

CHAPTER 3: A CONCEPTUAL FRAMEWORK FOR BEEF ALLIANCES

3.1 Introduction

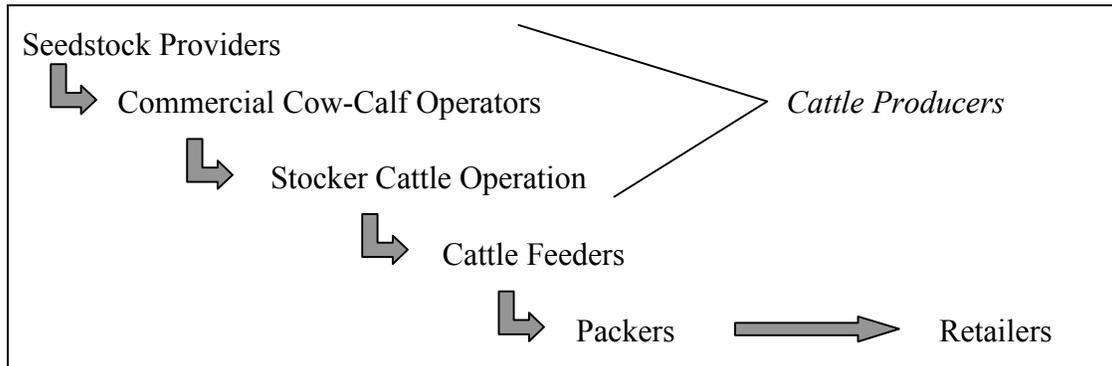
This chapter presents a general model for how alliances are developed, from their genesis in response to shortfalls in the traditional price system to the effects of alliance design choices, in an effort to advance the overall analysis of these new organizational structures. A description of the entities involved in the beef system is presented, with a review of how they interact within the traditional market structure. The previously reviewed failure of the traditional beef marketing system is described, and the emergence of alternative structures is examined.

The alliance model is broadly divided into three separate stages. Stage one of the model examines possible economic motivations held by each beef industry participant to become involved with an alliance system. Stage two focuses on the governance structure design adopted by the alliance in response to the identified economic motivations. Stage three of the alliance model centers on the benefits resulting from alliance design and governance, ultimately impacting the motivations participants may have to further alter alliance design. In chapter 4, those alliance design choices that can be tested empirically with available data will be analyzed in terms of implications to profitability, effectiveness of communication, and to optimal strategies for either profit maximization, risk minimization, or combinations of the two.

3.2 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 which supply cattle to feedyards. Figure 3.1 presents the industry structure through which cattle are produced and transformed into beef products for the consumer at the retail level.

Figure 3.1: Beef Industry Structure



In the traditional beef production/marketing system, each stage is characterized by sovereign firms with their unique revenue stream and subsequent profit pool resulting from transactions in the liveweight price based marketing system. For cattle 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. Feeder margins result from subtracting operating expenses from custom feeding charges or from fed cattle price. Those cattle feeders that take ownership of the cattle from the cattle producers must also subtract feeder steer prices to arrive at their final margin.

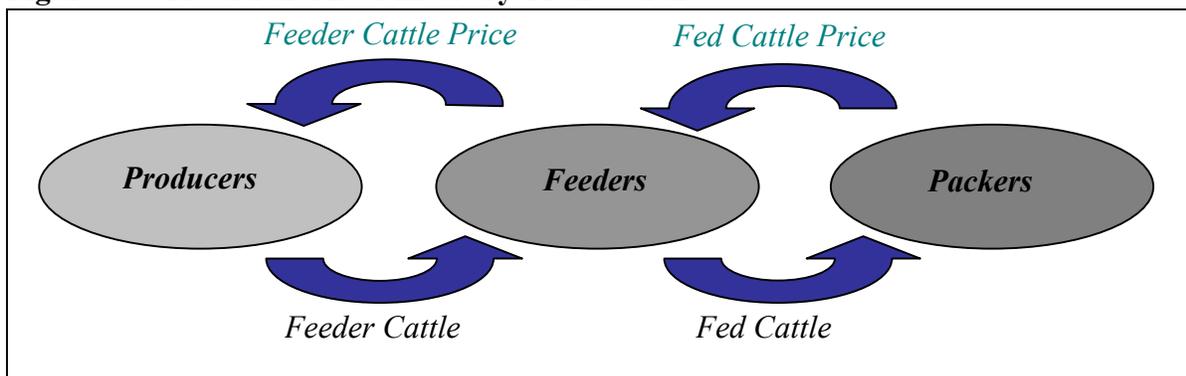
Packer revenues come from the sale of boxed beef products at the wholesale level. If a packer purchases cattle from a cattle feeder or a producer who has retained ownership, the packer's profit margin is determined by subtracting fed cattle per head costs and operating expenses from wholesale beef revenues. 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 3.2 depicts per cwt. or per lb. profit margins for participants in the traditional beef industry structure.

Figure 3.2: Calculation of Beef Industry Profit Margins – Traditional Marketing System

<u>Participant</u>	<u>Ownership of Cattle</u>	<u>Profit Margin Calculation</u>
Cattle Producers	Retain ownership through feedlot	Fed Price – Feeding Charge – Operations Cost
	No retained ownership	Feeder Price – Operations Cost
Cattle Feeders	Obtain ownership from producer	Fed Price – Feeder Price – Operations Cost
	No ownership – custom feeding	Custom Feeding Charge – Operations Cost
Packers	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 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, all economic signals must be 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 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 in the dualistic sense, minimizing costs) subject to signals received via market prices. Figure 3.3 shows the transactions occurring between participants in the traditional beef industry.

Figure 3.3: Traditional Beef Industry Transactions



There is a long history, however, of market prices failing as a coordinating mechanism in the beef industry (see Chapter 1). 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. As beef began to lose market share to alternative meats in the 1980's, the beef industry began to focus efforts on improving beef quality. Quality improving initiatives led many participants to focus on finding alternative communication systems and organizational structures.

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 expected alliances and individual carcass valuation to increase in the future.

3.3 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. Therefore, 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 as much as \$30/head or more.
 - Discourages producers from making investments in genetics and management practices that improve overall cattle quality.
 - Inability to obtain desired returns on investments in quality improvements.
 - Difficulty in the management of risk associated with variable feeder or fed cattle prices.
- Uncertain market access
 - Small cattle producers may not have the volume needed to arrange shipments of adequate size.
 - 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 attempting to obtain operational financing. 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, ultimately lowering operational costs.

- Diversifying their operations. The cattle producer could take an ownership position in other stages of beef production to either share in those margins, or simply to benefit from improvements in the industry as a whole. 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 margins at other levels of operation.
- Potential reduction in transaction and agency costs if they were to enter into an alliance system. Cattle producers may seek to benefit from reduced agency costs in an alliance system designed to ensure the management expertise and effectiveness of alliance feedyard or packer members.

Each individual cattle producer has economic motivations that may or may not be similar to those mentioned above. 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 their lower-quality 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 and can possibly return premiums to the feedyard's clients.
 - Seeking out the system most appropriate for their individual cattle type and management regime 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.
 - The price risk associated with varying feed grain costs.

- 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 and perhaps bidding smaller feeder's cattle at a discount.
- Ensuring that cattle can be marketed at a given time allows cattle feeders to finish 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 services.
- Potential for a reduction in transaction and agency costs with packers.
 - 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

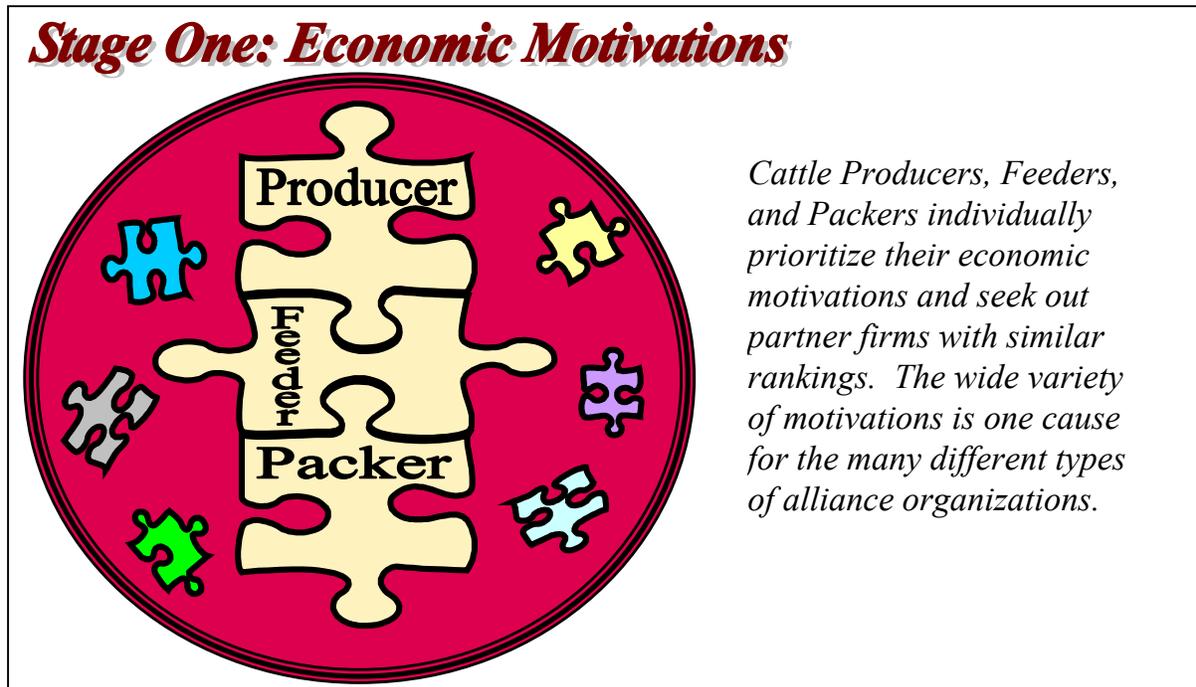
alliance based on its ability to provide a needed type of cattle. Becoming involved with an alliance that produces cattle of a defined quality provides packers with more accurate information on the cattle they are processing, more control over the timing of production, and a guaranteed supply of the needed cattle type. These benefits not only increase the likelihood for better final product wholesale beef prices, but 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 steady flow of cattle into whose plants running near optimal processing capacity could save packers \$2-5/head.
- 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 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 specific and 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. Figure 3.4 depicts Stage One of the alliance model and gives an example of the source for alternative alliance arrangements.

Figure 3.4: Stage One of the Alliance Model



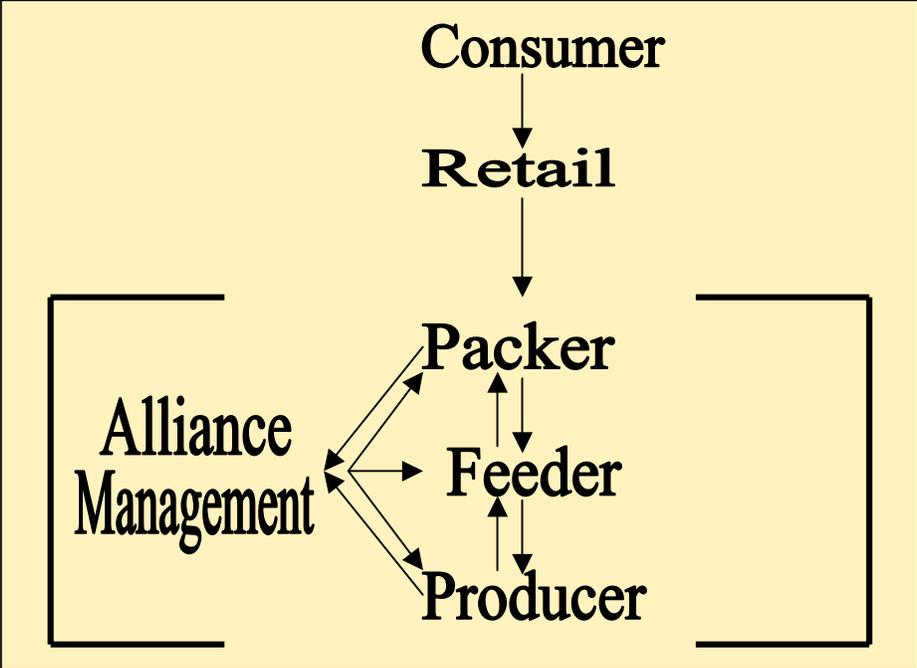
The *combined* prioritized set of economic motivations determines the overall objectives and mission of the alliance. At this point, alliances proceed to Stage Two and decide on the governance structure design. In this stage, alternative governance designs are fashioned to reflect priorities defined by members in Stage One.

3.4 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 to do so, 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 producing meat products. Figure 3.5 shows this new industry

structure. Unique to the alliance system is the presence of an alliance management entity. Alliance management is responsible for making sure the alliance achieves its original 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 management entity with the right to refuse cattle from a producer or cattle feeder that do not meet specific quality standards.

Figure 3.5: Alliance Industry Structure



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. Each of these areas is not a simple choice between two or three alternatives. There are many ways ownership, compensation, and risk sharing can be structured within an alliance, with each structure offering its own unique set of outcomes.

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 economic motivations set forth by each participant in Stage One. The lack of research on the choices available to the alliance complicates decision-making. Beef alliances today are seeking support in answering these questions of governance structure design to increase their likelihood of success from implementing appropriate designs suited to their needs.

As beef industry participants begin to coordinate efforts and forge an alliance, the alliance's identity and ownership must be defined. 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 dedication 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, 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 grid system or lease their rights to others.

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, or a cattle feeder and 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 investments in new genetics, management styles, or branded product lines.

Participant compensation is the fundamental alliance design choice, affecting 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 are participants paid for their services and/or cattle, and how any additional revenue being generated by the firm is shared between members. The first question centers on the choice of pricing system employed by the alliance. The second question requires determining 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 grid or formula pricing system. Grid pricing does not necessarily include formula pricing, and formula pricing does not necessarily involve grid pricing. Formula pricing refers to establishing a fed cattle sale price derived from a formula that includes another price as a reference. The other 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 observable market 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. Grid pricing systems that have base prices not determined by formula are typically set through negotiation. The choice of price to use in the formula for 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 differ between market levels: live or carcass weight cash market, futures market, or wholesale beef market (Ward, Feuz, and Schroeder). Therefore, 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. However, 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 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.

Each alliance must also make a determination of how cattle feeders and packers will be compensated. Typically, alliances have a choice between allocating a constant or market based margin to cattle feeders and packers. This decision 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 pricing of fed cattle and allocation of constant or market based margins to cattle feeders and packers, some alliances may compensate participants with other sources of revenue such as premiums or cost savings. An alliance can use the 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 plant averages for quality, wholesale price/value spreads, or negotiated values.

Cattle feeders and packers may also receive payments derived from premium cattle or cost savings pools. By sharing the benefits from higher quality cattle and/or better coordinated efforts, participants have an incentive to exert optimal effort towards the success of the alliance, and the sharing rule used for all participants 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 beef product. In this case, packers have a strong argument that they have made considerable investments in targeted product lines and should be rewarded with a majority of any additional value those lines generate. For cattle producers, the same argument exists for their investment in superior genetics and management practices, and they will typically want a large share.

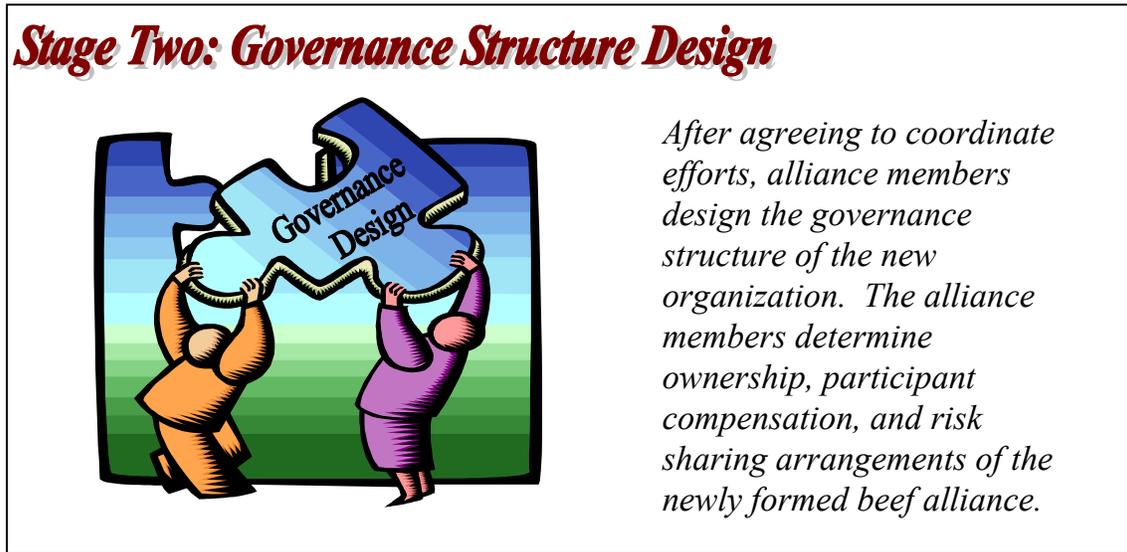
The potential for alternative compensation designs in alliances is large. Each alliance seeks to identify an optimal way of valuing cattle as they are produced and after they are merchandised to consumers. The design of participant compensation is the central focus of most beef alliance efforts.

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 a premium pool share a cattle owner may wish to share in the packer margins to stabilize their revenue variability. 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 pay constant pre-determined margins to cattle feeders and/or packers. In essence, the cattle feeder and packer 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 that cost 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. In many instances, alliances may not have formal risk sharing arrangements at all. As with ownership and compensation design, risk sharing design reflects the priorities set by each participant in Stage One of the alliance model.

In Stage Two of the alliance model, the governance structure is designed to reflect the economic motivations ranked by participants in Stage One. Mathematical models might classify this relationship as governance structure design being a function of each participant's economic motivations. The non-traditional nature of cooperation between all three stages of beef production leads to limitless possibilities for how these alliances can be designed. The three general areas of governance structure design are ownership, participant compensation, and risk sharing agreements. Figure 3.6 shows Stage Two of the alliance model, where participants possessing complementary economic motivations make decisions on governance structure design.

Figure 3.6: Stage Two of the Alliance Model



3.5 Stage Three of the Alliance Model – Design Assessment

In Stage Three of the alliance model participants perform assigned duties and revenues are 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 revenues than would have been realized selling cattle on a traditional live weight basis at average prices. The producer may then decide to either make

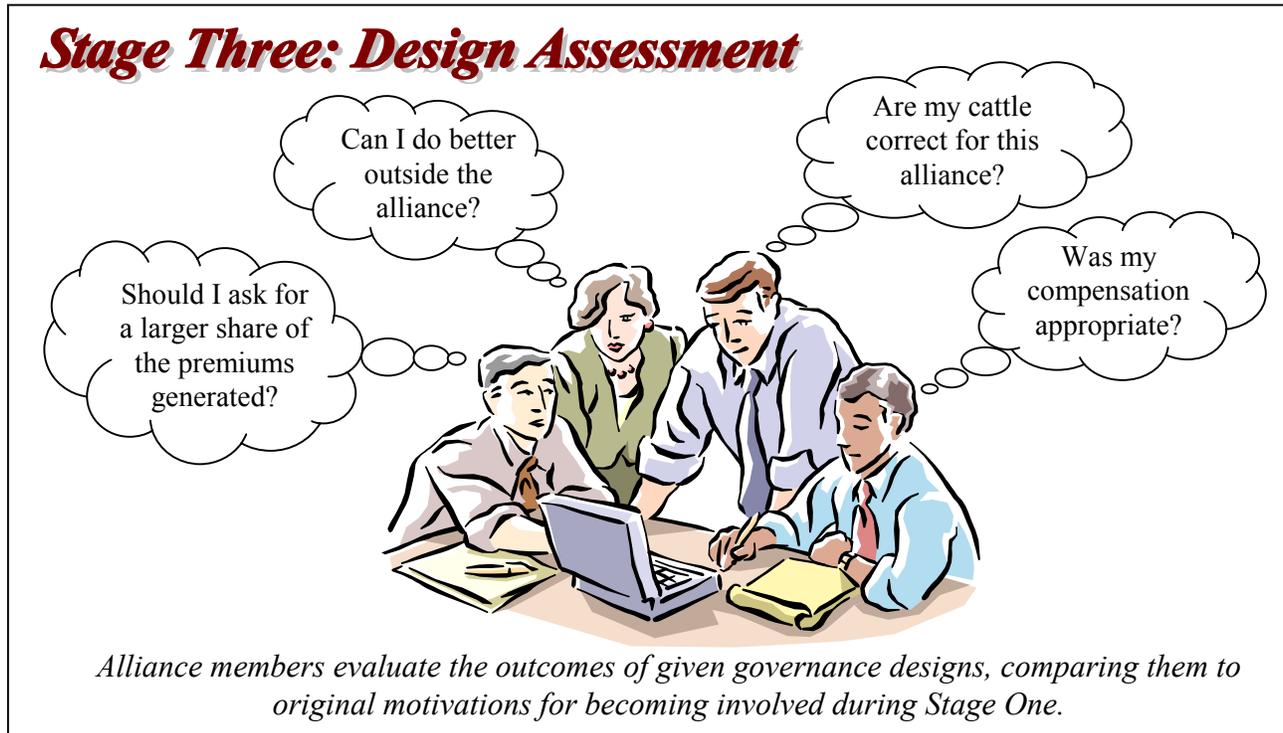
commitments that will improve herd quality, or leave the alliance system and again market cattle on a traditional live weight basis.

The analysis of alliance outcomes by participants can take many forms. Participants may choose to compare revenues before and after membership, or compare the variability associated with them. The alliance outcomes should ultimately satisfy the economic motivations set forth in Stage One of the model; if they do not, the member might leave the alliance or petition for a change in governance design. Impact of governance structure design can also be evaluated in terms of individual participant utility. Sherrick presents a simple framework for the analysis of contracting that can be applied to evaluating alliance outcomes.

Simplifying utility theory, Sherrick proposes each participant will have a utility measure that is a function of expected returns, their risk aversion coefficient, and the variance of the returns. Specifically, utility is approximated by $H = E(r) - \beta (\sigma^2)$ where H represents total participant utility, $E(r)$ is the expected return under a given governance design, β is their risk aversion coefficient, and σ^2 is the variance of the income stream. Sherrick uses the framework to make a decision on contracting between partner firms, but it can be generalized to an alliance setting. Generally, if a gain in total utility by all participants in the alliance outweighs the utility equivalent costs of forming the alliance, all participants should find it in their best interests to continue their membership in the alliance. Although simplified, the framework supplies a useful way of describing the analysis beef alliances participants are performing in Stage Three of the alliance model.

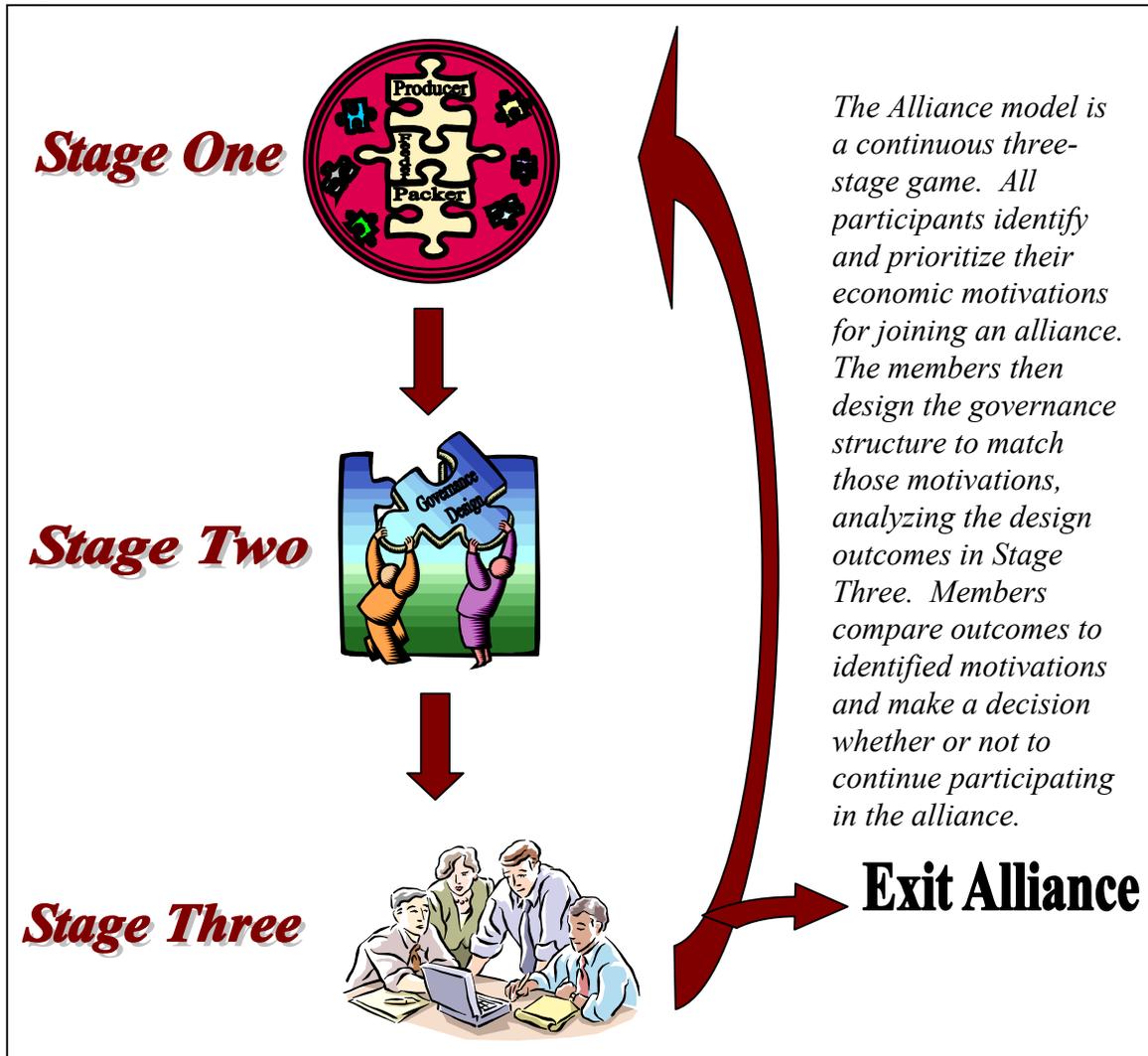
In Stage Three of the alliance model, the benefits of alliance participation are analyzed and weighed by members. After assessing the benefits or costs, they are compared to prioritized motivations identified in Stage One. Figure 3.7 presents the third stage of the alliance model.

Figure 3.7: Stage Three of the Alliance Model



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, making design choices and evaluating the outcomes that must ultimately satisfy original economic motivations to become involved with the alliance. Figure 3.8 shows all three stages of the alliance model as one complete system.

Figure 3.8: The Alliance Model System



3.6: Summary

Beef alliances can be framed within the context of a repetitive three-stage game. Members continuously evaluate their economic motivations for participation, design the alliance's governance structure to reflect those motivations, and evaluate outcomes to determine if they will participate in the future. Chapter 2 provides the theoretical background for understanding the economic motivations identified by beef participants. Chapter 4 provides an empirical analysis of common alliance design choices, margin sharing, and premium allocation to

exemplify evaluation of alliance design undertaken by members in stage three of the alliance model.

While each individual alliance is unique, as the resource-based approach to vertical coordination proposes they should be, the conceptual framework presented here can be applied to all alliances regardless of participants or scale of operation. For example, 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, design the alliance governance structure to reflect those motivations, and evaluate the outcome.

The formation of beef alliances fundamentally changes the beef industry structure. New profit centers are created, new interactions between industry members occur, and new problems emerge that need to be solved. The conceptual framework for alliance formation and design process is necessary for identifying what participants must accomplish before joining the alliance, and understanding what stage of the process a given problem manifests itself within. This knowledge allows alliances to be stronger more quickly after formation, understand the ramifications of design choices, and ultimately have a higher rate of success.