feedlot operators likely would prefer yardage fee contracts (Weimar and Hallam).

## Summary

In summary across the available literature, alliances are only one relatively new type of vertical coordination, and as such they are generally overlooked by researchers who focus on contracting or vertical integration. *Because alliances are a blend between separate firms interacting within a traditional open market price-based setting and a vertically integrated system, no single theory completely explains alliances.* Instead, all three of the available approaches to explaining vertical coordination can be used in building a conceptual framework for understanding why alliances are formed and the ramifications of alternative design and compensation choices.

*Transaction cost theory argues that minimizing transaction costs is the primary motivation for adopting alternative organizational designs like alliances.* According to the transaction cost approach, the emergence of alliances within the beef sector may be partially explained by high levels of transaction specific investments between participants and the frequently recurring nature of their transactions. Moving to alliances to reduce transaction costs is, perhaps, a logical extension of the long-established trend of bypassing organized terminal and auction markets and selling cattle direct.

*Agency theory answers “how” alliances can be set up to accomplish the objectives set forth by the firms.* Positive agency theory focuses on designing the firm or alliance to maximize advantages of teamwork while controlling all agency costs. Designing contracts that allocate risk effectively, creating the optimal compensation design, and aligning otherwise divergent preferences for behavior are a necessity for alliances to prosper in the future.

*Resource-based theory helps explain why the beef industry is witnessing a growth of alliance organizations.* In an attempt to meet consumer demands and improve the beef offering, industry participants have realized the need to coordinate effectively the efforts of all levels of production and processing. This coordination can be seen as the creation of a unique resource portfolio, giving an alliance or “team” a competitive advantage in the search for more of the consumer’s spending dollar.

## A Conceptual Framework for Beef Alliances

### *The Traditional Beef System*

There are three primary participants in beef production/marketing chain: cattle producers, cattle feeders, and packers. In this simplified context, cattle producers are assumed to be one firm. In reality, there are seedstock providers, commercial cow/calf producers, and backgrounders who supply cattle to feedyards. Each stage is characterized by sovereign firms with their unique revenue stream and subsequent profit pool resulting from transactions in the price-based marketing system. For cow-calf producers, revenues are received from the sale of feeder cattle to feedlot operators. Some cattle producers retain ownership of their cattle through the feedlot, so revenues are also derived from the fed cattle sale. In either case, cattle producer margins are determined by subtracting operating costs (including custom feeding charges for those who retain ownership) from the price received at either the feeder cattle or fed cattle sale.

Cattle feeders derive revenues from either custom feeding charges, fed cattle prices, or combinations of the two. Feeding margins result from subtracting operating expenses from custom feeding charges or from fed cattle price when ownership is involved. Those cattle feeders that buy the cattle must, of course, also subtract feeder steer costs to arrive at their final margin.

Packer revenues come from the sale of boxed beef products at the wholesale level. If a packer purchases cattle from a cattle feeder or a producer who has retained ownership, the packer's profit margin is determined by subtracting fed cattle buying costs and operating expenses from wholesale beef revenues. In some instances, packers take ownership of cattle before they enter the feedlot. In that case, the per head margin is determined by subtracting feeder steer costs, custom feeding charges, and operating expenses from the wholesale beef sales revenues. Figure 1 depicts per cwt. or per lb. profit margins for participants in the traditional beef industry structure.

**Figure 1. Calculation of Beef Industry Profit Margins: Traditional Marketing System**

<u>Participant</u>	<u>Ownership of Cattle</u>	<u>Profit Margin Calculation</u>
<b>Cattle Producers</b>	Retain ownership through feedlot	Fed Price – Feeding Charge – Operations Cost
	No retained ownership	Feeder Price – Operations Cost
<b>Cattle Feeders</b>	Obtain ownership from producer	Fed Price – Feeder Price – Operations Cost
	No ownership – custom feeding	Custom Feeding Charge – Operations Cost
<b>Packers</b>	Obtain ownership before feedlot	Wholesale Price – Feeder Price – Feeding Charge – Operations Cost
	No previous ownership of cattle	Wholesale Price – Fed Price – Operations Cost

In the traditional beef industry structure, the only information exchanged between participants is the sale price of cattle between successive stages of production. The pricing of cattle is often done through a liveweight system, where buyers bid on a pen of cattle, or by direct one-on-one negotiation between buyer and seller. Because the transaction is the only juncture where two stages of the industry communicate, economic signals are sent via the price paid for cattle. The idea of price as the sole mechanism for communication through a production or supply chain corresponds well with neoclassical economic theory, which asserts that price is the proper coordinating mechanism in all markets. Therefore, the beef industry has traditionally been modeled using neoclassical theory, seeking to explain firm level decision-making and industry structure as a maximization of profits (or minimizing costs) subject to signals received via market prices.

*There is a long history, however, of market prices failing as a coordinating mechanism in the beef industry.* Since the 1950's and early 1960's, researchers have shown that liveweight prices for beef fail to send the appropriate economic signals down the production chain from consumer to producer. Carcass-based sales with no delineation of various value-added traits such as tenderness experienced the same problems. As beef began to lose market share to alternative meats in the 1980's, the beef industry began to see the importance of improving beef quality.

*A wide range of alternative marketing agreements between participants in the beef industry has evolved since the 1980's, many of which do not use liveweight market prices to determine cattle value.* Instead, there has been a move towards using individual carcass pricing, similar to what has been implemented by the swine industry, to determine animal value. New organizational structures have ranged from vertical integration of beef production to informal marketing agreements between stages of production that share cattle performance data. Beef alliances are one of the most publicized organizational structures to be developed in the past 10 years. Schroeder et al. found that nearly all packers and most cattle feeders they surveyed in 1997 expected alliances and individual carcass valuation to increase in the future.

### ***Stage One of the Alliance Model – Economic Motivations***

Each participant in the beef industry possesses economic motivations that influence the course of action that firm will take in the marketplace. These motivations are the driving force behind beef industry participants seeking to form and successfully maintain alliance organizations. *The first step in developing the alliance model is the identification of individual economic motivations to become involved in an alliance.*

Cattle producer motivations may include:

- Frustration with the inability of liveweight pricing to accurately reflect the true value of their cattle. Ward, Feuz, and Schroeder estimate that “average” live weight or dressed weight prices fail to recognize value differences in cattle by \$30/head or more. These shortcomings discourage producers from making investments in genetics and management practices that improve overall cattle quality; block the ability to obtain desired returns on investments in quality improvements; and create obstacles to the management of risk associated with variable feeder or fed cattle prices.
- Access to markets may be blocked since small cattle producers may not have the volume needed to arrange shipments of adequate size and producers may not be able to afford investments in higher quality cattle. Schroeder et al. note that there is a large market for lower-quality beef products and that the entire industry should not be driven to produce the same high quality, higher priced products. Producers' efforts to secure credit may be influenced since some creditors want to see a guaranteed market contract from a buyer before offering credit and financing.

- Obtaining detailed performance reports on their cattle to evaluate investments in genetics and management.
- Diversifying their operations. The cattle producer could take an ownership position in other stages of beef production to share in those margins. Because there has traditionally been a sense that one segment of the beef production system captures large profit margins only at the expense of another, cattle producers may seek arrangements where they can benefit from sharing margins at other levels of operation, especially meat packing.
- Potential reduction in transaction and agency costs if they were to enter into an alliance system. Cattle producers may seek to benefit from reduced costs in an alliance system designed to ensure management expertise and effectiveness of alliance feedyard or packer members.

Each individual cattle producer has specific economic motivations. Regardless of their specific motivations, however, each individual firm assigns its own priority ranking to those motivations. For instance, some producers may place a high priority on obtaining cattle performance information and gaining access to a pricing system based on carcass value, while others are focused solely on guaranteeing market access for cattle. Producers use these priority rankings to make choices on which alliances may be appropriate for their operation.

Cattle feeder motivations may include:

- Finding an alliance pricing system that is value-based to return premiums to the feedyard's client or seeking the system most appropriate for their individual cattle type and management regime. This can result in increased volume of feeding contracts from clients at the same time that agency costs to participants are reduced.
- Reducing their margin risk caused by highly variable prices. Packer bids for fed cattle exhibit significant week-to-week variability, forcing cattle feeders to somehow manage the risk of pricing cattle. Historic feeding margins are highly variable and exhibit long periods of negative levels. Negative returns are a cash flow problem and become an impediment to obtaining financing and credit approval.
- Market access. Smaller feedlots have traditionally had problems marketing cattle to packers that might visit larger yards first, filling buying orders at the larger markets.
- Ensuring that cattle can be marketed at a given time allows cattle feeders to sell cattle at the appropriate time and avoid inefficient and costly weight gains.
- Better data and scheduling and operational management via coordination with a packer can lead to a decrease in operational costs.
- Diversification of operations, taking ownership in another stage of production, or seeking an arrangement that offers additional sources of revenue.
- The possibility to share in cattle performance information, allowing for discovery of what types of cattle perform best in their feedyard and developing a unique niche for their feedlot services.
- Potential for a reduction in transaction and agency costs with packers. The alliance can save time, lower operations costs, and reduce the risks associated with negotiating over fed cattle price



and delivery. Schroeder et al. found that the majority of cattle feeders and packers surveyed believe this reduction in the adversarial relationship between them served as a major reason why alliances would continue to grow in membership.

Packer motivations may include:

- Better communication of their needs to cattle producers and subsequently providing beef products at retail for which consumers may be willing to pay a higher price.
- Ability to establish targeted and branded product lines of beef. Packers are motivated to develop these lines because of the potential for higher prices as well as a guaranteed market outlet. Packers find that different product lines require different types of cattle and will be motivated to join a particular alliance based on its ability to provide a needed type of cattle. Becoming involved with an alliance that produces cattle of a defined quality provides packers with accurate information on the cattle they are processing, more control over the timing of production, and a guaranteed supply of the needed cattle type. These benefits not only increase the likelihood for better final product wholesale beef prices but can also lower packer operational costs.
- Lower cost of sourcing branded product lines with one supplier versus numerous small, non-uniform firms, allowing lower costs of contracting and negotiation.
- Lower operational costs through reduction of variation in cattle supply and cattle weights. When cattle weights are highly variable, the packer production costs increase due to the additional time needed for sorting and general lack of uniformity in the fabrication process. Anderson and Trapp estimated that a coordinated and steady flow of cattle into plants running near optimal processing capacity could save packers \$2-5/head compared to the current day-to-day variability in slaughter levels.
- Reduce transaction and agency costs incurred between themselves and cattle feeders. Fewer resources dedicated to monitoring and bonding transactions with cattle feeders and producers can allow for packers to focus efforts on other cost savings or demand increasing initiatives.

*In Stage One of the alliance model, beef industry participants determine a prioritized rank of economic motivations for joining an alliance organization.* Participants then seek firms with complementary motivations to form an alliance. The difference in motivations among beef industry firms leads to the multitude of alliance types currently available in the marketplace. For instance, cattle producers seeking higher prices to reflect their investments in superior genetics may form an alliance with a packer seeking high quality cattle that can generate a premium when merchandised in a branded product line. Another alliance may be formed between a coalition of small cattle producers that do not have large operations or high quality genetic potential. These producers, concerned with market access and interested in obtaining performance information for their herds, may align with a cattle feeder interested in lowering risk exposure by custom feeding cattle. A packer with a lower quality product line and seeking to lower operational costs could complete the alliance.

### ***Stage Two of the Alliance Model – Governance Structure Design***

*When beef industry participants come together in an alliance to achieve common objectives and coordinate their efforts, the industry structure has fundamentally changed.* Cattle producers, feeders, and packers now function as one coordinated production unit providing beef products to retail outlets. In this sense, cattle producers and feeders are no longer in the business of producing cattle but are producing meat products.

Unique to the alliance system is the presence of an alliance manager. Alliance management is responsible for making sure the alliance achieves its objectives. By serving as a monitor and mediator, management ensures that all alliance members coordinate their activities appropriately and perform their duties at a satisfactory level. For instance, many beef alliances focused on high quality products have a manager with the right to refuse cattle from a producer or cattle feeder that do not meet specific quality standards.

Participants in Stage Two of the alliance model make decisions on the governance structure's specific design. Like a new company, the alliance must determine the organization's rules and culture, creating the game plan for how the alliance will operate on a day-to-day basis. The alliance must make design choices in three fundamental areas: (1) alliance ownership, (2) participant compensation, and (3) risk sharing arrangements.

Stage Two of the alliance model is arguably the stage most beef alliances are now working through. Many alliances are struggling to determine the correct design that will accomplish the alliance's objectives as well as satisfy the sometimes inconsistent economic motivations set forth by each participant in Stage One. The lack of research-based information on the implications of choices available to the alliance complicates decision-making.

All firms involved with beef alliances maintain their own sovereign identity, but the alliance itself takes on its own identity. There are two primary ownership alternatives available for an alliance to choose from: equity based and non-equity based. Equity based alliances are characterized by members making a financial capital contribution to the alliance organization in the form of purchasing shares. The purchase of shares then allows the member to participate in the alliance program as well as possibly become a residual claimant if dividends of the operation are passed back to shareholders. Equity based alliances include cooperatives such as U.S. Premium Beef (USPB), a closed membership cooperative owned by producers who purchased a limited number of shares when the cooperative was formed. Shareholders in USPB are owners of the production alliance, which owns and operates a processing facility, and are able to market cattle through the cooperative's price grid system.

Non-equity based alliances are not a formal organization owned by participants. The best example of a non-equity based alliance is a formal agreement between beef industry participants to work together. This group may be made up of specific genetic type cattle producers, a cattle feeder, and a packer. In any case, the partners in the alliance do not hold ownership interests in the alliance. If on-going participation is seen as a threat, the partners may agree to bond themselves to the alliance in other ways such as making high (idiosyncratic) investments in specific genetics, management styles, or branded product lines.

Participant compensation is the fundamental alliance design choice and affects all aspects of alliance performance. Participants are seeking to be compensated in a manner that reflects their economic motivations identified in Stage One of the alliance model. Compensation design focuses on two questions: how participants are paid for their services and/or cattle, and how any additional revenue being generated by the alliance is shared between members. The first question centers on the choice of pricing system employed by the alliance. The second question requires sharing rules between the participants.

Most alliances utilize a pricing system determining fed cattle value on an individual carcass basis. To do this, alliances typically utilize a price grid or a formula pricing system. Formula pricing refers to establishing a fed cattle sale price using a formula that includes an observable price as a reference. The base price is external to the transaction, discovered separately from the current transaction. For instance,

an alliance may use the fed cattle liveweight price from a given cash market reported by the USDA as a price in the formula to determine cattle value.

Grid pricing sets a given base price, which may or may not be determined through a formula, and then specifies premiums and discounts for carcasses that are above or below a set of quality standards. The choice of price to use in the formula as a base price allows for a large variation to exist between possible grid pricing systems. The external price may be a USDA reported price or it could be a plant average price, and it can differ between market levels: live or carcass weight cash market, futures market, or wholesale beef market (Ward, Feuz, and Schroeder). Alliances must make a decision on what prices will be used in conjunction with a formula system to establish base prices in a grid.

The pricing system decision is commonly a direct reflection of the alliance's main objective. For instance, alliances that are formed to produce high quality premium beef products may set a high baseline value for cattle priced through the grid. If a carcass fails to exhibit superior quality characteristics it may be assessed large discounts, outweighing the benefit of a higher base price. Similarly, an alliance may set up a grid pricing system with a lower base price and quality standards that targets a specific type or grade of cattle. In either case, it is important for the alliance to construct a pricing system compatible with its long-term objectives. Cattle producers considering joining an alliance should also realize that all grid systems are not the same, and producers should have an understanding of how well suited their cattle are for a particular grid pricing system and/or what changes will be required for effective participation in the alliance.

Each alliance must also make a determination of how cattle feeders and packers will be compensated. Alliances usually start with a belief that they have a choice between allocating a constant or market-based margin to cattle feeders and packers. This decision on compensation requires the alliance to determine how the animal is valued into the system to determine margins. The alliance may choose to calculate those margins from market prices close to the alliance's operation, or derive them from other sources.

In addition to carcass-based valuation of fed cattle and allocation of margins to cattle feeders and packers, some alliances compensate participants with other sources of revenue such as product premiums or cost savings. An alliance can use a grid pricing system to award cattle producer's premiums directly for cattle that meet or exceed quality standards. These premiums vary by alliance, but many are based on a defined baseline or plant averages for quality, wholesale price/value spreads, or negotiated values.

*By sharing the benefits from higher quality cattle and/or better coordinated efforts, participants have an incentive to exert effort towards the success of the alliance. The sharing rule used for all participants therefore becomes an important decision for the alliance.* In many cases, the sharing rules are determined by bargaining, often involving the discussion of which participants add the most value to the final beef product. Packers may argue that they have made considerable investments in targeted product lines. Cattle producers will point to their investment in superior genetics and management practices.

The potential for alternative compensation designs in alliances is large. Each alliance seeks to identify an optimal way of valuing cattle as they are produced and after they are merchandised to consumers. *The design of participant compensation is the central focus of most beef alliance efforts.*

The question of risk sharing design is related to participant compensation. It may be seen as part of a compensation arrangement, but it can be unique in itself. Some alliances may develop risk sharing arrangements between participants as a result of bargaining for particular compensation designs. For instance, instead of, or possibly in addition to, a premium pool share, a cattle owner may wish to share in

margins of the participating packer. Another motivation for risk sharing centers on the chance that alliance participants may be able to make more outside of the alliance than by participating in it. This case is especially true for alliances that initially pay constant pre-determined margins to cattle owners and/or packers. The cattle owner and packer in the alliance realize an opportunity cost when margins are higher outside of the alliance. Market-based margins may be a type of risk sharing system designed to decrease the probability of incurring opportunity costs and risking the loss of participants. Depending on the alliance, forms of risk sharing arrangements can vary from custom feeding contracts designed to shift feed price risk to cattle producers, to margin sharing agreements between cattle owners and packers. As with ownership and compensation design, risk sharing design reflects the priorities set by each participant in Stage One of the alliance model.

### ***Stage Three of the Alliance Model: Design Assessment***

In Stage Three of the alliance model, participants perform assigned duties and revenues are being generated. Participants are compensated according to the established pricing and compensation systems, and premiums and/or cost savings are allocated as determined by the sharing rule. Due to the relatively recent emergence of alliance organizations, there is not a large body of information available on the results of differing governance structure designs. The absence of information is compounded by the proprietary nature of each alliance, limiting the extent to which empirical data can be obtained and analyzed.

Design assessment is a critical stage of alliance function because it allows alliance participants to evaluate their new industry structure. In some cases, alliance members may be satisfied with results. In others, the alliance may turn out to have unexpected consequences. For instance, a cattle producer may receive large discounts for cattle that do not match an alliance's quality specifications, resulting in lower average per-head revenues than would have been realized selling cattle on the open market at average prices. The producer may then decide to either make commitments that will improve herd quality, or leave the alliance system and market cattle in the traditional system, often on a live weight and average price basis.

In Stage Three of the alliance model, then, the benefits of alliance participation are analyzed and weighed by members. After assessing the benefits or costs, they are compared to prioritized motivations identified in Stage One. If the alliance fails to satisfy a member's original objectives, they have two choices: leave the alliance or work towards changing the governance structure design. The alliance model is therefore a three-stage game that is continuously repeated with design choices and evaluation of outcomes that must ultimately satisfy original economic motivations to become involved with the alliance.

*In summary, beef alliances can be framed within the context of a repetitive three-stage game. Members continuously evaluate their economic motivations for participation, seek to design the alliance's governance structure to reflect those motivations, and evaluate outcomes to determine if they will participate in the future.* While each individual alliance is unique, the conceptual framework presented here can be applied to all alliances regardless of participants or scale of operation. The alliance of cattle producers coordinating production efforts to schedule larger combined loads to feedlots will undergo the same decision processes in the alliance model as the large packer aligning with a cattle producer group to market branded beef products. Regardless of size or purpose, each alliance member will prioritize economic motivations for joining, seek to design the alliance governance structure to reflect those motivations, and then evaluate the outcomes. New profit centers are created, new interactions between industry members occur, and new problems emerge that need to be solved. This conceptual framework for alliance formation and design process is necessary for identifying what participants must accomplish

before joining the alliance and for understanding the stage of the process in which a given problem might be present.

## Empirical Analysis of Alliance Design

This research effort provides alliances with information on participant compensation and risk sharing arrangements. The overall objective is to begin providing analytical content to the decisions made by beef alliances when designing their individually unique structures. From Stage 2 of the alliance model, these design choices include ownership of the alliance, participant compensation, and risk sharing agreements. The analysis focuses on the last two design choices, compensation and risk sharing. Specifically, the analysis is targeted towards understanding three primary issues alliances face:

- The effects of margin sharing between cattle owners and packers in an alliance;
- The potential that premiums from branded beef product lines have for increasing alliance participant returns; and
- The possibility of exchanging premium rights for margin sharing agreements, and the relative value of each compensation type to cattle owners and packers.

### *Alliance Margins*

In this analysis the alliance being reflected is composed of cattle owners, cattle feeders, a packer, and an alliance manager. Both the alliance manager and cattle feeders are paid a constant fee for their services. Cattle owners, having retained ownership of cattle through slaughter, earn a market determined margin equivalent to the typical cattle feeder margin outside the alliance. Cattle packers earn a market based margin equivalent to typical margins being earned by packers outside the alliance.

These margins are determined by identifying “baseline” cattle value based on market prices before slaughter and after based on carcass values after slaughter. This baseline can be defined differently according to alliance objectives. An alliance targeting lower quality retail markets may identify baseline cattle as Select yield grade 2.0, while another alliance targeting higher quality outlets may identify baseline as Choice yield grade 3.5 cattle. After defining the “baseline,” the cattle owner earns a feeding margin equal to baseline cattle value for the specified cattle type and quality before slaughter minus feeding and production costs. Cattle packers earn a margin equal to wholesale baseline cattle value for the specified cattle minus baseline liveweight cattle value before slaughter.

While the “baseline” cattle value is defined differently according to an alliance’s objectives, clear motivations exist for cattle owners before the decision is made. *Cattle owners receive the entire baseline value for each steer marketed, but usually only negotiated a percentage of any premiums generated.* Therefore, other things equal, cattle owners will seek to join alliances with the highest defined baseline cattle level that their cattle can qualify for without incurring discounts. It is not in the best interest of owners to set a low baseline value and share premiums easily generated by higher quality cattle with other alliance members. Those premiums are generated at least partly as a result of the owner’s investment in higher quality cattle.

Regardless of how “baseline” cattle are defined, market based margins impose a variance in each participant’s returns. Cattle owners or packers concerned with lowering alliance participation risk are inclined to include margin sharing as a design characteristic of the alliance. Margin sharing between cattle owners and packers has become a relatively common method for compensating alliance members. Many margin sharing proponents see it as a solution for risk reduction, while others seek to share margins in lieu of rights to premiums generated by high quality cattle.

## **Premiums**

Many alliances are organized to capture premiums from the sale of higher quality beef products. The success of each alliance in generating premiums varies according to numerous factors such as target markets, level of coordination by participants, and management. Regardless of premiums earned, however, each alliance must deal with the fundamental issue of dividing the premiums among alliance members.

For most alliances, the share of premiums garnered by each participant results from negotiation and bargaining. Cattle packers, for instance, may feel entitled to the majority of premiums earned to recoup their investments in product development, brand building, and marketing. Cattle owners may argue for a large percentage of premiums, citing their investment in management technology and genetics that ultimately produce higher quality cattle.

Premiums are calculated differently in each alliance according to organizational guidelines and accounting procedures. In this analysis, the premium (or discount) to be shared among alliance participants is calculated as the difference between baseline carcass value and the eventual merchandised value of cuts from the carcass. If an alliance designated baseline cattle to be Choice YG3.5, then any carcass grading higher than Choice YG3 and sold for a higher than baseline price would generate a premium equal to the difference. For example, if Choice YG3.5 carcasses were valued at \$115.00/cwt. on a carcass basis and a Choice YG2.5 carcass was merchandised for \$117.00/cwt., a \$2.00/cwt. (carcass weight) premium, coming largely from the added meat yield, would be generated and split between alliance members. If cattle do not meet the baseline quality level, discounts may be assessed.

*Alliance participants all have an interest in knowing the size of the premium pool when bargaining for premium allocations.* Participants may be less demanding for premium shares when the premium (for a specific cattle type and quality) is small versus when it is large.

Premiums to bargain for may also alter the position alliance participants take regarding compensation. Rather than focusing only on margin sharing, the existence of premiums allows for greater flexibility in deciding how each alliance participant is compensated. Under some circumstances, alliance participants may be willing to forego margin sharing in favor of a higher percentage of premium rights. Producers with exceptional genetics that produce premium cattle might be interested primarily in the premiums. Conversely, margin sharing may at times be more beneficial than rights to any premiums generated. Empirical evidence on the relative worth of each compensation method allows alliance participants to engage in negotiations with more complete information, decreasing the likelihood of destructive opportunistic behavior by other participants.

Regardless of how they are distributed, *premiums are the primary way in which the number of dollars to be allocated can be increased.* Differing ways of sharing packer and feeding margins allocate essentially the same pool of dollars. *Planning for and producing high quality cattle can expand the total dollars involved by earning market premiums, and this is and will be a primary motivation for alliances.*

## **Cattle Owner and Packer Margins**

Historical weekly margin data were obtained for both cattle owners and packers. It is important to remember that cattle owners in the alliance are allocated a market determined margin equivalent to the average cattle feeder margin outside the alliance. Therefore, cattle feeding margin data were obtained to approximate cattle owner returns in the alliance. Weekly cattle feeder margin data were generated from

monthly margin estimates in the Kansas State University Cattle Feeder Return Series from January 5, 1990 to June 30, 2000, a total of 548 weekly observations.

KSU's monthly margin estimates were converted to weekly margin estimates by making minor modifications. The average marketing weight of fed cattle and the average breakeven costs per cwt. were both assumed constant for each week of the month. Weekly breakeven costs were then subtracted from Western Kansas fed steer prices reported by the Livestock Marketing Information Center<sup>1</sup> to calculate a weekly per head cattle owner margin. Estimated owner margins for each week are listed in Table A1 of the Appendix.

Weekly packer profit margins were obtained from Andrew Gottschalk<sup>2</sup>, industry analyst. Per-head packer margins are comprised of all carcass values including all hide and byproduct credits and represent an estimate of the industry-wide average per-head profit margin. Packer margin estimates were employed for the same time period, January 5, 1990 to June 30, 2000, a total of 548 observations. Estimated packer margins are also listed by week in Table A1 of the Appendix.

Because margin data from specific cattle owners and packers were not available due to proprietary reasons, the margins obtained from KSU and Gottschalk were assumed to be representative of weekly cattle owner and packer margins in the simulated alliance. These two series reflect essentially the same Western Kansas base price out of the feedyard and into the packing plant. The historical weekly margins are used as an approximation of the margins earned by marketing "baseline" cattle through the alliance organization. Table 1 provides descriptive statistics for each margin series.

**Table 1: Descriptive statistics of weekly feeding and packing margins (\$/head) from January 5, 1990 to June 30, 2000**

	<u>High</u>	<u>Low</u>	<u>Mean</u>	<u>Std. Deviation</u>
<b>Feeding Margins</b>	134.44	-190.91	-4.37	61.02
<b>Packing Margins</b>	58.75	-40.46	6.38	18.12

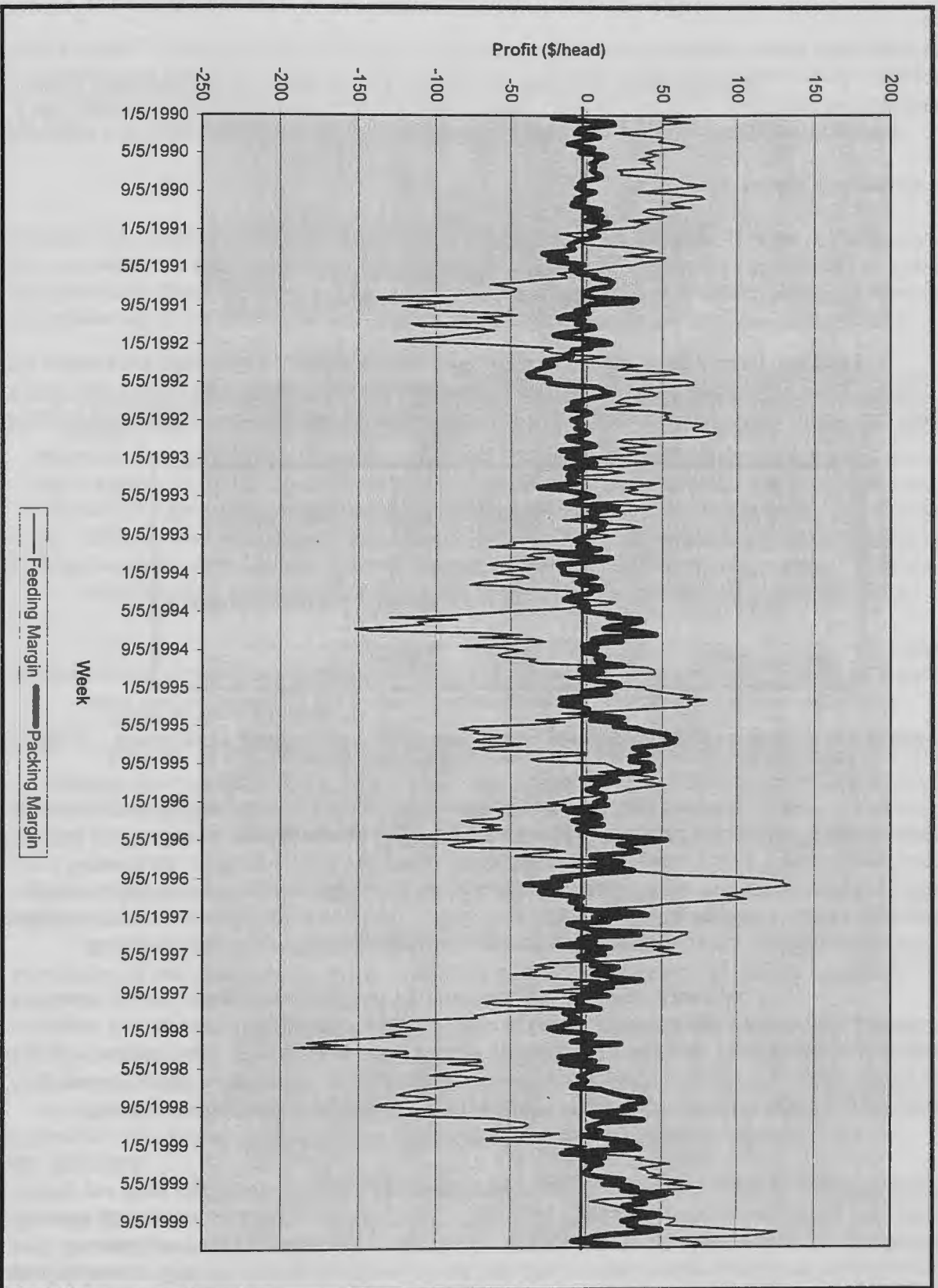
Figure 2 presents both feeding and packing weekly per-head margins from 1990 to 2000. The statistics in Table 1 are clearly represented in the graphic presentation. The feeding margins are more variable than the packing margins, and the periods of sustained losses are longer in the feeding margins.

<sup>1</sup> LMIC information is at: <http://www.lmic1.co.nrcs.usda.gov>.

<sup>2</sup> Andrew Gottschalk can be reached at 1-888-220-3344, or <http://www.hedgersedge.com>



Figure 2. Weekly Feeding and Packing Margins (1990-2000)



## *Premiums*

Prices and premiums earned for a sample of 2683 cattle marketed through a U.S. beef alliance were collected. The sample cattle were delivered from a number of producers. The sample provides baseline carcass values and premiums for one brief time period, rather than a series over time as is the case with the feeding and packing margins.

The sample data showed 28% (745 head) of the cattle received by the packer were of assumed baseline quality, Choice YG3, with a carcass value/cwt. of \$112.99. Another 21% (558 head) of cattle qualified for a branded product line above the Choice YG3 quality level. These “premium” cattle were sorted into different higher value lines where they earned a higher value/cwt. than the baseline cattle, thus generating a “premium” to be allocated across alliance members.

The premiums earned by 558 cattle in each of the product lines are shown in Table 2, ranging from \$0.12/cwt. to \$7.47/cwt. on a carcass weight basis. These premiums are the difference between the actual merchandised beef price and the baseline Choice YG3 price of \$112.99/cwt. “Brands” 1, 2, and 3, etc., are brand-specific product lines, labeled so as to protect the proprietary nature of the data.

Table 2 can be interpreted as follows. The sample of cattle had a 21% chance for a steer to qualify for a branded product line above the baseline Choice YG3 level. Of those cattle that qualified for a premium line, 51.96% were merchandised as Choice YG2 product, earning a premium of \$2.25/cwt. on a carcass basis due to the added meat yield. Similarly, 10.39% of premium cattle were merchandised as Choice YG1 products, earning a premium of \$2.61/cwt. on a carcass basis in this particular set of cattle.

The sample of alliance cattle had the highest probability of receiving \$2 to \$3/cwt. premiums if carcasses qualified for a premium product line. Almost 80 percent of the cattle that earned premiums received a \$2-3 per cwt. (carcass based) premium. Premiums will only be available when actual merchandised prices exceed baseline cattle prices. There are times when cattle exceed Choice YG3 quality, but do not earn a premium because of market conditions and the inability of the packer to garner a premium.<sup>3</sup>

---

<sup>3</sup> When alliances set a specific premium for qualifying cattle of a certain type/premium, they are abstracting from the small chance a premium will not be available in the beef market. Any risk associated with an animal qualifying for a premium but not receiving it is being concealed by the fixed set of premiums that are adjusted periodically as the market changes.

**Table 2: Sample of Premiums Earned by Alliance Cattle in 13 Premium Product Lines**

Premium = Merchandised Price – Choice YG3 Price				
<u>Premium Line #</u>	<u>Premium Line Name</u>	<u>Head Count</u>	<u>% of Total</u>	<u>Premium (\$/cwt.)</u>
1	Choice YG2	290	51.96	2.25
2	Choice YG1	58	10.39	2.61
3	<i>Brand1</i> YG3	42	7.53	0.12
4	<i>Brand1</i> YG2	28	5.02	2.33
5	<i>Brand1</i> YG1	2	0.36	2.70
6	<i>Brand2</i> YG3	34	6.09	4.02
7	<i>Brand2</i> YG2	6	1.08	5.32
8	<i>Brand2</i> YG1	2	0.36	6.17
9	<i>Brand3</i> YG3	65	11.65	2.94
10	<i>Brand3</i> YG2	23	4.12	3.87
11	<i>Brand3</i> YG1	2	0.36	5.71
12	Prime YG3	3	0.54	6.44
13	Prime YG2	3	0.54	7.47

### *Analysis*

Simulations were performed using the *@Risk* software package to analyze outcomes for alliance cattle owners and packers under alternative margin sharing and premium allocation designs. The analysis is divided into two sections:

- Simulations of cattle owner and packer margins under three margin sharing types:
  - Cattle owners transferring up to 50% of their margin to packers;
  - Packers transferring up to 50% of their margin to cattle owners; and
  - Cattle owners and packers sharing up to 50% of their respective margins with shares always equal (e.g., 10 and 10, or 20 and 20).
- Simulations of cattle owner and packer margins under equal sharing of margins up to 50%, combined with various premium rights for each participant. These scenarios were tested for three alternatives:
  - 25% of cattle qualifying for a product line above Choice YG3,
  - 50% of cattle qualifying for a product line above Choice YG3, and
  - 75% of cattle qualifying for a product line above Choice YG3.

It is important for the reader to understand the two different types of “margin sharing” tested. Margin sharing can take the following two forms:

- 1) *Unilateral sharing*, or direct transfer of margin, where one party transfers a percentage of their own margin to another party with nothing in return. For example, cattle owners may transfer 20% of their earned margin to packers. Cattle owners would be left with a margin equal to 80% of its original value. Packer revenues would then be equal to 100% packing margin + 20% owner margin.

- 2) *Equal margin sharing*, where both parties exchange an equal % of their own margins. For example, if 20% equal margin sharing was agreed on, then packers would receive 20% of the cattle owner margin and owners would receive 20% of the packer margin. Cattle owner revenue would be equal to 80% owner margin + 20% packer margin. Packer revenue would be equal to 80% packer margin + 20% owner margin.

The *@Risk* software program allows a user to define distributions to be sampled during a simulation. These distributions may be discrete or continuous, and numerous distributions can be created for the simulation to sample from. For each iteration, a value is randomly selected from each identified input distribution and used in the calculations set forth in an *Excel* worksheet. The calculated values from all iterations are then stored in a separate worksheet cell for later analysis. The software program therefore allows for a large number of “what if?” scenarios to be performed by a user when variables of interest take a wide range of values. In this manner, users can get a better idea of most likely outcomes when variable factors change over time.

Defining the input distributions can be tricky if a researcher only has a relatively small sample of data. The *BestFit* program that accompanies *@Risk* solves this problem by searching for the most likely population distribution that could have produced the sample data. *BestFit* takes the sample data input by a user and compares it to 26 pre-defined distribution types. Using the Chi-Square statistic as a goodness-of-fit test, *BestFit* uses an iterative search process to find the parameters for each distribution type that minimize the Chi-Square statistic. After optimizing the parameters of all possible distributions, *BestFit* ranks all distributions according to Chi-Square statistic values. The distribution returning the lowest Chi-Square value is ranked as the most likely population distribution for the sample data.

If two or more variable distributions are defined, *@Risk* can adjust for correlation between them. For two distributions that are negatively correlated, accounting for the correlation reduces the probability of *@Risk* sampling highly unlikely events, such as two record high observations at the same time.

To simulate all three margin sharing scenarios, the input distributions to sample from needed to first be defined. Using the *BestFit* software program, historical cattle feeding and packing margins were analyzed to determine the distribution type that described each historical series best. Both cattle feeder and packer historical weekly margins were entered as sample data into *BestFit*, where the data were first sorted and converted into a histogram to create a probability density function.

*BestFit* found that cattle owner margins can be best represented by a normal distribution with an expected margin value of \$-4.37/head and a standard deviation of \$61.02 per head. Cattle packer margins are best represented by a logistic function with an alpha level of 6.38 and a beta level of 9.92.

Using the newly defined distributions<sup>4</sup> to represent alliance cattle owner and packer margins over time, the *@Risk* program randomly selected margin values to divide according to the three different sharing rules. The inverse correlation existing between feeding and packing margins was accounted for by entering the correlation coefficient for the two series, -0.1185, into the *@Risk* correlation coefficient matrix.

---

<sup>4</sup> The distributions chosen by the *BestFit* program do not completely capture historical margins, and the calculated Chi-Square values were not statistically significant at the widely used .05 confidence level at least partly because the sample of data was small. However, judgment was made that it was better to have a somewhat poorly fitting distribution representing alliance margins than to rely directly on the empirical data. In order to utilize the power of *@Risk*'s simulation programming, a continuous distribution was needed from which to sample. Historical data provide actual margin levels, but all margin levels have a discrete and equal probability of being sampled in each iteration of the simulation if actual data are used. *BestFit* results provide a robust distribution that is not constrained by past history, and allows for more detailed observations than would historical data.

In order to analyze each sharing arrangement, @Risk performed a simulation of 10,000 iterations that randomly sampled both cattle owner and packer margin distributions. These sample margins were then divided according to sharing rule and each result stored before beginning the next iteration. At the end of 10,000 iterations, @Risk had generated 10,000 observations for each tested margin sharing scenario. Performing 10,000 iterations ensured that each output distribution ultimately converged to a stable state, decreasing the probability that the sharing results would change if more iterations were performed.

The first simulation determined the effect of alliance cattle owners transferring up to 50% of their margin to packers. The second simulation focused on the effects of packers transferring up to 50% of their margin to cattle owners. The final simulation examined impacts of equal margin sharing between participants. This simulation tested the outcome from cattle owners and packers sharing 10%, 20%, up to 50% of their margin with each other, and receiving an equal percentage in return.

### ***Equal Margin Sharing in Combination with Premium Allocation Analysis***

The second component of the analysis incorporated premium rights into the compensation design. For this analysis both cattle owners and packers were assumed to have agreed to *equal*, rather than unilateral, margin sharing if any was desired by either participant. Equal margin sharing means that both cattle owners and packers exchange an equal % of their own margin. @Risk conducted 12 simulations under a variety of margin sharing and premium allocation designs, with each iteration recording margins earned by cattle owners and packers, as well as the premium (if any) generated and divided by designated rules of sharing.

The 12 simulations performed by @Risk were divided into three groups, with each group representing a different level of steer quality in the alliance. The first group represented a high quality alliance where 75% of cattle qualified for above baseline premium product lines. Group two represented an average quality alliance where 50% of cattle qualified for a premium, while group three demonstrated lower quality results with only 25% of cattle qualifying for an above baseline premium.

For each alliance quality group, four simulations were performed to generate results from different margin sharing and premium allocation rules between cattle owners and packers. These simulations analyzed the outcome if each participant were awarded from 0% up to 100% of the premiums generated (at intervals of 25%), while equal margin sharing ranged from 0% to 50%.

For each iteration, @Risk performed the following process. First, margins were sampled from pre-defined cattle owner and packer distributions, generating a margin earned by each participant. These simulations assumed that no correlation existed between type of premium (if any) earned, and level of either owner or packer margin<sup>5</sup>. Second, the program randomly selected whether that iteration (representing one steer being marketed) would qualify for a premium product line at all. For example, in the high quality alliance 75% of iterations would qualify for a premium versus only 25% in the low quality alliance.

If the steer qualified, @Risk randomly selected the premium line it qualified for based on the empirical sample probabilities for each premium line, as shown in Table 4.2. To demonstrate, a

---

<sup>5</sup> In reality, this assumption of zero correlation may be incorrect. When cattle are overfed and the market is filled with heavy Yield Grade 4 cattle, the premiums for High Choice or even Prime beef can disappear. Live cattle prices might decrease sharply, leaving the packer with better margins when the feeding margins are at large negative levels.

premium-qualifying steer had a 52% chance to be a Choice YG2 carcass, and only a 0.54% chance to be a Prime YG2 carcass. The percentage of premium qualifying cattle merchandised through each premium line, and the premium earned, remained constant for each simulation. Therefore, an above baseline steer in a low quality alliance (25% qualifying) had the same probability of being merchandised as Prime YG2 as a steer in a high quality alliance (75% qualifying) would, namely 0.54%, and would earn the same \$7.47/cwt. premium. To reflect the roughly 10% chance that cattle may qualify for one of the above baseline premiums yet receive no premium due to market conditions, each steer was given only a 90% probability of receiving the appropriate premium amount shown in Table 4.2.

After any premiums earned by a steer were calculated, they were converted to a per-head live basis by assuming 7.56 cwt. on a carcass basis for each steer. Therefore, a \$2/cwt. carcass premium results in a \$15.12 per head premium to be divided between cattle owners and packer. The appropriate percentage of both cattle owner and packer margin was then shared between them, and the premiums were allocated to each participant as defined by the given simulation.

### ***Margin Sharing: Results***

The first margin-sharing scenario tested the effects of cattle owners transferring up to 50% of their margins to packers, receiving nothing in return. Table 3 presents the outcome for both owners and packers.

**Table 3. Owner and Packer margins (\$/head) as Owners Transfer Up to 50% of Their Margin to Packers**

		<i>% of Owner Margin Transferred To Packer</i>					
		<b>0</b>	<b>10</b>	<b>20</b>	<b>30</b>	<b>40</b>	<b>50</b>
<b>Owner</b>	<b>Mean</b>	-4.37	-3.93	-3.50	-3.06	-2.62	-2.19
	<i>Std. Deviation</i>	61.02	54.92	48.82	42.72	36.61	30.51
<b>Packer</b>	<i>Mean</i>	6.38	5.94	5.50	5.07	4.63	4.19
	<i>Std. Deviation</i>	17.99	18.34	20.59	24.20	28.67	33.66

Cattle owners experience an increase in their expected margin as they transfer more of their margin to the alliance packer. Not only does expected margin increase from the average of -\$4.37/head to -\$2.19/head, but the standard deviation of owner margins decreases from \$61.02 to \$30.51/head.

Cattle packers experience the reciprocal impact. Expected packer margins decrease from \$6.38/head when they receive none of the owner margin, to \$4.19/head when they receive 50% of cattle owner margins. Margin standard deviation to the packer increases from \$17.99 to \$33.66/head.

Table 4 provides the results when cattle packers transfer their margins to cattle owners, and receive nothing in return. The results indicate that cattle owner expected margin increases from -\$4.37/head to -\$1.18/head as they receive up to 50% of the packer margin. Cattle owner margin variability, however, does not significantly change when receiving larger percentages of the packer's margin, remaining around \$61.00/head. Packer margins decrease from \$6.38/head to \$3.19/head, and

margin variability decreases from \$17.99 to \$9.00/head as the packer transfers a larger percentage of their margin to cattle owners.

**Table 4. Owner and Packer Margins (\$/Head) as Packers Transfer Up to 50% of Their Margin to Owners**

		<i>% of Packer Margin Transferred To Owner</i>					
		0	10	20	30	40	50
Owner	Mean	-4.37	-3.73	-3.10	-2.46	-1.82	-1.18
	Std. Deviation	61.01	60.82	60.68	60.59	60.55	60.57
Packer	Mean	6.38	5.74	5.10	4.46	3.83	3.19
	Std. Deviation	17.99	16.19	14.39	12.59	10.80	9.00

Table 5 provides results for equal margin sharing between alliance cattle owners and packers. As cattle owners share a larger percentage of their margin with packers, receiving an equal amount of packer margin in return, cattle owners increase expected margin from -\$4.37 to \$1.00/head, while simultaneously decreasing margin variability from \$61.02 to \$30.84/head.

Packers have an interesting result, lowering expected margins while eventually increasing standard deviation of the margin overall. Packers experience a decrease in the level of expected margin from \$6.38 to \$1.00/head. At the same time, the standard deviation of the margin decreases initially from \$18.00 to \$16.67/head while sharing 10% of their margin, to increasing at higher levels of sharing to an eventual \$30.84/head.

**Table 5: Owner and Packer Margins (\$/Head) as Both Share Equal Percentages of Their Margin Up to 50%**

		<i>% of Respective Margins Exchanged Between Owners and Packers</i>					
		0	10	20	30	40	50
Owner	Mean	-4.37	-3.30	-2.22	-1.15	-0.07	1.00
	Std. Deviation	61.02	54.75	48.55	42.46	36.52	30.84
Packer	Mean	6.38	5.30	4.23	3.15	2.08	1.00
	Std. Deviation	18.00	16.67	17.81	21.04	25.57	30.84

An example is helpful to understand how the values in Table 5 are calculated. Under 40% equal margin sharing, packers return an average \$2.08/head. This is calculated as follows:

- Packers earn an average margin of \$6.38/head;

- Packers give 40% of their margin or \$2.55/head to owners;
- Packers receive 40% of the cattle owner's margin, -\$1.75/head; and
- Average packer return under 40% equal margin sharing:  

$$(6.38 - 2.55) + (-1.75) = \$2.08/\text{head}$$

### ***Margin Sharing: Conclusions***

*Results from margin sharing simulations suggest that cattle owners are in a position to benefit more from margin sharing arrangements than are cattle packers. In every scenario where alliance cattle owners could transfer a portion of their margin to the packer, expected margins to cattle owners increased and standard deviation of margins earned decreased. This result held without regard to whether or not owners received any packer margin in return.*

The most significant improvement for cattle owners comes from equal sharing of margins with the packer. Cattle owners realized their highest expected margin of \$1.00/head and very nearly the lowest standard deviation of those margins when they transferred 50% of their margin to packers, and received 50% of the packing margin in return.

These results suggest that cattle owners have a significant incentive to:

- Receive as much of the packer margin as possible; and
- Simultaneously transfer the largest percentage possible of their own margin to packers.

The importance of transferring some of their own margin to packers while receiving packing margin should not be overlooked. *In all tests, cattle owners received higher expected margins with lower standard deviation by simultaneously transferring some of their margin to packers, rather than only receiving a portion of the packer's margin.*

Simulation results reveal that packers would not prefer equal margin sharing arrangements. Assuming cattle packers have strong risk management programs already in place, and prefer a higher average return over lowering return variance, cattle packers would support receiving more cattle owner feeding margins rather than share their packing margins with cattle owners.

*Cattle owners are thus more likely to press for margin sharing agreements in alliances than are packers.* Exposed to highly variable and often negative feeding margins, many cattle owners may have joined the alliance to reduce the variability associated with a failed pricing system, leading them to press hard for margin sharing agreements with packers. Historically, cattle feeding margins have exhibited long periods of consecutively negative returns. These negative returns for long periods of time impose a cash flow problem on owners, and may frustrate efforts to obtain financing or credit.

*Alliance packers may be willing to accept margin sharing as part of the alliance design to reap the benefits of improved supply chain coordination.* Packers who have invested large amounts of capital into branded beef product lines must attract a large number of high quality cattle and compete with other packers who are pursuing those same cattle. To avoid the costly process of dealing with new cattle owners all the time, packers have an incentive to accommodate owner needs in exchange for a long-term



relationship. Agreeing to margin sharing needs is just one example of packer compromises to guarantee a consistent supply of needed cattle.

Alliance packers also earn additional returns besides premiums. Cost savings from operating plants at higher utilization rates and removing the variation in daily slaughter rates can average as much as \$3-6/head (Anderson and Trapp). These earnings allow packers to participate in alliances where average return may be lower than the \$6.38/head available outside the alliance, but processing cost savings coming from even quantity flows of cattle make up for the difference.

### ***Equal Margin Sharing in Combination with Premium Allocation***

It is important for the reader to understand that this portion of the analysis assumes all margin sharing is equal between participants. For example, the statement “10% margin sharing” means that:

- Cattle owners transfer 10% of their margin earned to packers, and
- Packers transfer 10% of their margin to owners.

It is reasonable to assume that owners and packers agree to equal margin sharing for the reasons set forth earlier.

The simulations combining premium rights with equal margin sharing allow for an examination of both cattle owner and packer motivations when given a compensation tool other than margin sharing with which to bargain. Results first provide an empirically based estimate of the size of premiums that might be captured in three types of alliances: those with cattle that qualify for premium product lines with above average, average, or below average frequency. Table 6 shows the average per-head premium, and standard deviation of that premium, earned by the sample of alliance cattle.

*The results emphasize the potential that premiums have for improving both cattle owner and packer profits.* In an alliance with cattle that grade higher than the Choice Yield Grad 3 baseline 75% of the time, premiums average \$12/head across all cattle. Those alliances with half of all cattle qualifying for premium lines return an average of \$8/head in premiums. Even lower quality alliances, where only one steer out of four qualifies for a premium line, average \$4/head in premiums. These results are after discounting the premiums by the small probability that the cattle will qualify for, but not get in the marketplace, the indicated premium.

**Table 6. Mean and Standard Deviation (\$/Head) of Premiums Generated Over All Cattle According to Alliance Quality**

	<i>Mean premium earned by all cattle (\$/head)</i>	<i>Std. Deviation (\$/head)</i>
<i>High Quality</i> 75% of cattle qualify for a premium line	12.83	11.01
<i>Average Quality</i> 50% of cattle qualify for a premium line	8.46	10.78
<i>Low Quality</i> 25% of cattle qualify for a premium line	4.22	8.75

Results from simulations show the standard deviation of cattle owner and packer returns did not change when premiums were included in compensation to alliance participants. The variation of returns was determined by the level of equal margin sharing, not the specific premium allocation design. This was an expected result since the premiums were a one time constant observation or increment.

Average per head returns for both cattle owners and packers are given in Tables 7, 8, and 9. Table 7 lists average returns for cattle owners and packers in high quality alliances, where 75% of cattle marketed through the alliance qualify for one of the thirteen premium product lines. Table 8 shows average returns in an average quality alliance, where 50% of cattle qualify for a premium line. Finally, Table 9 shows the results for lower quality alliances, where only 25% of cattle marketed through the alliance qualify for a premium line.

At the top of each table cattle owners are allocated 100% of any premiums generated by the cattle and packers receive none. As one moves down the chart, cattle owners receive less of the premium, and packers increase their share.

An example will help to understand how results in these tables are calculated. In Table 7 cattle owners who participate in an alliance characterized by high quality cattle, are allocated 100% of all premiums generated, transfer 20% of their margin to packers, and receive 20% of the packer's margin earn an average return of \$10.61/head. The \$10.61/head is calculated as follows:

- Owners earn an average margin of -\$4.37/head
- Owners give 20% of their margin to packers, -\$0.87/head
- Owners receive 20% of the packer's margin, \$1.28/head
- Owners receive an average premium of \$12.83/head
- Average owner return is:  

$$[(-4.37) - (-0.87)] + 1.28 + 12.83 = \$10.61/\text{head}$$

Examination of Tables 7, 8, and 9 helps to determine what each participant would require or be willing to give up in order to advance to the next level of premium allocation or equal margin sharing. Continuing from the previous example of the cattle owner earning \$10.61/head: if asked to give up 25% of premium allocation rights, the owner would have to be able to increase equal margin sharing to 50% in order to maintain a approximate return of \$10.61/head, the \$10.47 shown under the "Owner - 75% Premium" heading and at 50% levels of margin sharing.

Perusal of the table demonstrates why cattle owners will be aggressive in pursuing a high percent of premiums. If cattle owners only get 50% of the premiums, there is no margin sharing arrangement that matches the \$8.46 per head return when the producer gets 100% of the premiums and margin sharing is not present (is at zero).

Conversely, it is clear the packer will negotiate for a large share of the premiums and to keep margin sharing as low as possible. Recall these tables are built with equal margin sharing. While pushing for a large share of the premium pool, the packer will want to (1) minimize sharing of feeding margins, and (2) minimize the share of the packing margin going to cattle owners.

**Table 7. Average Returns (\$/Head) for Owners and Packers Under Various Equal Margin Sharing Rules and Premium Allocations -- High Quality Alliance**

<i>% of respective margins exchanged between owners and packers</i>		
	Owner - 100% Premium	Packer - No Premium
0	8.46	6.38
10	9.53	5.30
20	10.61	4.23
30	11.68	3.15
40	12.76	2.08
50	13.83	1.00
	Owner - 75% Premium	Packer - 25% Premium
0	5.10	9.58
10	6.17	8.50
20	7.25	7.43
30	8.32	6.35
40	9.40	5.28
50	10.47	4.20
	Owner - 50% Premium	Packer - 50% Premium
0	2.01	12.76
10	3.09	11.69
20	4.16	10.61
30	5.24	9.54
40	6.31	8.46
50	7.39	7.39
	Owner - 25% Premium	Packer - 75% Premium
0	-1.17	15.84
10	-0.10	14.77
20	0.98	13.69
30	2.05	12.62
40	3.13	11.55
50	4.20	10.47
	Owner - No Premium	Packer - 100% Premium
0	-4.37	19.21
10	-3.30	18.13
20	-2.22	17.06
30	-1.15	15.98
40	-0.07	14.91
50	1.00	13.83

**Table 8. Average Returns (\$/Head) for Owners and Packers Under Various Equal Margin Sharing Rules and Premium Allocations -- Average Quality Alliance**

<i>% of respective margins exchanged between owners and packer</i>	<b>Owner - 100% Premium</b>	<b>Packer - No Premium</b>
0	4.08	6.38
10	5.16	5.30
20	6.23	4.23
30	7.31	3.15
40	8.38	2.08
50	9.46	1.00
	<b>Owner - 75% Premium</b>	<b>Packer - 25% Premium</b>
0	1.94	8.52
10	3.01	7.45
20	4.09	6.37
30	5.16	5.30
40	6.24	4.22
50	7.31	3.15
	<b>Owner - 50% Premium</b>	<b>Packer - 50% Premium</b>
0	-0.16	10.59
10	0.92	9.51
20	1.99	8.44
30	3.07	7.37
40	4.14	6.29
50	5.22	5.22
	<b>Owner - 25% Premium</b>	<b>Packer - 75% Premium</b>
0	-2.22	12.69
10	-1.15	11.61
20	-0.08	10.54
30	1.00	9.46
40	2.07	8.39
50	3.15	7.31
	<b>Owner - No Premium</b>	<b>Packer - 100% Premium</b>
0	-4.37	14.84
10	-3.30	13.76
20	-2.22	12.69
30	-1.15	11.61
40	-0.07	10.54
50	1.00	9.46

**Table 9. Average Returns (\$/Head) for Owners and Packers Under Various Equal Margin Sharing Rules And Premium Allocations -- Low Quality Alliance**

<i>% of respective margins exchanged between owners and packer</i>		
<u>packer</u>	Owner - 100% Premium	Packer - No Premium
0	-0.15	6.38
10	0.93	5.30
20	2.00	4.23
30	3.08	3.15
40	4.15	2.08
50	5.23	1.00
	Owner - 75% Premium	Packer - 25% Premium
0	-1.18	7.44
10	-0.11	6.36
20	0.97	5.29
30	2.04	4.21
40	3.12	3.14
50	4.19	2.06
	Owner - 50% Premium	Packer - 50% Premium
0	-2.26	8.49
10	-1.19	7.42
20	-0.11	6.34
30	0.97	5.27
40	2.04	4.19
50	3.12	3.12
	Owner - 25% Premium	Packer - 75% Premium
0	-3.31	9.57
10	-2.23	8.49
20	-1.16	7.42
30	-0.09	6.34
40	0.99	5.27
50	2.06	4.19
	Owner - No Premium	Packer - 100% Premium
0	-4.37	10.60
10	-3.30	9.53
20	-2.22	8.45
30	-1.15	7.38
40	-0.07	6.30
50	1.00	5.23

## *Margin Sharing in Combination with Premium Allocation*

Clearly, premiums can be substantial even when combined with shared margins. If these data can be assumed representative of alliances, *the largest potential for increasing average returns is through higher quality cattle*. For cattle owners, the implication of premiums is significant. *In an alliance where all premiums earned are allocated to the cattle owner, and no margin sharing exists, owners can turn an average loss of \$4/head over time into a breakeven situation by improving the consistency with which their cattle qualify for premium lines to only 25%<sup>6</sup>. If 75% of the cattle are premium cattle, that \$4 per head loss improves to a positive \$8.46 per head.*

Even in alliances where most cattle do not qualify for premium product lines, premium allocation rights can make a significant difference in average returns. For those cattle owners mentioned above, the increase in qualifying percentage results in an approximately 100% increase in average return per steer marketed. At that rate, *cattle owners improve average per head return 4% for every 1% increase in percentage of cattle qualifying for premiums.*

The potential for premiums to improve returns for the alliance packer is large as well. For a packer allocated all premiums generated, an increase in premium qualifying percentage from 25% to 50% would raise average return from \$10.60/head to \$14.84/head (a 40% increase). At that rate, the packer increases return by 1.6% for every 1% increase in qualifying percentage. *Packers could maintain the increase in average return even if they had to partially subsidize owners for any quality improvements they make.*

Packer returns decline when equal margin sharing levels increase. Simulation results show that *packers are more willing to agree to equal margin sharing increases when they are allocated premium rights in return*. However, the amount of equal margin sharing is dependent on the quality of cattle being marketed through the alliance. In alliances where only 25% of cattle qualify for a premium line, the packer will be willing to increase equal margin sharing by 10% in exchange for 25% of all premiums generated. But the packer's willingness to participate in equal margin sharing runs out at 40%, when they have already been allocated 100% of all generated premiums.

The simulation results show cattle owner and packer preferences change according to the relative quality of alliance cattle. As quality of cattle increases, the packer will demand less in terms of premium allocation for each increase in equal margin sharing sought by cattle owners, and cattle owners will demand less premium allocation for every reduction in margin sharing sought by the packer.

As cattle quality decreases, packers will demand more premium allocation in return for increases in equal margin sharing, and cattle owners will demand more premium allocation for any reduction in equal margin sharing sought by the packer.

In a negotiation situation over alliance compensation design, both cattle owners and packers have a need to understand the tradeoff for each offer or concession. For example, cattle owners may seek to increase the level of equal margin sharing by 10%. In order to accommodate the request, packers will demand an appropriate increase in their premium rights. But how much premium right should be given up by cattle owners? How much premium right is needed by packers to maintain an equivalent level of

---

<sup>6</sup> This assumes, of course, that the costs of producing the cattle remain the same. Costs will tend to increase with investments in new technology in production and management. But the improved technology and the often superior cattle might also realize better conversions and lower costs of gain.

return? Table 10 provides the marginal rates of substitution between premium rights and margin sharing needed to solve the negotiation problem.

**Table 10. Marginal Rates of Substitution Between Changes in Premium Rights and Changes in Equal Margin Sharing for Cattle Owners and Packers to Maintain Equivalent Returns on Cattle Marketed Through the Alliance**

	Low Quality Alliance (25% of cattle qualify for premium)	Average Quality Alliance (50% of cattle qualify for premium)	High Quality Alliance (75% of cattle qualify for premium)
1% change in premium rights is worth	0.4% change in equal margin sharing	0.8% change in equal margin sharing	1.2% change in equal margin sharing
1% change in level of equal margin sharing is worth	2.5% change in premium rights	1.25% change in premium rights	0.83% change in premium rights

Assuming a low quality alliance where there is already 20% equal margin sharing, the cattle owner request to increase sharing to 30% will be accepted if the packer can be compensated with an appropriate increase in premium rights. Packers would need a 2.5% increase in premium rights for every 1% increase in equal margin sharing. Therefore, the packer and cattle owner would both maintain an equivalent average return if equal margin sharing increased by 10%, and packers received 25% more of all premiums generated. This marginal rate of substitution holds in a low quality alliance regardless of what the current level of equal margin sharing is, 20% or any other amount. Only cattle quality changes influence the relative value of premium rights to equal margin sharing arrangements.

Cattle owner preferences for either equal margin sharing or premium rights change as cattle quality increases. When only 25% of cattle qualify for a premium line, cattle owners receive a higher average return under equal margin sharing of 50% (\$1.00/head) than by having rights to 100% of premiums and no margin sharing at all (-\$0.15/head). When alliance cattle quality increases, however, the premiums generated become too large for cattle owners to disregard. In the high quality alliance, owners still earn a higher average return by receiving 100% of all premiums and having no equal margin sharing (\$8.46/head), than if they chose to receive 50% of premiums and equal margin sharing of 50% (\$7.39/head).

*The increasing value of premium allocations relative to equal margin sharing levels as cattle quality increases has important ramifications for the motivations that will exist under differing circumstances.* Alliance packers anticipating an increase in cattle quality in the future may now be more willing to accept a larger amount of equal margin sharing. As an example, packer average returns for 50% premium allocation and 20% equal margin sharing in the lowest quality alliance is \$6.34/head – roughly equivalent to not participating in the alliance at all. If owners negotiate for 30% equal margin sharing, packer return drops to \$5.27/head if cattle quality stays at 25% qualification levels. If alliance quality does improve by 25%, the packer will realize an average return of \$7.37/head, a 16% increase in average return over what would have been realized by not agreeing to any increase in equal margin sharing and subsequently stalling negotiations. If packers believe the opposite is true, that cattle quality is



going to decrease, they will seek higher premium allocations for any increase in equal margin sharing sought by owners.

Since cattle owners possess the ability to improve cattle quality, agreeing to low amounts of equal margin sharing in exchange for high levels of premium allocation may pay off nicely *if cattle improvement can be achieved*. For example, in the lowest quality alliance, cattle owners can increase premium allocation by 1% for only a 0.4% decrease in equal margin sharing. When cattle quality improves, however, the same 1% premium allocation increase would require owners to make an 0.8% concession in equal margin sharing. In short, cattle owners have an incentive to “purchase” as much premium allocation right as possible when the price is cheap (only small concessions in equal margin sharing) and reap the rewards of higher premiums when cattle quality improves. The inverse is also true. There is an incentive for owners to give up large premium allocations in exchange for higher levels of equal margin sharing when cattle quality is expected to decline.

*Results show a motivation for cattle packers to increase cattle quality by subsidizing producers.* For example, if a packer has negotiated a 50% allocation of premiums and 30% equal margin sharing, average return is \$7.37/head. If cattle quality increased from 50% to 75% qualification for premium lines, the same negotiated position would return an average of \$9.54/head. By subsidizing owners \$1.50/head to improve cattle quality to the 75% level, the packer would earn an average of \$0.67/head on their investment. The increase in average per-head return reflects a return on investment of 45%, a 1.8% increase in investment return for every 1% increase in cattle quality. This result may help to explain why an alliance is willing to subsidize certain costs of owners participating in alliances, such as free carcass data. The subsidy may result in higher cattle quality and subsequently higher returns for the alliance.

Overall, the simulation results point to a few general conclusions:

- As quality of cattle increases, packers are more willing to accept higher levels of the equal margin sharing which improves owners' positions;
- The increase in quality subsequently increases the value of premium pool sharing relative to equal margin sharing agreements;
- Decreases in cattle quality lower the value of premium pool sharing relative to equal margin sharing agreements;
- Premium allocations offer a way for both sides to negotiate new compensation and risk sharing arrangements; a flexibility that can lengthen the lifespan of the alliance and better accommodate each participant's needs;
- Incentives exist for owners and packers to negotiate for more premium allocation if they expect cattle quality to increase, or more beneficial levels of equal margin sharing if cattle quality is expected to decline; and
- Improvements in cattle quality can be subsidized by cattle packers since packers benefit significantly from the improvements in quality.

## *The Impact of Constant Arrangements*

It was observed earlier that during the design process, alliances may be inclined to adopt a fixed fee method for compensating the cattle packer involved in the alliance. In this sense, the packer is earning a margin not determined by the market, but predetermined by a bargaining agreement adopted prior to beginning operations. This type of arrangement will block the realizing of alliance objectives because it is not sustainable. It is inconsistent with many of the conceptual guidelines examined in this research, and it needs to be discussed again in light of the research results.

For the sake of an example, let us assume that an alliance has determined to pay the packer a flat fee of \$100 for every head of alliance cattle processed. In addition to the fee, the cattle packer will also receive a share of the premiums generated from the sale of alliance cattle.

The market-based margin earned by packers not participating in the alliance becomes the opportunity cost of the alliance cattle packer. Therefore, when packers outside of the alliance are earning an operating margin of \$125 per head, the alliance cattle packer is incurring an opportunity cost of \$25 per head. The \$25 per head becomes an internal-to-the-alliance revenue transfer to the alliance cattle owner. All packers are selling commodity beef in essentially the same boxed beef market. The \$125 per head operating margin is present because fed cattle prices are sufficiently low to generate the \$125 given the boxed beef market. Relative to the going cash market for fed cattle, therefore, alliance producers are being “overpaid” by \$25 per head.

In essence, then, under a fixed payment structure, there are times when the cattle packer will be subsidizing the cattle producer by the amount that the fixed and market based packing margins differ. The subsidy from packer to producer will most often occur during those seasonal or cyclical periods when cattle numbers are high and market-based packer margins are traditionally large. Conversely, when market based margins are below the \$100 margin paid to the alliance packer, the alliance cattle producers are subsidizing the packer by the difference. The subsidy from producer to packer will most likely occur during periods where cattle numbers are seasonally or cyclically down and packer margins are traditionally tighter. A fixed payment system to the packer will consistently be causing a subsidy or a revenue transfer to occur between cattle owners and packers. *This subsidy or transfer can create serious implications for alliance incentives and the economic signals being sent between participants and can effectively block participation in the alliance. There is no level of margin sharing or premium allocation that can offset these distortions that can and do range up to \$50 per head.*

Those times when outside packing margins are above alliance constant margins and alliance producers are receiving a subsidy, the economic signal they are responding to is incorrect. Cattle producers may believe that the \$25 subsidy from the packer referred to above is actually a result of high quality cattle. If the cattle were actually of low quality, the correct economic signal to producers might be a discount, not a subsidized premium. *Reliance on a fixed margin system guarantees there will be times when the economic signals sent to producers will be incorrect*, exactly the scenario that prompted many beef industry participants to leave the traditional beef marketing system and come to the alliance.

The fixed margin system also hinders the incentives each participant has to perform their alliance function to the best of their ability. In those cases where alliance packers are receiving a margin that is below their counterparts outside of the alliance, there exists a disincentive for participating in the alliance. Clearly, no participant in the alliance system will remain dedicated and focused on achieving long term success if they face high opportunity costs for participating. Situations where cattle packers are subsidizing cattle producers will also diminish the incentive to work towards truly higher value cattle. Already receiving a subsidy possibly believed to be from high quality characteristics, producers may not feel the push towards making needed investments in higher quality genetics and management necessary to

maintain a quality value-added product at the wholesale or retail level. When lower market-based packing margins outside the alliance are causing a subsidy from alliance producers to packers, *alliance producers will then feel pressure to leave or to decline to participate in the system*. Packers, already receiving a higher fee than market-based margins outside the alliance, will have little incentive to merchandise the beef products vigorously for additional premiums. All of the various theories (transaction costs, agency, resource) examined in developing a conceptual framework for beef alliances stress the importance of correct incentives and effective communication.

Paying a fixed margin to any alliance participant only guarantees one outcome: *there will always be a revenue transfer from one participant to another*. In order for the alliance to grow stronger and prosper in the long-term, participants must be rewarded according to the true value for their products. Receiving market determined margins for services rendered eliminates the subsidy problem and focuses all participant efforts back on the most important goal: producing high-quality cattle and generating premiums.

Paying an alliance participant a constant fee is often a common starting point for new alliances. The implications of paying the packer a constant fee have been discussed. The implications are onerous, and a similar problem emerges when producers are compensated on a cost-plus basis for calves entering the alliance. The incentives are distorted, and revenue transfers within the alliance will be involved.

## Conclusions

For beef alliances, there is no single utility maximizing equation to solve and consequently open the door to success for every alliance. The wide array of preferences, risk tolerances, and motivations prohibits the application of a uniform template. This research exemplifies the direction future research must take: examining the effects of alternative alliance designs, educating participants with empirical evidence of likely outcomes, and allowing them to assign their own preferences to choices – ultimately determining a unique solution to every alliance problem.

Findings of this research and keys for success with alliances are as follows:

- 1) *Cattle owner returns, determined by industry feeding margins, have been more variable during the 1990s than packer returns.*
  - Owner profit margins average -\$4.37/head with a standard deviation of \$61.02/head. Historical feeding margins range from -\$190/head to \$130/head.
  - Packer profits average \$6.38/head with a standard deviation of \$18/head. Historically, packer margins have ranged from -\$40 to \$58/head.
- 2) *Cattle owners are more likely than packers to press for margin sharing agreements in alliances.*
  - With a significantly higher variance of margins than packers, cattle owners may believe margin sharing is needed to compensate for feeding margin risk exposure. Owners will wish to share packers' margin and/or encourage packers to share feeding margins.
  - Many cattle owners become involved with alliances to reduce return risk from a failed pricing system. These owners will likely assign a higher priority to margin sharing agreements when the alliance is organized.

- Many cattle owners do not have the risk management programs in place to deal with margin variance, and are therefore seeking margin sharing as a remedy for the lack of a risk management program.
  - The historical tendency of feeding margins to be negative for long periods of time could cause significant cash flow problems to owners, or frustrate efforts to obtain financing.
- 3) *Packers are likely to agree to margin sharing requests to ultimately reap the benefits of improved supply chain coordination.*
- Packers can earn higher returns through cost savings from operating plants at higher utilization rates and removing the variation in daily slaughter rates. Anderson and Trapp estimated packer cost savings to be between \$3-6/head. These cost savings can be applied towards any decrease in returns from margin sharing or used to compensate cooperating cattle owners.
  - Packers with branded products need to attract and maintain large numbers of producers of high quality cattle, and they will be willing to accept margin sharing as a way to ensure a long term relationship with a group of cattle owners devoted to alliance success.
- 4) *Cattle owners prefer equal margin sharing overall, for highest average return and lowest standard deviation. If equal sharing is not available, transferring their own margin to packers decreases owners' margin variance. Receiving packer margins increases average return to cattle owners the fastest.*
- Cattle owners not concerned with revenue variance will choose to receive packer margin transfers if equal margin sharing is not available, and raise average return by 73%.
  - Cattle owners setting a high priority for risk reduction will choose to transfer their own margin to packers to reduce standard deviation by up to 50% and forego higher average returns.
- 5) *Packers prefer to receive owner margins and their variance rather than transfer their own margins to owners.*
- Packers can receive owner margins without transferring any of the packing margin to cattle owners and still return \$4.19/head.
  - Accepting the owner's preference of equal margin sharing would eventually lower average return to packers to only \$1.00/head with a large increase in variance.
- 6) *Premiums can be substantial. If these data can be assumed representative of alliances, the largest potential for increasing average returns is through higher quality cattle.*
- The potential for cattle owners to benefit from premiums is significant. Allocated 100% of premiums, cattle owners could turn an average loss of \$4.37/head into a breakeven situation by only qualifying 25% of cattle for premium product lines.

- This analysis, however, does not include any study of the marginal cost of generating these premium pools.

7) *The key to generating the largest economic pie for division between owners and packers centers on capturing premiums through the sale of higher quality cattle.*

- Assuming premiums were to be divided evenly, cattle owners could increase average return per head from 48-146% by improving quality, and packers could increase average return by 33 to 100%. These results could be achieved with no margin sharing agreement.
- Any time a participant has been allocated a percentage of premium rights, they either maintain or improve average return by seeing an increase in quality cattle instead of negotiating changes in margin sharing.
- Combined with Anderson and Trapp's estimate of \$5-15/head of cost savings to the entire beef industry through non-price coordination, total industrywide profits where 75% of cattle qualify for premium lines could reach \$17-27/head above traditional marketing system levels.

8) *Premium rights make excellent bargaining exchanges for equal margin sharing agreements. Alliance participants can make tradeoffs between these two compensation designs to accommodate all preferences.*

- Knowing the relative worth of equal margin sharing and premium rights allows participants to bargain fairly. Absence of information can allow one participant to behave opportunistically, leading to mistrust and a breakdown of communication.
- At any quality level, packers will forego their hesitancy to share margins equally in exchange for the correct amount of premium rights.

9) *As cattle quality increases, premium rights become more valuable in terms of equal margin sharing. As cattle quality decreases, equal margin sharing becomes more valuable in terms of premium rights.*

- As more cattle qualify for premium lines, packers become more willing to participate in accepting higher levels of equal margin sharing with cattle owners in exchange for an increase in premium rights.
- As cattle quality decreases, cattle owners will demand more premium rights to forego any previously negotiated equal margin sharing arrangement with packers.

10) *Separate accounting of premiums and allocating rights to them sends the correct economic signal to cattle producers. Producers are rewarded for improvements in quality, and prices reflect true value of cattle at the consumer level, thereby allowing producers to understand better the end consumer's needs.*

- Combining margins earned with premiums generated and distributing pre-determined percentages to participants serves to obscure the reason why returns may increase or decrease at a given time by conceding the true value of premiums for quality cattle.
- Systems allocating a combined margin/premium lump sum are frustrated by the difficulty in determining each participant's marginal contribution to the final product.

Overall, the research results support the working hypothesis that valuable guidelines can be created for beef alliances to improve performance, work through difficult negotiations, and generate premiums that reflect true quality of cattle. By coordinating efforts and understanding participant motivations, alliances can successfully meet consumer demands in the future and regain lost market share for beef products. Concentration on growing the amount of premiums captured is the key to success of alliances and to future industry success.

## REFERENCES

- Alchian, A. A., and H. Demsetz. "Production, Information Costs, and Economic Organization." *The American Economic Review* 62(1972): 777-795.
- Anderson, J. D. and J. N. Trapp. *Estimated Value of Non-Price Vertical Coordination in the Fed Cattle Market*. Research Bulletin 2-99, Research Institute on Livestock Pricing, Virginia Tech, Blacksburg, VA. February 1999.
- Barkema, A. "Reaching Consumers in the Twenty-First Century: The Short Way Around the Barn." *Amer. J. Agr. Econ.* 75(1993): 1126-1131.
- Barney, J. B. "Strategic Factor Markets: Expectations, Luck, and Business Strategy." *Management Science* 32(1986): 1231-41.
- Barney, J. B., and W. Ouchi. (eds.) *Organizational Economics: Toward a New Paradigm for Studying and Understanding Organizations*. San Francisco: Jossey-Bass, 1986.
- Barry, P. J., S. T. Sonka, and K. Lajili. "Vertical Coordination, Financial Structure, and the Changing Theory of the Firm." *Amer. J. Agr. Econ.* 74(1992): 1219-1224.
- Boehlje, M., and L. F. Schrader. "The Industrialization of Agriculture: Questions of Coordination." In *The Industrialization of Agriculture*, eds. J. S. Royer and R. C. Rogers. 3-26. Great Britain: The Ipswich Book Company, 1988.
- Borys, B. and D. B. Jemison. "Hybrid Arrangements as Strategic Alliances: Theoretical Issues in Organizational Combinations." *Academy of Management Review*. 14(1989): 234-49.
- Castanias, R. P., and C. E. Helfat. "Managerial Resources and Rents." *Journal of Management* 17(1991): 155-171.
- Caswell, J. A. "Rethinking the Role of Government in the Future Agri-Food System." Paper presented at the Food and Agricultural Marketing Consortium Meeting *Global Restructuring of Agro-Food Markets: Need for Change in Marketing Policies*, Alexandria, VA. 1996.
- Cloutier, M. L., S. T. Sonka and R. E. Westgren. "The Economics of Learning-based Strategies and Structural Changes in the U.S. Pork Chain: A System Dynamics Perspective." In *Vertical Relationships and Coordination in the Food System*, ed., G. Galizi and L. Venturini, pp. 211-24. New York: Physica-Verlag, 1999.
- Coase, R. H. "The Nature of the Firm." *Economica* 4(1937): 386-405.
- Collins, N. R. "Changing role of Price in Agricultural Marketing." *J. Farm Econ.* 41(1959): 528-34.
- Conner, K. R. "A Historical Comparison of Resource-based Theory and Five Schools of Thought within Industrial Organization Economics: Do We Have a New Theory of the Firm?" *Journal of Management* 17(1991): 121-54.
- Cozzarin, B. P., and P. J. Barry. "Organizational Structure in Agricultural Production Alliances." *International Food and Agribusiness Management Review* 1(1998): 149-165.

- Cozzarin, B. P., and R. E. Westgren. "Rent Sharing in Multi-Site Hog Production." *Amer. J. Agr. Econ.* 82(2000): 25-37.
- Das, T. K., and B. S. Teng. "Risk Types and Inter-firm Alliance Structures." *Journal of Management Studies* 33(1996): 827-43.
- Den Ouden, M., A. A. Dijkhuizen, R. B. M. Huirne, and P. J. P. Zuurbier. "Vertical Cooperation in Agricultural Production-Marketing Chains, with Special Reference to Product Differentiation in Pork." *Agribusiness*. 12(1996): 277-90.
- Eisenhardt, K. M. "Control: Organizational and Economic Approaches." *Management Science* 31(1985): 134-49.
- Fahlbeck, E. *Essays in Transaction Cost Economics*. Uppsala: Swedish University of Agricultural Sciences, 1996.
- Fama, E. F., and M. C. Jensen. "Separation of Ownership and Control." *Journal of Law and Economics* 26(1983): 301-25.
- Frank, S. D., and D. R. Henderson. "Transaction Costs as Determinants of Vertical Coordination in the U.S. Food Industries." *Amer. J. Agr. Econ.* 74(1992): 941-50.
- Hobbs, J. E. "A Transaction Cost Approach to Supply Chain Management." *Supply Chain Management* 1(1996): 15-27.
- Holmstrom, B. "Moral Hazard and Observability." *Bell Journal of Economics* 10(1979): 74-91.
- Jensen, M., and W. Meckling. "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure." *J. Finan. Econ.* 3(1976): 305-60.
- Knoeber, C. R. "A Real Game of Chicken: Contracts, Tournaments, and the Production of Broilers." *J. Law, Econ. and Organ.* 5(1989): 271-92.
- Knoeber, C. R., and W. N. Thurman. "Don't Count your Chickens...: Risk and Risk Shifting in the Broiler Industry." *Amer. J. Agr. Econ.* 77(1995): 486-96.
- Koenig, C., and G. van Wijk. "Inter-firm Alliances: The Role of Trust." In *Microeconomic Contributions to Strategic Management*, eds. J. Thepot and R. -A. Thietart. 169-83. Amsterdam: North Holland Publishing, 1991.
- Mahoney, J. T. "Organizational Economics within the Conversation of Strategic Management." In *Advances in Strategic Management*, eds. P. Shrivastava, A. S. Huff, and J. Dutton, Vol. 8. Greenwich CT: JAI Press, 1992.
- Mahoney, J. T. and J. R. Pandian. "The Resource-based View within the Conversation of Strategic Management." *Strategic Management Journal* 13(1992): 363-80.
- Mighell, R.L. and L.A. Jones. "Vertical Coordination in Agriculture." USDA-ERS AGECE Report 19, 1963.



- Ramanathan, K., A. Seth, and H. Thomas. "Explaining Joint Ventures." In *Cooperative Strategies*, eds. P. W. Beamish and J. P. Killing, pp. 51-85. San Francisco: The New Lexington Press, 1997.
- Rasmusen, E. "Moral Hazard in Risk-averse Teams." *RAND Journal of Economics* 18(1987): 428-35.
- Ricardo, D. *Principles of Political Economy and Taxation*. London: J. Murray, 1817.
- Sartwelle, J. D. III. "Marketing and Informational Alliances in the Fed Cattle Sector." Paper presented at the Kansas State University Agricultural Lenders Conferences, Garden City, KS, 1996.
- Sauvee, L. "Toward an Institutional Analysis of Vertical Coordination in Agribusiness." In *The Industrialization of Agriculture*, ed., J. S. Royer and R. C. Rogers, pp. 27-71. Great Britain: The Ipswich Book Company, 1998.
- Schroeder, T. C., C. E. Ward, J. Mintert, and D. S. Peel. "Beef Industry Price Discovery: A Look Ahead." In *Price Discovery in Concentrated Livestock Markets: Issues, Answers, Future Directions*, ed., W. D. Purcell, pp. 19-84. Blacksburg, VA: Virginia Polytechnic Institute and State University, Research Institute on Livestock Pricing, 1997.
- Schroeder, T. C., C. E. Ward, J. Mintert, and D. S. Peel. *Beef Industry Price Discovery: A Look Ahead*. Research Bulletin 1-98, Research Institute on Livestock Pricing, Virginia Tech, Blacksburg, VA, March 1998.
- Sheldon, I. M. "Contracting, Imperfect Information, and the Food System." *Review of Agricultural Economics* 18(1996): 7-19.
- Sherrick, B. J. "A Framework for the Analysis of Contracting." In *New Industries and Strategic Alliances in Agriculture: Concepts and Cases*, ed. K. F. Coaldrake, S. T. Sonka, D. Sudharshan, and F. W. Winter. 145-72. University of Illinois at Urbana-Champaign: Stipes, 1995.
- Sonka, S. T. "New Industries and Strategic Alliances in Agriculture: Forces for Change." In *New Industries and Strategic Alliances in Agriculture: Concepts and Cases*, ed. K. F. Coaldrake, S. T. Sonka, D. Sudharshan, and F. W. Winter. 5-28. University of Illinois at Urbana-Champaign: Stipes, 1995.
- Spekman, R. E., L. A. Isabella, T. C. MacAvoy, and T. Forbes. "Creating Strategic Alliances which Endure." *Long Range Planning*. 29(1996): 346-57.
- Sporleder, T. L. "Managerial Economics of Vertically Coordinated Agricultural Firms." *Amer. J. Agr. Econ.* 74(1992): 1226-31.
- Sporleder, T. L. "Assessing Vertical Strategic Alliances by Agribusiness." *Can. J. Agric. Econ.* 42(1994): 533-40.
- Stafford, E. R. "Using Co-operative Strategies to Make Alliances Work." *Long Range Planning*. 29(1996): 64-74.
- Van Duren, E., W. Howard, and H. McKay. "Creating Vertical Strategic Alliances: Theory and Cases from Canada's Agri-food Sector." *Can. J. Agric. Econ.* 42(1994): 577-82.

- Vukina, T., and W. E. Foster. "Grower Response to Broiler Production Contract Design." In *The Industrialization of Agriculture*, eds. J. S. Royer and R. C. Rogers. 133-54. Great Britain: The Ipswich Book Company, 1988.
- Ward, C. E., D. M. Feuz, and T. C. Schroeder. *Formula Pricing and Grid Pricing Fed cattle: Implications for Price Discovery and Variability*. Research Bulletin 1-99, Research Institute on Livestock Pricing, Virginia Tech, Blacksburg, VA, January 1999.
- Weimar, M. R., and A. Hallam. "Risk Sharing in Custom Cattle Feeding." *North Central Journal of Agricultural Economics*. 12(1990): 279-91.
- Westgren, R. E. *Creating Value in a Strategic Alliance: A Resource-based Approach to Inter-organizational Decision Making*. Discussion Paper, George Morris Centre. 1994.
- Williamson, O. E. "Transaction Cost Economics: The Governance of Contractual Relations." *J. of Law and Econ.* 22(1979): 233-61.
- \_\_\_\_\_. *The Economic Institutions of Capitalism*. New York: Free Press, 1985.
- \_\_\_\_\_. "Transaction Cost Economics." In *Handbook of Industrial Organization*, Vol. 1, eds. R. Schmalensee and R. D. Willig. 135-182. Elsevier, 1989.
- Winter, F. W. "Strategic Marketing Concepts and the Process of Formulating Relationships." In *New Industries and Strategic Alliances in Agriculture: Concepts and Cases*, ed. K. F. Coaldrake, S. T. Sonka, D. Sudharshan, and F. W. Winter. 45-67. University of Illinois at Urbana-Champaign: Stipes, 1995.
- Ziggers, G. W. "Vertical Coordination in Agribusiness and Food Industry: The Challenge of Developing Successful Partnerships." In *Vertical Relationships and Coordination in the Food System*, ed., G. Galizi and L. Venturini, pp. 453-66. New York: Physica-Verlag, 1999.

