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Vertical Organization and Coordination

in the Broiler and Egg Subsectors\*

Lee F. Schrader\*\* and George B. Rogers\*\*\*

Our subject is too broad to do more than compare and contrast the broiler and egg subsectors with respect to a few issues. We refer the reader interested in a more complete picture to others (Marion and Arthur, Benson and Witzig, and Schrader, et al.). Our object is to contribute to the understanding of vertical market structures, their causes and impact on performance across commodities.

Concentration

Both the broiler and egg subsectors have tended to concentrate horizontally and geographically. Broilers are more concentrated in both dimensions. The largest 20 broiler firms did 55 percent of the business in 1975 with 61 percent grown in 5 states in 1977. The largest 34 egg producers accounted for only 25 percent of production in 1977 with 37% produced in five states. Both have shifted toward the South Central and Southeast.

Economies of scale in processing led to fewer plants. Other economies to scale, particularly in broiler marketing, input supplying, and financing, have encouraged horizontal concentration at the processing stage. Economies attributable to production density have contributed toward geographic concentration.

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\*\* Purdue University.

\*\*\* ESCS, U.S. Department of Agriculture.

That is, cost of supplying production inputs vary inversely with production density.

Yet the concentration of firms has not been such that it materially effects the competitive behavior in the product markets. Aggressive competitive behavior is the rule rather than the exception. The product markets are regional or national in scope, however, the individual seller of unprocessed products may face a much less perfect market.

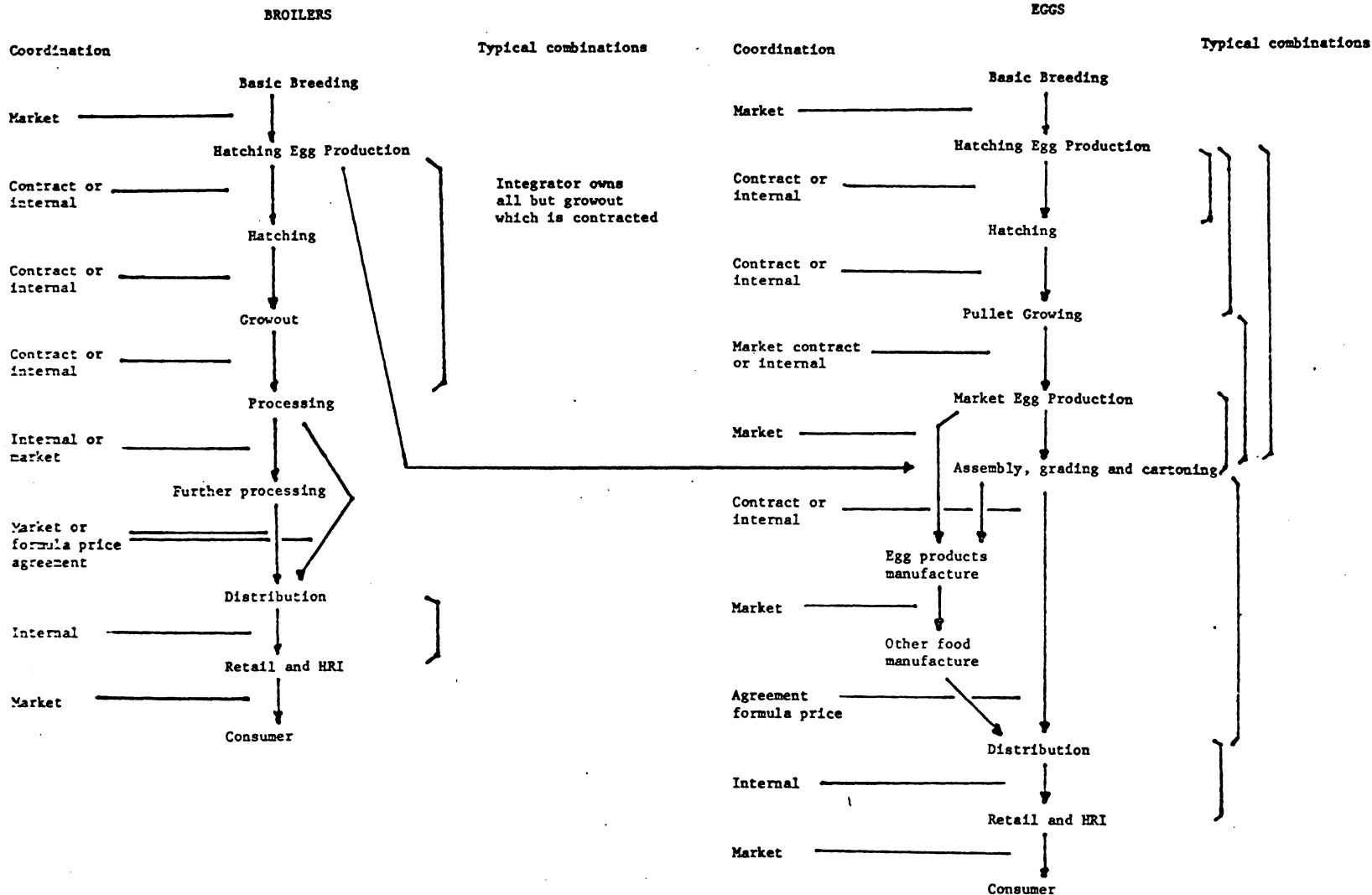
The stream of technological change in breeding, feeding and mechanization has kept both subsectors in a state of change and has facilitated organizational changes as well as physical production changes. The pace of change has not allowed stagnation at any level. The improved technologies tended to be so far superior to existing technology that adoption was virtually assured. These changes have been so powerful that they forced organizational change even in the egg subsector where total demand has declined. The fact that the subsectors have been in a continuous process of adaptation to changing technology left them in a position to make other organizational and geographic adjustments in response to advantages which may have been too small to initiate change.

#### Short Marketing Channels

The marketing channel is short and simple for both eggs and chickens (Figure 1). Both products are perishable and neither provides much opportunity for varying the rate of product flow once the process is set in motion. In both cases, the identity of the product is preserved all the way from the farm to the consumer for the bulk of the output. Some broiler meat is further

Figure 1 Stages, Coordination and Integration in the

Broiler and Egg Subsector



processed for use in other food products and approximately 14% of eggs used for food are broken commercially for egg products manufacture.

The development of large scale enterprises made closer coordination of the marketing process possible. Increased size of individual operations reduced or eliminated the need for a number of assembly and distribution steps which came into existence when production and processing units were smaller. The line of causation is certainly not clear. The need for coordination was a factor in the creation of larger units at the same time the existence of the larger units made coordination simpler. It is clear that transactions costs were high relative to value added at some of the levels of handling which existed in the past.

#### Integration and Coordination Patterns

Patterns of stage integration and contract coordination have been quite different in the two subsectors.

Contracting and integration was dominated by the feed supplier at the beginning of the broiler consolidation phase. Risk shifting and the need for financing motivated the grower. Profits and an assured outlet for feed motivated the contractor. The influence of the feed companies has decreased steadily in the broiler subsector. The processor stage has become a focal point of system control. The processing stage represents a bottleneck in the channel with scheduling of breeders, hatch, and growout keyed to processing capacity and the processors judgment of market demands. The most common arrangement is for the processor to own the birds and to contract for growout with family units and with the grower payment based, in part at least, on production performance. Only about 10% of the growout is integrator-owned. The processor-integrator either owns the hatching egg supply flocks and hatchery or maintains a continuing arrangement with these stages. The need to coordinate facility use is a major factor in

maintaining present coordinating arrangements. The investment and value added at the processing stage are relatively large.

Specialized firms dominate the broiler subsector. Diversified publicly owned companies have tended to leave the subsector because of highly variable earnings and in some cases earnings averaging below opportunity cost. Feed manufacturing has tended to be integrated into the processor-coordinator firm.

The pattern of coordination in the egg subsector is more diverse. One of the few generalizations which can be made is that pullet growing tends to be combined with either the hatching stage or egg production stage. Approximately 37% of market egg production is integrated with other stages in the process. Contract coordination of production represents about 43% with 20% of the production remaining largely independent. These forms of coordinating have grown, while contract marketing, an older form, has declined on eggs and virtually disappeared on broilers. In contrast to broilers - where integrated firms all look somewhat alike - integration or contracting proportions for eggs may vary from region to region. These differences may narrow over time. Feed suppliers continue to play in an important role and probably dominate the contract production. Egg assembly-grading firms may also be the centerpiece for a coordinated unit however, production and grading is often loosely coordinated by marketing agreements. Producing firms have tended to integrate forward into grading and distribution and some distributors and retailers have integrated backward into production. The processor level has not been the focal point for coordination, probably because the investment per unit of product and value added is low relative to the production stage.

There has been an expansion of the number of production-processing complexes in which eggs are moved directly from the production house to processing machinery located at the same site. Some expect this arrangement ultimately to dominate. No one system has established a dominant position at this time.

Non-price coordination dominates for short term decisions. Price is certainly an influence on the decision maker or makers but the messages are not in terms of price. That is, while the broiler processor includes price in his decisions the message to the grower is not in terms of price. Longer term decisions such as capacity expansion are clearly price responsive at all levels. So are decisions to reduce output, but often moderated by concerns with fixed costs or maintaining market shares.

#### Pricing

Pricing practices differ considerably between the two subsectors (Schrader). Weekly negotiated prices predominate in the exchange of ice-packed, ready-to-cook broilers at the processor-retailer interface. The proportion of transfers to the retail level represented by ice-packed broilers is decreasing. Prepackaged and special cut broilers tend to be formula priced against the ice-packed quotation. Negotiated trades account for about half the volume. While there is some concern about the amount of formula pricing, the ice-packed price as quoted by the USDA Market News is considered to be an accurate reflection of broiler values. As noted earlier, contract payments to growers tend not to be based on broiler prices.

The pricing of cartons of egg transfers is dominated by formula prices based on a private market report. Open, negotiated trades are few and often not reported. A relatively new institution, Egg Clearinghouse, Inc., provides a forum for open exchange of nest run eggs. It represents virtually the only source of information on open cash trading, however, trading there represents

only about 1/2 of 1% of all U.S. egg production. The Market Evaluation Committee interprets ECI trading and other information into benchmark nest run values for the East and Midwest. In recent years, collection and analysis of cartoning cost records has been used to offer a bridge between nest run and carton values. In effect, price is used to allocate income, not product, with longstanding arrangements and contracts determining the exchange partners and non-price terms of trade. Transfers to the egg products manufacturing firms are typically on an open market basis but not widely reported.

Participants in the egg subsector may want to use market price but evidence very little desire to participate in the process of discovering that price. As a result, prices and pricing are much more a point of conflict than is the case in the broiler subsector. Apparently, the benefits of formula priced transfers outweigh the desire for open market pricing. Both the processes of assembly of eggs from the farm and distribution of cartoned eggs to retailers is more efficiently accomplished when the exchange partners are established by longstanding arrangements. One can hardly imagine the problems associated with a daily restructuring of assembly and delivery routes if the entire exchange were negotiated daily. There are clear cost advantages in the present arrangements but the problem of pricing remains unsolved. Contracts and pricing arrangements at all levels in the egg subsector beyond the breeder may involve payments tied to a recognized price quotation.

#### Conflict and Equity

There appear to be more contractor - contractee conflicts in the broiler subsector than is the case in eggs. The broiler-grower has few alternatives. In most cases the system is so tightly coordinated that independent growing



is not a viable alternative. Often, there may be only one processor operating in the grower's area. The dominance of a single system restricts the alternatives of any of the actors in the subsector. The egg subsector presents more alternatives. There are more buyers and more contractors. No single system dominates and in most cases an individual producer has a number of market outlets. Independent production remains a viable alternative.

The existence of alternatives is a major factor in giving the feeling that a market participant is being treated fairly. It seems rather difficult to argue that the broiler grower is exploited to a large degree when production capacity is being expanded at an average rate of about 3% per year. If the payments are sufficiently high to encourage the building of efficient new facilities it appears to be consistent with a competitive result. The technological progress referred to earlier may be a factor in grower discontent. The level of contract payment necessary to bring in new production using current technology may not be sufficient to fully amortize cost resulting from an older technology.

There remains conflict between processors and large retailer organizations in both subsectors. There is an apparent residual disparity of market power between the large retailers and the sellers of both broilers and eggs, as was noted in 1966 by the National Commission on food marketing. The National Broiler Marketing Association represented an attempt on the part of broiler-processors to counter this disparity under the protection of the Capper-Volstead Act. Recent Court decisions indicate that the NBMA formula is not acceptable. United Egg Producers is a cooperative organization of egg producers organized to increase the influence of the producer which has not been challenged in the Courts.

A few broiler processors are cooperatives with coordinated systems. There has been some renewed interest in broiler cooperatives within the past several years.

#### Performance

Both the broiler and egg subsectors are models of production and marketing efficiency. Gains in efficiency have outrun cost increases to deliver products to the consumer at decreasing real prices. If any actors in the system have been exploited, the exploiters appear to have passed the benefits to the consumer. Net returns from production and marketing activities, while somewhat variable from year-to-year, have not been high.

Feed use per unit of product has been cut more than 25% for eggs and nearly 30% for broilers since 1955. Production per man hour has increased by a factor of 6 in the poultry group (including turkey). Similarly, gains in productivity in marketing have been substantial, totaling almost 40% since the mid-1960's alone. Most, if not all, these gains have accrued to the consumer.

The rapid shift in technology has likely been more the cause of the organization of the broiler and egg subsectors rather than the result.

Table 1. Growth of Vertical Integration of Production in the Broiler and Egg Subsectors, 1955-1977<sup>1/</sup>

Year	Broilers		Eggs	
	Percent Contract <sup>2/</sup>	Percent Company Production	Percent Contract <sup>2/</sup>	Percent Owner-integrated
1955	88	2	13	2
1960	91	5	21	6
1965	92	6	32	13
1970	92	7	35	20
1975	91	8	47	32
1977	89	10	52	37

<sup>1/</sup> Estimates, G.B. Rogers.

<sup>2/</sup> Production and/or marketing. Contract production has expanded, and contract marketing has tended to decline since the 1960's.

Table 2. Measures of Efficiency in Production in the Broiler and Egg Subsectors, 1955-1977.

Year	Broilers			Eggs			All Poultry Output per hour of labor, index <sup>3/</sup>
	Lbs. feed per lb. live broiler <sup>1/</sup>	Age to market weight <sup>1/</sup>	Mortality per batch	Lbs. feed per doz. eggs <sup>1/</sup>	Eggs per year per average layer on hands <sup>2/</sup>	Annual Mortality <sup>1/</sup>	
	(no.)	(days)	(%)	(no.)	(no.)	(%)	(1967=100)
1955	2.85	84	15	5.50	192	15	32
1960	2.48	--	--	5.20	209	13	55
1965	2.28	--	--	4.95	218	15	87
1970	2.10	--	--	4.55	218	21	120
1975	2.10	--	--	4.25	233	14	175
1977	2.05	53	4	4.25	236	12	196 <sup>4/</sup>

<sup>1/</sup> Estimates, G.B. Rogers.

<sup>2/</sup> SRS and ESCS statistics.

<sup>3/</sup> ERS, Stat. Bul. 581, Nov. 1977.

<sup>4/</sup> 1976.

Table 3. Changes in Productivity in Egg and Broiler Marketing (1965-69=100).<sup>1/</sup>

Period	Eggs			Broilers		
	Preparatory functions <sup>2/</sup>	Distributive functions <sup>3/</sup>	Total system	Preparatory functions <sup>2/</sup>	Distributive functions <sup>3/</sup>	Total system
1955-59	66	89	78	69	82	77
1960-64	80	90	85	85	96	96
1965-69	100	100	100	100	100	100
1970-73	108	120	115	105	119	114
1974-77	127	151	140	120	150	138

<sup>1/</sup> Estimates, G.B. Rogers.

<sup>2/</sup> Assembly, processing, long-distance transportation.

<sup>3/</sup> Wholesaling, retailing.

Table 4. Percentage Net Returns<sup>1/</sup> in Egg and Broiler Marketing Compared with Long-term Bond Yields.

Period	Eggs			Broilers			Long-term bond yield
	Preparatory functions <sup>2/</sup>	Distributive functions <sup>3/</sup>	Total system	Preparatory functions <sup>2/</sup>	Distributive functions <sup>3/</sup>	Total system	
	%	%	%	%	%	%	
1955-59	3.8	8.7	6.3	3.9	10.0	7.7	3.7
1960-64	2.9	8.0	5.8	3.8	9.4	7.5	4.4
1965-69	3.9	8.1	6.4	4.3	9.1	8.3	5.7
1970-73	5.0	10.8	8.4	5.0	10.8	8.7	7.5
1974-77	5.5	10.2	7.9	5.8	11.5	9.3	8.2

<sup>1/</sup> Net returns as percentage of average margin. Estimates, G.B. Rogers.

<sup>2/</sup> Assembly, processing, long-distance transportation.

<sup>3/</sup> Wholesaling, retailing.

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