Vertical Integration Comparison: Beef, Pork, and Poultry

Oklahoma Cooperative Extension Service • Division of Agricultural Sciences and Natural Resources

WF-552

Clement E. Ward
Professor and Extension Economist

Several strategic alliances have been organized in recent years in the beef industry. A few mega-sized hog operations have changed the pork industry. As a result of these and other developments, there has been much discussion regarding the vertical structure and evolutionary changes in the beef and pork industries. Frequently those changes are compared with the poultry industry. Will the beef and pork industries vertically integrate as completely and in the same manner as poultry? This fact sheet provides a perspective on the likely extent of vertical integration in the beef and pork industries relative to the poultry industry, given the incentives and disincentives that exist for vertical integration.

Vertical Integration Definition and Motives

Vertical integration is the control of two adjacent stages in the vertical marketing channel from producers to consumers. An example would be one firm engaged both in cattle feeding and meatpacking. There are two primary types of vertical integration: contract integration and ownership integration.

Contract integration involves a firm at one production-processing-distribution stage (such as meatpacking) contracting with a firm at an adjacent stage (such as cattle feeding) for specific services and/or products (such as fed cattle for slaughter). Both parties may own some but not all of the necessary resources. The contract, if written, would typically specify which party provides what resources and what services or products. Contracts also would likely include terms related to quality, quantity, time, and place of the services or products and how price is determined and when payment is made.

Ownership integration differs in that the integrating firm owns most resources in both adjacent production-processing-distribution stages. An example would be a meatpacking firm owning a cattle feedlot and some or all cattle fed in the lot. Alternative forms of ownership integration do not exist; the only variable is the extent to which resources are owned by the vertically integrated firm.

Profit opportunities are the ultimate economic incentive for vertical integration. Profit opportunities may arise due to inefficiencies in production, processing, or distribution, large transaction costs in non-integrated industries, or the application of new technology which may reduce costs or lead to new or improved products.

Production Characteristics: Beef, Pork, and Poultry

There are some basic physical and economic production characteristics of the three industries which contribute to or limit vertical integration in each (Table 1).

Biological Production Cycle

The conception to market period for beef, pork, and poultry varies widely. Time periods given here and in Table 1 are approximations. The importance of the biological process to vertical integration is interrelated with factors discussed later. Perhaps the primary factor involves the speed with which biological changes such as genetic improvements can be made. While this factor is present both under non-integrated and vertically integrated systems in the same industry, it affects the incentives and disincentives for vertically integrating. For example, if a firm is considering vertically integrating to improve product quality stemming from genetic or biological changes, there is more incentive to vertically integrate in an industry which has a shorter biological process and in which genetic changes can be made more quickly.

Genetic Base

The genetic base for poultry is relatively narrow. Only a few breeds or genetic lines, i.e., fewer than ten, are used and they ultimately provide the vast majority of final products. Both the short biological process and more uniform animals resulting from a relatively narrow genetic base are important for managing the production process and production costs. It also affects managing costs in processing and getting consistent products to consumers. Genetic changes can be made more quickly, also, because from the hatching process, one hen produces many more offspring in a short time than either a cow or sow does.

The genetic base for hogs has narrowed considerably in

Table 1. Production Characteristics: Beef, Pork, and Poultry.

Characteristics	*Beef*	*Pork*	*Poultry*
Biological Production Cycle	24 months	12 months	5 months
Genetic Base	Wide and widening	Moderately wide but narrowing	Narrow
Industry Stages	Cow-calf Stocker Feeding	Farrowing Finishing	Hatching Growing
Geographic Concentration in Production	Dispersed throughout the U.S.	Midwest, Mid Atlantic, Southwest	Southeast
Operation Size and Specialization	Varies by production stage	Increasing in size and specialization	Large and specialized

recent years. There has been rapid growth in specialized firms that provide breeding stock for larger hog operations. Genetic changes can be made more quickly and through larger litters can influence more offspring in a single breeding cycle than with cattle. Making quicker genetic changes also affects efforts to reduce production costs and increase consistency of pork products for consumers.

In the beef industry, we observe a contrary trend compared with poultry and pork. Rather than the genetic base narrowing, it is widening. Many cattlemen are attempting to create new breeds, some of which are called composite breeds created through consistent, planned crossbreeding programs. The result is further amalgamation or agglomeration of the genetic base. There are desirable genetics in every breed, but there is no easy method of recognizing many of those desirable genetic traits in commercial cattle operations. The biological process is a serious deterrent to quickly changing the genetic base also, since a cow produces only one calf per year and it takes about 24 months to learn whether or not the breeding process resulted in beef with more or less desirable eating characteristics.

Industry Stages

The poultry industry has two primary production stages, hatching and growing, apart from the processing and distribution stages which are common to beef, pork, and poultry. The pork industry also has two primary production stages, farrowing and finishing. The beef industry is at a relative disadvantage compared with poultry or pork. The production process for cattle consists of cow-calf, stocker or growing, and feeding. Thus, the beef industry has a third production stage, which increases the transaction costs for the industry. Each stage also has different resources and management needs and thus increases the difficulty in managing a vertically integrated beef production unit.

Geographic Concentration in Production

The geographic concentration of poultry, pork, and beef production differs significantly by industry. Poultry production is more narrowly concentrated in the southeastern U.S. Hog production has traditionally been concentrated in Iowa and surrounding corn belt states. However, pork production has increased sharply in North Carolina and the mid-Atlantic states as well as in Oklahoma and the southern plains states. The growth areas in hog production are those which are more accepting of vertically integrated systems, culturally and legally, partly due to the presence of integrated poultry operations in those areas.

Cattle production is again distinctly different. A major reason is the significant land and forage base required for cattle production. Beef and dairy cattle, both of which contribute to the supply of beef, are geographically concentrated in different states. Cattle stocker or growing operations are quite diverse and are frequently not concentrated in the same geographic regions as cow-calf production. Cattle feeding has increased in geographic concentration and involves some of the same states where there are numerous stocker and growing operations. However, because of the geographic dispersion combined with an added production stage, the beef industry incurs significant transactions costs moving animals from dispersed cow-calf operations to more concentrated stocker or growing areas and to still more concentrated cattle feeding areas.

Operation Size and Specialization

Poultry operations, largely as a result of integration, are specialized units. While operation size varies, many are relatively large, intensely managed operations. Hog production units have moved in the direction of poultry. Hog production operations have become more specialized, both in farrowing and finishing operations. Size of operation has increased significantly to capture cost economies associated with larger units.

Cattle production is a mixture. A large number of cow herds are small, with less than 30 cows per operation, in part again because of the significant land and forage base required. Stocker or growing operations are larger, usually combining calves from several cow-calf operations into a

larger production unit. Cattle feeding has moved increasingly toward much larger units. There has also been greater consolidation of feeding capacity in fewer, but larger firms.

Implications for integration are interrelated with other factors discussed above. A large, specialized production unit usually can be managed more efficiently than many, smaller, diverse production operations. Specialization and larger size units in poultry are partly the result of integration. Such units capitalize on more specialized management and economies of size. Assuming the poultry model can be applied to pork, then the trend toward increasingly larger and more specialized operations in hog production will lead to more integration and is already an outgrowth of expanded integration. Vertical integration in the beef industry will occur more slowly than for either poultry or pork, due in part to the difficulty of organizing and managing smaller, highly diverse production units. Incorporated with that are the disadvantages cited above for the beef industry, i.e., longer biological process, diverse genetic base, an added production stage, and more geographically dispersed production.

Vertical Integration Incentives

One of the perceived benefits of vertical integration is being able to respond more quickly and correctly to changing consumer demands, especially changing tastes and preferences. Therefore, incentives discussed in this section relate to how integrated firms or non-integrated firms are able to meet consumer demands at the retail and food service level and how to capitalize on profit opportunities. Market characteristics affecting vertical integration incentives are summarized in Table 2.

Value-Added Products at Retail

Greater profit opportunities exist with value-added, differentiated meat products than with commodity-type products sold in the traditional fresh form. Over the past decade or two, there has been a distinct trend toward providing more value-added poultry products. The space in the meat case for fresh, whole birds or for fresh parts has declined as more products have appeared on the frozen food shelves. These frozen, packaged products offer more opportunities for satisfying varied consumer demands. Examples include different size packages and serving sizes for different size families, different flavors and styles for different ethnic and religious groups, and different degrees of convenience in meal preparation.

The pork industry has traditionally sold several processed, value-added products, i.e., bacon, hams, and sausages. Still, a relatively high percentage of the pork carcass was marketed in fresh form as chops, roasts, and other products. That percentage has probably not changed markedly over the past couple of decades. However, as more consistency is achieved from a narrower genetic base, there is more incentive to develop new, value-added products which can capitalize on different consumer tastes and preferences.

Beef is primarily marketed in fresh form from the retail meat case. Most beef products are marketed more as a commodity than as differentiated products. There are a few value-added beef products throughout the retail supermarket, but none which have significantly affected beef demand. There are few identifiable characteristics of fresh products that can be used as a basis for product differentiation. As a result, there is little economic incentive on balance to vertically integrate, develop value-added products, and use product differentiation as a profit opportunity.

Table 2. Market Characteristics: Beef, Pork, and Poultry.

Category	*Beef*	*Pork*	*Poultry*
Value-Added Products at Retail	Low	Moderate	High
New Product Development	Slow	Moderately aggressive	Very aggressive
Brand Marketing	Low	Moderate	High

New Product Development

Studies show that product differentiation allows firms to price products differently and receive premium prices for perceived or actual product differences from target market segments. The poultry industry, led by vertically integrated firms, has capitalized on opportunities offered by new product development and product differentiation. During the past twenty years, we have seen numerous new, frozen poultry entrees in retail supermarkets. Many are a single part of the chicken, the breast, prepared in several ways to satisfy a wide range of consumer tastes. Nearly every fast-food firm has introduced some type of chicken nugget or strip product and one or more chicken sandwiches. Product development in poultry is interrelated to the above trend of relying less on fresh meat sales and moving toward more value-added, processed products.

The pork industry is positioning itself to do the same. “The Other White Meat” advertising campaign and aggressive new product development has changed the mix of pork products offered at retail and in restaurants. New pork products are appearing in retail meat cases. Case ready pork loins are an example, some of which are preseasoned and have cooking and serving instructions on the package. Progress has been made to increase pork products such as the “Iowa Chop” and “America’s Cut” pork products on menus in white tablecloth restaurants. The pork industry has tried to penetrate the fast food industry with new products such as McDonald’s “McRib” sandwich and is currently making progress with ground pork sandwiches, termed “The Other Burger.” But clearly to date, pork has not achieved the degree of success poultry has experienced.

Successful new products in the beef industry seem to be rare. There have been attempts at case ready beef products at retail with limited success. There have been attempts to offer new burgers, such as McDonald’s “Arch Deluxe” with very limited success. However, a modified burger or burger sandwich, while technically called a new product, may only increase purchases of the new burger at the expense of competing burgers, rather than increasing beef demand or sales in total. Truly new beef products which take the pressure off burgers, steaks, and roasts are rare.

Brand Marketing

It is difficult to separate brand marketing from value-added products and new product development. Brand loyalty and perceived or actual product differentiation enables firms to extract premium prices. Consumers will pay a premium for consistent quality or perceived quality. This provides firms with an economic incentive to vertically integrate and to develop consumer brands and brand loyalty for differentiated products.

Poultry took a major step toward brand marketing in the 1960s when brands were developed successfully for fresh poultry. That success broadened as brands were placed on new, value-added products. Most of the new products at retail are introduced by integrated firms which own the brands and benefit most from brand marketing success.

Numerous brands exist for traditional processed pork products such as bacon, hams, and sausages. Firms introducing case ready pork products are attempting to capitalize on brand loyalty while introducing new, value-added, branded products. Similarly, there are few brands for fresh beef. "Certified Angus Beef" has developed some brand loyalty as an indicator of high quality beef products. There are also examples of branded beef products for niche markets, such as "Coleman's Natural Beef" and "Laura's Lean Beef."

Brands are an incentive to integrate, but brand loyalty demands consistency. Fresh beef products in particular historically have not had the necessary consistency due to a broad genetic base and little or no control over the entire production process from selection of genetics to end-product distribution. Poultry integrators have capitalized on that production control capability and a narrower genetic base to produce, process, and distribute branded products. Consequently, the incentive for controlling production, developing new products, and targeting market segments with differentiated products exists with poultry. The same incentive may be present with pork and beef but as yet the probability of success is too low for the needed investment.

Vertical Integration Disincentives

Many of the economic disincentives toward vertical integration, mostly in the beef subsector, are interrelated with production characteristics and are opposite the economic incentives discussed above. Management characteristics that affect vertical integration disincentives are summarized in Table 3.

Table 3. Management Characteristics: Beef, Pork, and Poultry.

Category	*Beef*	*Pork*	*Poultry*
Capital and Risk	High	Moderate but some shared	Low and shared
Control of Quantity, Quality, Consistency	Loose	Increasing	Tight
Management Skills Needed	High	Declining	Low

Capital and Risk

The absolute outlay of capital for a new venture must be considered in light of the probability of success stemming from the investment. This introduces the dimension of risk and the typical tradeoff between profits and risk. Higher risk ventures may have higher profit opportunities. Capital requirements refer to the extent of capital needed by an individual firm to vertically integrate production, processing, and distribution. Capital requirements have two dimensions. First is the absolute capital needed to vertically integrate. Second is the capital needed to vertically integrate a sufficient volume to influence a large target market segment.

The poultry subsector is predominantly organized in a manner that limits capital requirement by the integrator. Contract growers are required to provide part of the capital, thereby reducing capital requirements by the integrating firm. Along with a shift in capital requirements, some risks associated with production are effectively shifted to contract growers as well because risks follow the investment of capital. On the other end, contract terms are written to limit the potential profitability of the contract growers. They can earn a reasonable return on investment but significant returns above that accrue to the integrating firm.

Vertical integration in the pork industry is following the poultry model. Contract growers, i.e., those engaged in farrowing and finishing, provide part of the capital, are allowed a reasonable but limited return on investment. The integrating firm provides the remainder of the capital, assumes the remainder of the risk, but retains the potential for unlimited returns.

Little vertical integration has occurred in the beef subsector, except between two production or production-processing stages. One deterrent is the immense capital required to integrate three production stages plus processing and distribution, even on a small scale. Due to economies of size in slaughtering-fabricating, an efficient size plant requires about 1 million fed cattle annually. That represents the output from about 10 feedlots each with a 40,000 head one-time capacity and, in turn, feeder cattle from about 12,500 cow herds of 100 cows each. The capital required for the processing plant, feedlot, and cattle is immense, even excluding capital for land. Therefore, to date, no clear method of integration has arisen in beef as it has in poultry and pork. One means of reducing the capital outlay required is to develop a contract-integrated operation.

Control of Quantity, Quality, Consistency

Several factors come together in a discussion of controlling quantity, quality, and consistency. Quantity is tied directly to capital requirements. Quality and consistency are tied to the production characteristics discussed earlier, especially the genetic base, as well as the opportunities or difficulties in developing value-added branded products.

The poultry industry has demonstrated the ability to control the quantity of output in a vertically integrated firm, while simultaneously controlling quality and consistency. Narrow genetics, only two production stages, capital-sharing contracts, tight management specifications, the linkage be-

tween product differentiation and brand loyalty, and other related factors have all contributed to poultry's success.

The pork subsector is following the poultry model, but there are differences which limit the extent or success of vertical integration. Regulations on contract farming in some states interfere with developing a vertically integrated industry as completely as in poultry. Less consistency in pork, due to more genetic variation, remains a problem but is diminishing. Not having brand loyalty for fresh products may be a limitation, yet considerable brand loyalty exists for processed products. Time may be the largest factor. Integration in the pork industry simply trails poultry by nearly two decades, though integration in pork has occurred relatively quickly in the past five-to-ten years.

Perhaps the biggest impediment to vertical integration in the beef industry is the difficulty with controlling quality and consistency. Control over a sufficient quantity is difficult in terms of capital needs. However, if an economical, technological breakthrough were found to predict and control end-product consistency, a means would likely be found to share the capital requirements. In part, the profit potential would increase sufficiently to provide the necessary incentive for innovation in financing and organizing a vertically integrated operation. Increased consistency would enable identifying the proper genetics and narrowing the genetic base, more tightly linking the stages of production, and providing more incentive for new, value-added products and brand marketing.

Management Skills Needed

The biological characteristics of poultry, pork, and beef; number of production stages; geographic concentration; and size and diversity of production units all affect the managerial skills required to manage a vertically integrated firm. The poultry industry has found ways to manage each production stage, in part due to narrower genetics, a shorter biological process, and specialized production units. Pork is headed in the same direction. Managerial skills needed to manage many small geographically dispersed cattle operations which have a broad genetic base is immense. Similarly, more managerial resources are needed at every step to effect control over quantity, quality, and consistency of end products. Therefore, the extent of vertical integration in beef will continue to lag behind that of pork and poultry.

Current and Future Integration

The poultry industry is highly vertically integrated and little additional integration is expected. Vertical integration in the pork industry has increased dramatically in the past five years and more is expected. Many of the large or mega-size hog production units are already vertically tied to specific processors and larger producers expect closer ties with processors in the future. Most integration is via contract, similar to the poultry industry, though there are cases of large ownership-integrated operations. The genetic base for hogs is expected to narrow, offering opportunities for more consistent pork products. This in turn provides an incentive for vertically integrated firms to capture the necessary control over quality and consistency and to develop processed, value-added, branded products for retail and food service.

The beef industry has the lowest degree of vertical integration to date and the most barriers to overcome to further develop vertically integrated systems. Vertical integration in the beef industry will continue to trail pork and poultry. There needs to be a major breakthrough in identifying the genetics which produce beef having the eating quality consumers desire and maintaining identity of the beef from conception to the consumer. Such a breakthrough would lead to increased control over quality and consistency of beef products and a reduction in genetic variation in cattle. Alternatively, there needs to be a major breakthrough in processing or new product development to increase the profit opportunities for beef products at the retail and food service level. Lastly, for vertical integration to increase significantly in the beef industry, a mechanism must be developed to shift or share the capital requirements and risk. Some type of contract-integrated arrangement or series of arrangements not currently in use will be required.

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Samuel E. Curl, Director of Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is issued by Oklahoma State University as authorized by the Dean of the Division of Agricultural Sciences and Natural Resources. 1297