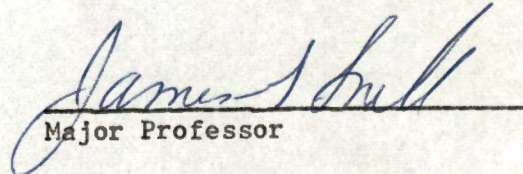


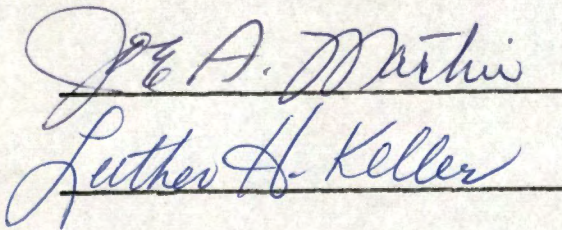
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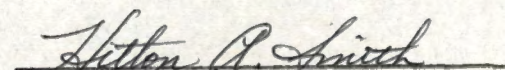
I am submitting herewith a thesis written by Alvin Andrew Bedel entitled "A Descriptive Study of the Structure of the Broiler and Livestock-Meat Industry in Tennessee." I recommend that it be accepted for nine hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.


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Luther H. Keller

Accepted for the Council:


Vice Chancellor for
Graduate Studies and Research

**A DESCRIPTIVE STUDY OF THE STRUCTURE OF THE BROILER AND
LIVESTOCK-MEAT INDUSTRY IN TENNESSEE**

**A Thesis
Presented to
the Graduate Council of
The University of Tennessee**

**In Partial Fulfillment
of the Requirements for the Degree
Master of Science**

**by
Alvin Andrew Bedel
August 1970**

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ABSTRACT

This study was undertaken, primarily to provide a starting point for future research into the effect the Tennessee Meat and Poultry Inspection Act may have on the structure of the slaughtering and processing sector in Tennessee. Specifically, the objectives are: (1) to determine by area and county the number of broilers and livestock produced, the number of commercial farms involved, and the average size and distribution of size for swine, beef, and broiler producers, (2) to determine the type of livestock marketing channels available for each county, some indication of their volume, and a discussion of the marketing arrangements for broilers, (3) to determine the number, location, and size of the present slaughtering and processing firms in Tennessee.

Data were obtained from secondary sources, primarily census reports, the records of the Division of Food and Drugs, Tennessee Department of Agriculture, and the records of the Packers and Stockyard Administration, United States Department of Agriculture.

The location of cattle and calf production was widely spread throughout the state. Of the total number of cattle sold, Middle Tennessee was the largest producing area, followed by West Tennessee. The greatest concentration of cattle by county was in middle Middle Tennessee and upper West Tennessee. Middle Tennessee also sold the highest percentage of calves of the three areas observed. The greatest concentration of calves by county was also found in middle Middle Tennessee, with the upper section of West Tennessee the next most concentrated area of the state. The average number of cattle sold per

commercial farm was 9.63 head for the state. The average size of the cattle farm in the state was primarily small in terms of head sold, with a few large units, and with the average size unit increasing as we move from East to West Tennessee. The average number of calves sold was almost 12 head per commercial farm for the state. The size of the calf production unit can be summarized as mostly small, with the smallest average sale per firm in East Tennessee, followed somewhat closely by West Tennessee, with Middle Tennessee farms the largest.

Hog and pig production is highly concentrated in certain sections of West Tennessee, scattered generally throughout Middle Tennessee, with very few hogs and pigs sold in East Tennessee. The highest concentration of swine by county is in upper West Tennessee. The smallest average sale per farm was found in East Tennessee. Middle and West Tennessee had about the same percentage of small producers, with West Tennessee having a higher percentage of large producers and therefore a larger average sale per farm.

Broiler production took place primarily in East Tennessee, secondarily in Middle Tennessee, with West Tennessee producing very few birds. The production units were quite large, with the state average of 41,442 birds per firm. Most broilers are produced by vertically integrated firms. This results in a very few live broilers entering a market. Production prices are therefore determined by bargaining between producer and processor.

The marketing sector is made up of three types of livestock markets, terminal, auction, and country markets. Country markets include packer and independent buying stations, order buyers, and

dealers. There were two terminal markets available for the sale of livestock, one in Memphis, the other in Nashville. Auction markets were generally located throughout the state. Country buying stations were located mostly near the packer plants. There were 18 packer buying stations and 12 independent buying stations. There were 13 order buyers registered in the state, with their locations generally spread throughout Tennessee. All the commission firms, 43 of the auction markets, and 157 registered dealers operated in Tennessee. The highest concentration of dealers was in Middle Tennessee, with the remainder generally located throughout East and West Tennessee.

The slaughtering and processing industry contains a relatively few firms. Furthermore, most of the meat slaughtering and processing firms are small. Many of the slaughtering plants, especially the large federally inspected plants are located in or near the large urban areas. The same is true of meat processing plants. Poultry eviscerating and processing occur in a very few firms with large volumes. Most of these firms are located in Davidson, Knox, and Hamilton counties.

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CHAPTER I

INTRODUCTION

One of the most important ingredients in the American diet is some type of red meat or poultry. As the data in Table I illustrates, the amount of red meat and chicken consumed per person in the United States has increased about 28.8 percent, or some 48.7 pounds, in the past 20 years. These statistics suggest that consumers have substituted red meat and chicken into the diet for less desirable foods. The data in Table I also shows an appreciable increase in the amount of beef (72 percent) and chicken (44 percent) consumed from the base year (1949) to 1968. Veal, lamb and mutton made up a small and declining percentage of the total meat consumed. Pork consumption has also declined slightly, however, the amount consumed varied considerably from year to year.

While the increased consumption of chicken meat may be attributed to falling consumer prices and/or changes in tastes and preferences, probably the most important variable in explaining the rise in beef consumption has been the increase in real per capita personal income. As the data in Table II shows, real per capita personal income has doubled in Tennessee over the past two decades. In addition to the rise in per capita consumption of red meat and chicken from increased income, total consumption increased considerably due to a rise in population (Table II). During the 1950's, Tennessee's population grew at an average rate of 0.8 percent per year; in the 1960's, this figure has risen to 1.3 percent per year [29, p. 12].

TABLE I

PER CAPITA CONSUMPTION OF RED MEAT AND POULTRY BY SPECIES AND TOTAL
IN POUNDS FOR THE UNITED STATES, 1949 TO 1968^a

Year	Beef	Veal	Lamb and Mutton	Pork	Chicken	Total
-----Pounds-----						
1949	63.5	8.7	4.1	67.6	25.3	169.2
1950	62.6	7.9	3.9	68.2	20.3	162.9
1951	55.3	6.5	3.4	70.9	21.4	157.5
1952	61.4	7.1	4.1	71.4	21.8	165.8
1953	76.5	9.4	4.6	62.9	21.6	175.0
1954	79.0	9.9	4.5	59.2	22.5	175.1
1955	82.0	9.4	4.6	66.8	21.4	184.2
1956	85.4	9.5	4.4	67.4	24.6	191.3
1957	84.5	8.8	4.2	61.5	25.6	184.6
1958	80.5	6.7	4.1	60.7	28.3	180.3
1959	81.6	5.7	4.5	68.3	28.8	188.9
1960	85.0	6.1	4.8	64.9	28.1	188.9
1961	87.8	5.6	5.1	62.0	30.2	190.7
1962	88.8	5.5	5.2	63.6	30.0	193.1
1963	94.2	4.9	4.9	65.3	30.9	200.2
1964	99.8	5.2	4.2	65.3	31.0	205.5
1965	99.3	5.2	3.7	58.5	33.3	200.0
1966	104.0	4.5	4.0	58.0	36.0	206.5
1967	105.9	3.8	3.9	63.9	37.1	214.6
1968 ^b	108.9	3.5	3.7	65.4	36.4	217.9

^aMeat and chicken were measured by carcass and eviscerated weight, respectively.

^bPreliminary estimate.

Source: United States Department of Commerce, Statistical Abstract of the United States: 1951 (Washington: Government Printing Office, 1951); _____, Statistical Abstract of the United States: 1957 (Washington: Government Printing Office, 1957); _____, Statistical Abstract of the United States: 1959 (Washington: Government Printing Office, 1959); _____, Statistical Abstract of the United States: 1961 (Washington: Government Printing Office, 1961); _____, Statistical Abstract of the United States: 1965 (Washington: Government Printing Office, 1965); _____, Statistical Abstract of the United States: 1969 (Washington: Government Printing Office, 1969).

TABLE II

TOTAL POPULATION AND DEFLATED PER CAPITA PERSONAL INCOME
WITH POPULATION AND INCOME CHANGE FROM THE PRECEDING
YEAR FOR TENNESSEE, 1949 TO 1968

Year	Population (1,000)	Change from preceding year (percent)	Deflated Per Capita Personal Income ^a (dollars)	Change from preceding year (percent)
1949	3,236	--	1,048	--
1950	3,304	2.1	1,154	10.1
1951	3,363	1.8	1,180	2.3
1952	3,352	-0.3	1,217	3.1
1953	3,326	-0.8	1,385	13.8
1954	3,364	1.1	1,282	-7.4
1955	3,422	1.7	1,346	5.0
1956	3,444	0.6	1,422	5.6
1957	3,472	0.8	1,411	-0.8
1958	3,500	0.8	1,431	1.4
1959	3,547	1.3	1,499	4.8
1960	3,577	0.8	1,490	-0.6
1961	3,630	1.2	1,540	3.4
1962	3,690	1.7	1,606	4.3
1963	3,742	1.4	1,671	3.9
1964	3,805	1.7	1,862	10.3
1965	3,847	1.1	2,001	7.5
1966	3,878	0.8	2,095	4.7
1967 ^b	3,936	1.5	2,035	-2.9
1968 ^b	3,975	1.0	2,106	3.5

^aDeflated by dividing per capita personal income by the consumer price index for all items, where 1957-59= 100.

^bPreliminary estimate.

Source: United States Department of Commerce, Statistical Abstract of the United States: 1954 (Washington: Government Printing Office, 1954); _____, Statistical Abstract of the United States: 1957 (Washington: Government Printing Office, 1957); _____, Statistical Abstract of the United States: 1959 (Washington: Government Printing Office, 1959); _____, Statistical Abstract of the United States: 1961 (Washington: Government Printing Office, 1961); _____, Statistical Abstract of the United States: 1963 (Washington: Government Printing Office, 1963); _____, Statistical Abstract of the United States: 1965 (Washington: Government Printing Office, 1965); _____, Statistical Abstract of the United States: 1967 (Washington: Government Printing Office, 1967); _____, Statistical Abstract of the United States: 1968 (Washington: Government Printing Office, 1968); _____, Statistical Abstract of the United States: 1969 (Washington: Government Printing Office, 1969).

From the above discussion, it appears the production and processing industries must expand output to meet the demand of a growing population, with changing tastes and preferences and rising real incomes. The effect of continual growth in demand on the size, the number, and the location of firms in the poultry and livestock industry then becomes a relevant economic question.

In Tennessee the various segments that make up the organization of the broiler and livestock-meat industry result in a complex and dynamic structure. Changes are constantly being brought about by the interactions taking place between firms, sectors, and industries, as well as social and political dictates. In order to evaluate the effect of these changes, we must first have a conception of the present structure, or organization of the industry.

This study will be concerned with describing the structural characteristics of the three sectors of the Tennessee livestock-meat economy. These sectors are identified by the main functions they perform. On the first level of the industry are the producers of the raw product. The raw products in this study will include pigs, hogs, cattle, calves, and broilers. The next level, the marketing sector, performs the function of moving the raw product from the producer to the slaughter plant. The last sector to be described will be the slaughter and processing industry. The flow of red meat and chicken from the processor into the wholesale and retail sectors complete the movement through the industry, but are beyond the scope of this study.

I. THE PURPOSE AND IMPORTANCE OF THE STUDY

The main objective of this study is to provide a description of the structure of the broiler and livestock-slaughter industry in Tennessee. This study will cover the production of raw products, the marketing channels through which livestock flow and the slaughter and processing sector. Specifically, the objectives are:

1. To determine by area and county the number of broilers and livestock produced, the number of commercial farms involved, and the average size operation and distribution of size for pork, beef and broilers.
2. To determine the type of livestock marketing channels available for each county with some indication of their volume, and a discussion of the marketing arrangements for broilers.
3. To determine the number, location, and size of the present slaughtering and processing firms in Tennessee.

This study was undertaken, primarily to provide a starting point for future research into the effect the Tennessee Meat and Poultry Inspection Act¹ may have on the structure of the slaughter and processing sector in Tennessee. This Act affects these firms by requiring certain sanitary facilities, which must pass periodic inspection. This Act also provides for inspection of livestock and poultry processed for human consumption. However, to determine any changes in the structure of the industry over a period of time, it is necessary to have a frame of reference. The purpose of this study is to provide this frame of reference.

¹The Tennessee Meat and Poultry Inspection Act was signed into law on April 20, 1967, and became fully effective on January 1, 1968.

Of secondary importance, this study will provide a beginning source of information for future studies in this research area. As I will discuss in the next chapter, important work needs to be conducted to study market conduct and performance. These studies also require an understanding of the basic structure of the industry in Tennessee which this study should provide.

II. METHOD OF PROCEDURE AND SOURCE OF DATA

The theoretical framework of market structure research is discussed in Chapter II. The main emphasis in this chapter will be placed on the conduct and performance of the firm and industry.

The following chapter will provide information on the number of broilers and livestock produced, the average size and the number and distribution of production units by species for each area and county.

In Chapter IV, the types of marketing channels and their relative importance are discussed.

The location, the number and the size of firms slaughtering and/or processing livestock and poultry in Tennessee will be discussed in Chapter V.

The last chapter summerizes the present structure of the industry, points out shortcomings of the study, and suggests avenues where future research would be beneficial.

All data used in this study were from secondary sources. Most of the marketing and slaughtering data came from licensing and inspection agencies. The production information was obtained from the United States Census of Agriculture, 1964, Tennessee.

CHAPTER II

THEORETICAL FRAMEWORK

I. INTRODUCTION

The organization and control of the human and non-human resources determine who will produce, what will be produced, where production will take place, and how resources will be combined to satisfy the objectives of the firm or industry. In the case of the firm, this objective is usually taken to be to maximize net profits. In the case of the poultry and meat economy, this objective is to provide the consumer with a final product, in the form and at the time and place desired [6, p. 5]. Since the industry objective is not directly measurable as the net profit goal can be, other factors which do influence this objective and which are measurable, are used. These other factors include such variables as the number and size of the firm, location of production and processing to consuming areas, and the timing of production.

One approach to conducting market research has been within the framework of market structure analysis. This study would be classified as a part of this approach. Specifically, this study will be concerned with market structure.

II. MARKET STRUCTURE

In defining a theoretical model underlying market structure analysis, Clodius and Mueller attributed market structure, conduct and performance as the key concepts [7, p. 516]. Furthermore, these concepts

were said to be interrelated with the causation running from structure through conduct to performance [7, p. 516].

Market structure has been defined for practical purposes to mean ". . . those characteristics of the organization of the market which seem to influence strategically the nature of competition and pricing within the market" [7, p. 516]. The characteristics most emphasized are the following:

1. The degree of seller concentration, described by the number and size distribution of sellers in the market.
2. The degree of buyer concentration, defined in the same fashion.
3. The degree of product differentiation. . . the extent to which their (seller) outputs (though similar) are viewed as nonidentical by buyers.
4. The condition of entry to the market, referring to the relative ease or difficulty with which new sellers may enter the market as determined generally by the advantages which established sellers have over potential entrants [3, p. 8].

This study will provide information on the degree of buyer and seller concentration by determining the number, location, and when available, the size of the firms in each sector. By also identifying the location of firms, we can approximate the area the market encompasses. The higher the degree of competition or the lower the concentration within a sector, the smaller the influence each firm will have on the market. This usually is illustrated by the large number of small producers of livestock. Each firm cannot appreciably affect the price of his product. The buyers of livestock on the other hand, are more concentrated. A few firms slaughter and process meat which means the

buyers of the livestock can to some extent affect the prices they pay. The structural variables of number, size, and location play an important role in determining the degree of competition in the market.

Another characteristic which affects the degree of competition between firms in a sector, is the degree of product differentiation. The closer the products of different firms resemble each other, or the more homogeneous the output of these firms, the less the degree of product differentiation. This characteristic is important because if a firm can produce a product with some advantageous characteristic, the firm can isolate a part of the sectors market for itself. The degree of product differentiation at the production level is nil. Cattle are graded in the market into certain classifications, with the producer having some control over the grade, by his buying of feeder calves and feeding ability, but no differentiation from other producers of the same grade of cattle. To a large extent the slaughtering sector also sells a homogeneous product. The degree of product differentiation by firms is not appreciable until brand name products are sold at the wholesale market.

The last characteristic listed referred to the relative ease of entry by firms into the market. This characteristic is very important in determining the structural variables of the industry. The barriers to entry are three general types [3, pp. 239-242]. The first being the degree of product differentiation, where the existing firms have an established market and new entrants in the market will have difficulty in establishing a market for their product. This factor will not be very restrictive for the sectors under study, because of the homogeneity

of the products sold. More important to the discussion is the second type of barrier. This restriction deals with the cost and/or technique of production. A good example of this factor is the requirement made on present and future firms in the slaughtering and processing sector, as they are set forth in the Tennessee Meat and Poultry Inspection Act. This Act requires present and future slaughtering and processing firms to use sanitary facilities and practices, and to have the live animal, as well as the carcass, inspected. To firms which do not presently have acceptable facilities, this would require additional costs in remodeling or replacing their present facilities. For firms entering into slaughtering and/or processing, the facilities must be constructed to meet the requirements of the law, therefore in all probability increasing costs of construction. In addition, the techniques used may be altered by the necessity of timing slaughtering and maintaining sanitary equipment and facilities. Since inspectors are available for only certain times during the week for small firms, this may place a restriction on the number of animals that can be scheduled for slaughtering. Maintaining sanitary equipment and facilities may require more labor in the production phase, or in general. Both of these restrictions may be reduced by the next barrier to entry.

The last barrier to entry is concerned with the ". . . economics of large scale production and distribution" [3, p. 241]. This factor is important in determining size, number, and location. The location of firms slaughtering and/or processing animals is determined by the cost of transportation of the inputs, and for distribution of the outputs. If the unit cost of transportation can be reduced by expanding the volume

then economies of size are present. If increasing the volume of production results in a per unit decrease in costs, there are economies of size in production. Smaller size plants are in a substantial cost disadvantage relative to the large slaughtering plants [11, p. 22]. Therefore, economies of size are present for the smaller firms in this sector. Moreover, by placing additional restrictions on firms, such as the Tennessee Meat and Poultry Inspection Act does, this may result in the decline in the number of firms, but increase the size of the firms which remain. While the cost of remodeling a facility may not be economically feasible at the present volume of output, economies of size may permit the firm to expand and remain in business.

To adequately describe the difficulty of entry by a firm into any of the three sectors, would require more detailed information on costs of operation by size and location. The structural variables do provide a starting point for examining this problem, however.

The conduct and performance of a market are also highly affected by the structural variables. This interrelationship will be discussed in the remaining sections of this chapter.

III. MARKET CONDUCT

This concept refers to the "... pattern of behavior which enterprises follow in adapting or adjusting to the markets in which they sell or buy" [7, p. 517]. The main element in this concept is the behavior of the firm in determining output and prices. Nielson and Sorenson place the variable pertinent to looking at firm behavior into three general categories: outcomes, behavioral variables, and a

set of variables that specify the internal and external conditions facing the firms [14,p. 71].

Outcomes are defined as the actual results of the action taken. These outcomes take the form of changes in earnings, costs, market growth, market power, and adjustments in the organization [14, p. 71].

The behavioral variables are identified as ". . . those factors that can be manipulated by the firm to attain ends sought" [14, p. 71]. These variables include prices, what and how much to produce, and the size and organization of the firm [14, p. 71]. No general theory of pricing has been found totally acceptable except in the case of pure competition or monopoly. In this industry neither of these extremes are present so that relative bargaining power may be the dominate force in setting prices. In an industry where there is an abundant supply situation, as in agriculture, the firms in the sector closest to the consumer tend to have the greatest bargaining strength [11, p. 49]. Furthermore, it has been found that ". . . the most significant and sensitive market in the livestock-meat economy is for dressed meat at wholesale" [11, p. 55]. This suggests that prices are determined by the consumer at the retail level, with the sector prices derived from this retail price. However, short run fluctuations in prices are handled mostly in the wholesale market.

There seems to be economies of size at the farm level, as attested by the declining number of livestock farms, with a sharp increase in average size [31, p. 29]. These economies seem to have been exhausted by the packing industry. Since World War II, the number of packing firms have increased while the volume of the largest four firms have

declined [11, p. 7]. Marketing agencies have also undergone drastic changes during this period. The trend has been toward smaller direct buying agencies near the source of supply [11, pp. 2-4].

The internal conditions affecting the firm include the quality and the quantity of resources available, organizational structure of the firm, and the goals or objectives sought by the firm [14, p. 71]. The resources are classified into land, labor, capital, and management. Land and labor are self-explanatory, while capital includes not only operating cash, but more importantly, the buildings, equipment, and inventories. The management input arises because of risk and uncertainty and, therefore, is defined as the decision making entity of the firm. Although land, labor, and capital can easily be put into quantity figures--acres, hours, and dollars--the quality of the inputs are more difficult to ascertain. The management input has defied a clear and accurate method of identifying and measuring the quantity and quality of this input. To circumvent this problem, the usual method of handling this input is to assume the quantity and quality of the input is fixed to the firm, or the quantity is fixed while the quality is separated into levels, such as low, medium, and high, for analysis.

The objective of the firm in most economic studies is taken to be to maximize net income. Other objectives have been suggested, such as expansion of sales, maintaining a competitive position in the market, or satisficing, expending only the effort necessary to maintain a satisfactory level of income [4, pp. 296, 308].

The external conditions refer to the environment in which the firms operate. These external conditions are classified into four general

categories: physical environment, government and institutional environment, cultural environment, and economic and market environment [14, p. 71]. The physical environment is the climate, rainfall, and topography. The government and institutional environment refers to the laws and agencies that regulate such things as the inspection of food used for human consumption, the inspection of facilities used in processing, restricting monopoly pricing and limiting the importation of meat. Cultural environment centers around people's beliefs and values in a society. Finally, the economic and marketing environment is the interrelationship of all firms in buying and selling, and the state of the national economy.

The structural variables of number, size, and location determine, and are determined by the market conduct of firms in an industry. The outcomes of actions taken depend on those variables a firm can control directly (behavioral variables), manipulate indirectly (internal conditions), and those variables determined outside the firm (external conditions). The size of the firm is limited by the availability of resources, which is also a factor in determining the location of the firm. External conditions determine the demand for the product. The demand for the product determines the supply or the volume of production for the industry. The volume of output is determined by the number and size of the firms in each sector.

IV. MARKET PERFORMANCE

Market performance refers to how well an industry or sector is able to fulfill its functions or objectives. These objectives are measured in terms of some level of optimum of efficiency, progressiveness,

or stability [7, p. 517]. Because market performance takes into account the changing goals of society, performance is considered a more dynamic concept than efficiency [13, p. 12]. On the other hand, many definitions of efficiency could easily fit our conception of performance. Because of the importance and the usefulness of the concept of efficiency, the remainder of this section will deal with defining and discussing various aspects of efficiency.

The Concept of Efficiency

Efficiency in the usual sense is visualized as a ratio of output per unit of input, or inputs per unit of output [31, p. 121]. In defining efficiency this way, both inputs and outputs are measured in physical terms. A feeding ratio is the pounds of feed fed relative to the pounds of meat produced. If this ratio is 3.5 to 1 for pork, this means it requires 3.5 pounds of feed inputs to produce one pound of pork. If this ratio should fall, however, such as using a superior feed, or a superior type hog, this does not necessarily mean the more efficient ratio is the "best" method of production. Best is used here to mean the most profitable. The more efficient type of hog may require more labor, or use the feeding facilities for a longer time, reducing hog volume. The increased cost of the superior feed may more than offset the efficiencies gained.

From the above discussion, it becomes apparent that to measure technical efficiency accurately, all the inputs must be included on one side, while all the final, as well as any other outputs, must be included on the output side. For example, the slaughter plant uses not only the raw product input, for example, a live hog, but also labor, equipment

time, miscellaneous supplies, and other resources, to produce not only the final products, the cuts of pork, but also sellable by-products such as meat scraps, fat, and hair.

Technical efficiency has only limited use by itself. Not only because of the difficulty of putting many different types of inputs into a common unit of measure, but more importantly because our primary concern is economic in nature. Only by attaching prices to the inputs and outputs can any relevant discussion of the efficiency of an operation or the industry be carried out. Economic efficiency is concerned with reducing the cost of producing a given level of output, or producing a larger output for a given cost. The most efficient firm in the economic sense would be one which receives the maximum returns possible given the highest level of technology available, and the prices of inputs and outputs.

The Tennessee Meat and Poultry Inspection Act should have an affect on the economic efficiency of the firms and the sector at the slaughtering and processing level. First of all, this law will probably reduce the number of plants in the sector. This will be the case where the cost of remodeling the facilities to meet standards, are so high the firm ceases operation, or meets the lower standards for custom slaughtering. Secondly, for those firms which must make changes in their operation, the incentive should be present to take advantage of any economies of size that may be present. As was mentioned before, these economies are present for the smaller size operations. Finally, new firms must enter, or the present firms must increase output to replace firms leaving the sector. This should also be an incentive to take advantage of any economies of size.

Operational and Pricing Efficiency

The above discussion of efficiency has been more in terms of what is usually called operational efficiency. Operational efficiency involves the effectiveness in which the market system ". . . adds for the benefit of consumers, the conventional form, time, and place utilities to raw farm products through assembly, storing, transportation, distribution and similar operations" [8, p. 425]. This concept of efficiency is concerned with the cost of performing the production activities.

Pricing efficiency is concerned with the price setting mechanism. This concept ". . . is concerned with improving the operation of the buying, selling, and pricing aspects of the marketing process so that it will remain responsive to consumer direction" [9, p. 11]. One function of the pricing mechanism is to transmit information. The effectiveness, the rapidity, and the accuracy with which the market system develops and disseminates this information, and the cost associated with this function is the essence of pricing efficiency [31, p. 122].

The concepts of operational and pricing efficiency are interdependent. For example, how soon changes in consumer taste and preferences are recognized, and production changes made in the industry, determine to some degree the operational efficiency of the firms. This has led many to reject the dichotomous classification and define efficiency into a single concept ". . . as the ratio of ends to resources" [10, p. 70].

Micro and Macro Efficiency

Micro efficiency refers to a measure of the efficient operation of a firm. Macro efficiency refers to a measure of efficiency of all the firms in the industry. Micro efficiency is concerned with the operational efficiency of a firm. That is, how well is the firm able to integrate and aggregate all the many different operating stages? The optimal level of micro efficiency is attained at the minimum point on the long run average cost curve of the firm, given technical and price coefficients [13, p. 9].

Macro efficiency can be described in much the same terms as micro. The industry is made up of many firms with each firm having its own average long run cost curve. The industry cost curve will be the sum of these individual curves. The most efficient industry then is one which includes those firms operating at the minimum point on the industry planning curve.

V. SUMMARY

What this chapter attempted to accomplish was to present the theoretical framework of market structure analysis. Key concepts of this framework included the identification and inclusion of market structure, conduct, and performance of the industry. For the most part, this study will be concerned with describing the structure of the poultry and livestock-slaughter industry, but the interrelated factors of conduct and performance will also be present. For this reason, all the various roles were discussed.

CHAPTER III

PRODUCTION OF LIVESTOCK AND POULTRY IN TENNESSEE

I. INTRODUCTION

Livestock are found on a majority of farms in Tennessee. About 83 percent or some 110,617 farms in Tennessee had some species of livestock on hand in 1964 [30, p. 348]. Enumerating by category, over 75 percent of all farms had some cattle and/or calves, 41 percent had some hogs and pigs, and a little over two percent had some sheep and lambs on hand (Table III). For farms classified as commercial¹, these percentages were even higher.

More important than number on hand is the number of head sold and the value of these sales. In 1964, over one million head of cattle and calves were sold for over \$90 million (Table IV). Almost 1.5 million pigs and hogs were sold for over \$34.5 million. Approximately 36 million broilers added another \$16.6 million to sales. Sheep and lambs sold live, and hens and roosters sold for slaughter added about \$3.5 million to bring the total from the sale of live animals and poultry for slaughter from all farms in Tennessee to almost \$145 million. The estimated value of all farm products sold in 1964 was almost \$529 million [30, p. 50]. Therefore, livestock and poultry sales accounted for about 27.4 percent of the income from farm production to Tennessee farmers in 1964.

¹Farms were classified as commercial if total sales were \$2,500 or more, or if the operator was under 65 years of age, worked less than 100 days off the farm, and had sales of \$50 to \$2,499.

TABLE III

THE NUMBER AND PERCENTAGE OF ALL FARMS AND COMMERCIAL FARMS
HAVING ON HAND SOME CATTLE AND CALVES, HOGS AND PIGS,
AND SHEEP AND LAMBS IN TENNESSEE IN 1964

Item	Number	Percent
All Farms	133,446	100.0
Farms with Cattle and Calves	100,666	75.4
Farms with Hogs and Pigs	55,403	41.5
Farms with Sheep and Lambs	2,946	2.2
Commercial Farms	76,352	100.0
Farms with Cattle and Calves	58,555	76.7
Farms with Hogs and Pigs	37,033	48.5
Farms with Sheep and Lambs	2,112	2.8

Source; United States Department of Commerce, United States Census of Agriculture, 1964, Tennessee, Vol. I, Part 31, Bureau of the Census (Washington: Government Printing Office, 1966), pp. 7, 12, 222, 232, 234.

TABLE IV

THE NUMBER, VALUE, AND PERCENT OF TOTAL VALUE FOR EACH
SPECIES OF LIVESTOCK AND POULTRY SOLD FROM ALL FARMS
AND FROM COMMERCIAL FARMS IN TENNESSEE IN 1964

Item	Number (Head)	Value (\$1,000)	Percent of Total Value
<u>All Farms</u>			
Livestock Sold ^a			
Cattle and Calves	1,058,486	90,236	62.3
Hogs and Pigs	1,478,932	34,479	23.8
Sheep and Lambs	83,778	1,241	0.9
Poultry Sold ^b			
Broilers	36,220,128	16,661	11.5
Hens and Roosters	2,670,938	2,331	1.6
Total	41,512,262	144,948	100.1 ^c
<u>Commercial Farms</u>			
Livestock Sold ^a			
Cattle and Calves	853,641	75,229	60.1
Hogs and Pigs	1,260,482	30,868	24.7
Sheep and Lambs	69,854	1,053	0.8
Poultry Sold ^b			
Broilers	36,189,830	16,647	13.3
Hens and Roosters	2,561,155	1,306	1.0
Total	40,934,962	125,103	99.9 ^c

^aSold live.

^bSold for slaughter.

^cPercentages do not add to 100.0 because of rounding.

Source: United States Department of Commerce, United States Census of Agriculture, 1964, Tennessee, Vol. I, Part 31, Bureau of the Census (Washington: Government Printing Office, 1966), pp. 13, 234.

Although only 57 percent of all farms were classified as commercial, these farms produced 86 percent of the income from sales of livestock. Because commercial farms produced most of the livestock and almost all the poultry sold, commercial farm data will be used whenever possible.

Since very few sheep or lambs are sold in Tennessee, a discussion of this species was omitted.

The data used in this chapter were taken from the 1964 Census of Agriculture, the latest source available by county for Tennessee.

The remainder of this chapter will be concerned with determining the number of cattle and calves, hogs and pigs, and broilers and slaughter hens and roosters by location, and the average size and size distribution of the production unit.

II. CATTLE AND CALF PRODUCTION

Before discussing numbers and size, it should be noted that cattle and calf sales reported in this section include not only beef but also dairy animals. Furthermore, these statistics include animals sold for resale, as well as animals sold for slaughter. This mixture of categories can provide some general information on production however, which is the aim of the remainder of this section.

Number and Location of Production

The data in Table V provides the number of commercial farms selling some cattle and calves, the total number sold, and the average number of cattle and calves sold per farm, by county, area, and the state in 1964. The next table (Table VI) contains the percent of farms and the percent of the total head sold from each area, for cattle and calves. Figure 1

TABLE V

THE TOTAL NUMBER OF COMMERCIAL FARMS SELLING LIVE CATTLE OR CALVES, THE TOTAL NUMBER OF HEAD SOLD, AND THE AVERAGE NUMBER OF HEAD SOLD PER FARM, BY AREA AND COUNTY IN TENNESSEE IN 1964

Area and County	Cattle			Calves		
	Farms Selling Some	Total Head Sold	Average Number Sold Per Farm	Farms Selling Some	Total Head Sold	Average Number Sold Per Farm
-----Number-----						
<u>East Tennessee</u>						
Anderson	116	1,040	8.97	162	1,627	10.04
Bledsoe	150	2,477	16.51	221	3,740	16.92
Blount	286	4,073	14.24	391	5,958	15.24
Bradley	208	1,633	7.85	328	4,384	13.37
Campbell	144	1,385	9.62	227	1,599	7.04
Carter	139	981	7.27	209	1,868	8.94
Claiborne	461	2,500	5.42	1,021	6,847	6.71
Cocke	245	1,509	6.16	602	4,793	7.96
Grainger	338	1,987	16.94	680	5,316	7.82
Greene	1,316	6,070	4.61	2,306	22,178	9.62
Hamblen	259	3,508	13.54	455	5,285	11.62
Hamilton	111	1,111	10.01	188	2,824	15.02
Hancock	260	2,151	8.27	558	3,217	5.77
Hawkins	526	3,479	6.61	1,035	9,097	8.79
Jefferson	387	3,515	9.08	611	7,780	12.73
Johnson	283	2,404	8.49	468	2,974	6.35
Knox	313	3,426	10.95	434	5,360	12.35
Loudon	258	2,925	11.34	364	4,848	13.32
McMinn	301	2,626	8.72	489	7,126	14.57
Marion	105	998	9.50	173	2,243	12.97
Meigs	102	901	8.83	174	2,549	14.65
Monroe	331	2,334	7.05	551	7,136	12.95
Morgan	82	410	5.00	115	938	8.16
Polk	49	846	17.27	86	1,282	14.91
Rhea	89	750	8.43	174	2,626	15.09
Roane	148	1,124	7.59	240	2,490	10.38
Scott	60	393	6.55	115	1,226	10.66
Sequatchie	51	759	14.88	90	1,965	21.83
Sevier	359	3,614	10.07	587	5,945	10.13
Sullivan	367	3,013	8.21	638	6,994	10.96
Unicoi	43	220	5.12	120	480	4.00
Union	139	557	4.01	262	2,335	8.91
Washington	564	4,538	8.05	920	12,724	13.83
Area	8,590	69,257	8.06	14,994	157,754	10.52

TABLE V (CONTINUED)

Area and County	Cattle			Calves		
	Farms	Total	Average	Farms	Total	Average
	Selling Some	Head Sold	Number Sold Per Farm	Selling Some	Head Sold	Number Sold Per Farm
-----Number-----						
Middle Tennessee						
Bedford	525	5,131	9.77	769	12,092	15.72
Cannon	255	1,632	6.40	414	4,123	9.96
Cheatham	158	1,054	6.67	231	2,665	11.54
Clay	216	1,030	4.77	434	3,702	8.53
Coffee	388	3,741	9.64	541	6,638	12.27
Cumberland	152	1,311	8.63	275	3,433	12.48
Davidson	210	3,562	16.96	287	6,025	20.99
DeKalb	308	1,901	6.17	555	6,011	10.83
Dickson	286	2,615	9.14	431	6,034	14.00
Fentress	145	1,036	7.14	317	3,813	12.03
Franklin	415	3,567	8.60	654	8,562	13.09
Giles	639	5,728	8.96	987	13,695	13.88
Grundy	86	542	6.30	145	1,513	10.43
Hickman	231	2,999	12.98	296	4,455	15.05
Houston	75	534	7.12	124	1,570	12.66
Humphreys	144	1,226	8.51	237	3,219	13.58
Jackson	270	1,203	4.46	649	5,776	8.90
Lawrence	456	2,787	6.11	666	4,850	7.28
Lewis	58	392	6.76	102	1,213	11.89
Lincoln	594	4,188	7.05	1,078	14,390	13.35
Macon	431	1,742	4.04	922	6,505	7.06
Marshall	453	3,833	8.46	621	9,859	15.88
Maury	672	7,013	10.44	931	13,883	14.91
Montgomery	368	4,454	12.10	651	11,582	17.79
Moore	131	1,818	13.88	204	2,704	13.24
Overton	227	1,316	5.80	468	4,841	10.34
Perry	106	1,028	9.70	175	2,041	11.66
Pickett	77	344	4.47	209	2,773	13.27
Putnam	332	2,318	6.98	570	5,014	8.80
Robertson	609	4,725	7.76	1,041	16,547	15.90
Rutherford	655	7,182	10.96	871	12,306	14.13
Smith	528	2,950	5.59	996	11,314	11.36
Stewart	141	898	6.37	222	2,004	9.03
Sumner	724	9,484	13.10	1,099	14,270	12.98
Trousdale	177	1,074	6.07	338	3,788	11.21
Van Buren	57	215	3.77	122	1,534	12.57
Warren	385	2,581	6.70	672	9,238	13.75
Wayne	192	1,218	6.34	300	2,833	9.44
White	298	2,023	6.79	581	7,452	12.83
Williamson	584	7,561	12.95	838	15,645	18.67
Wilson	603	5,655	9.38	907	13,788	15.20
Area	13,361	115,611	8.65	21,930	283,700	12.93

TABLE V (CONTINUED)

Area and County	Cattle			Calves		
	Farms	Total	Average	Farms	Total	Average
	Selling Some	Head Sold	Number Sold Per Farm	Selling Some	Head Sold	Number Sold Per Farm
-----Number-----						
<u>West Tennessee</u>						
Benton	104	580	5.58	207	1,847	8.92
Carrol	440	2,702	6.14	699	7,090	10.14
Chester	154	703	4.56	284	1,717	6.05
Crockett	324	3,039	9.38	563	6,397	11.36
Decatur	162	1,199	7.40	260	2,648	10.18
Dyer	423	7,698	18.18	521	8,758	16.81
Fayette	419	3,430	8.19	681	12,435	18.26
Gibson	730	7,920	10.85	1,156	12,552	10.86
Hardeman	292	2,971	10.17	473	5,938	12.55
Hardin	177	1,137	6.42	338	2,771	8.20
Haywood	328	2,513	7.66	643	8,229	12.80
Henderson	323	2,215	6.86	551	4,054	7.36
Henry	450	14,314	31.81	628	7,365	11.73
Lake	19	122	6.42	18	213	11.83
Lauderdale	290	3,580	12.34	438	6,091	13.91
McNairy	218	827	3.79	439	2,165	4.93
Madison	304	5,069	16.46	549	6,726	12.25
Obion	520	11,700	22.50	739	13,333	18.04
Shelby	313	13,680	43.71	392	6,351	16.20
Tipton	359	3,183	8.87	536	6,592	12.30
Weakley	688	5,700	8.28	952	9,765	10.26
Area	7,037	94,282	13.40	11,067	133,037	12.02
<u>State</u>	28,988	279,100	9.63	47,991	574,491	11.97

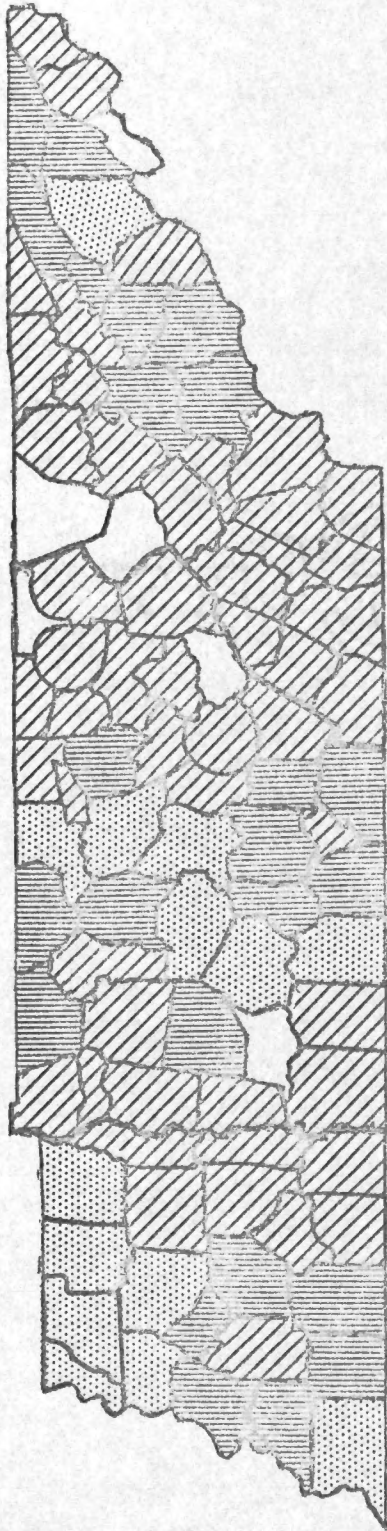
Source: United States Department of Commerce, United States Census of Agriculture, 1964, Tennessee, Vol. I, Part 31, Bureau of the Census (Washington: Government Printing Office, 1966), pp. 294-303.

TABLE VI
THE PERCENT OF COMMERCIAL FARMS SELLING SOME, AND
THE PERCENT OF TOTAL HEAD SOLD, OF CATTLE OR
CALVES BY AREA FOR TENNESSEE IN 1964

Area	Cattle		Calves	
	Farms Selling Some	Total Head Sold	Farms Selling Some	Total Head Sold
	-----Percent-----			
East	29.6	24.8	31.2	27.5
Middle	46.1	41.4	45.7	49.4
West	24.3	33.8	23.1	23.2
Tennessee	100.0	100.0	100.0	100.1 ^a

^aPercent did not add to 100.0 because of rounding.

Source: Calculated from Table V, pages 23-25.



Legend

-  Very small: 422 head or less
-  Small: 423 to 2937 head
-  Medium: 2938 to 5454 head
-  Large: 5455 head or more

Figure 1. The number of live cattle sold from commercial farms by category for each county in Tennessee in 1964.

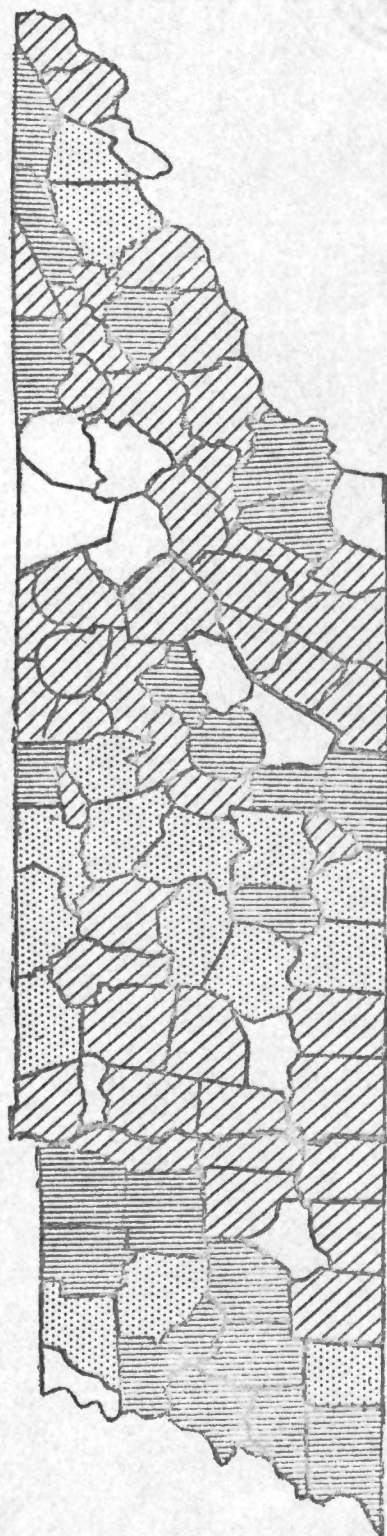
Source: Table V, pages 23-25.

and Figure 2 identify the range of total cattle and calf sales within which each county falls. The heavy lines in the figures separate the three areas---East, Middle, and West Tennessee---by the usual delineation.

The average number of cattle sold per county for the state was 2,938 head, with the range from 122 to 14,314 head. The average number of calves sold per county was 6,047 head. The range in calf sales was from 213 to 22,178 head.

An average of 2,099 head of cattle was sold per county from the East Tennessee area. This was 24.8 percent of the cattle marketed in Tennessee in 1964. Most of the counties were included in the small or very small category in Figure 1, with only nine counties having sales above the state average. In Middle Tennessee the average number of cattle sold per county was 2,820 head. This area contains 41 counties, and had a range in sales from 215 to 9,484 head. Middle Tennessee sold 41.4 percent of the cattle marketed in Tennessee. The highest concentration of cattle numbers was in the middle counties of this area as shown in Figure 1. West Tennessee sold the remaining 33.8 percent of the cattle market in the state. The average number of cattle sold from these 21 counties was 4,490 head. The range in sales was from 122 to 14,314 head, with a third of these counties selling 78 percent of the cattle. The western and upper section of this area had the highest concentration of cattle sold.

Looking at the characteristics in regard to calves, East Tennessee sold an average of 4,780 head per county. The range in numbers was from 480 to 22,178 head. This area sold 27.5 percent of all the calves marketed from commercial farms in Tennessee in 1964. Most of these counties were small or very small in terms of number of head sold, as



Legend

-  Very small: 1732 head or less
-  Small: 173 to 6046 head
-  Medium: 6047 to 10,362 head
-  Large: 10,363 head or more

Figure 2. The number of live calves sold from commercial farms by category for each county in Tennessee in 1964.

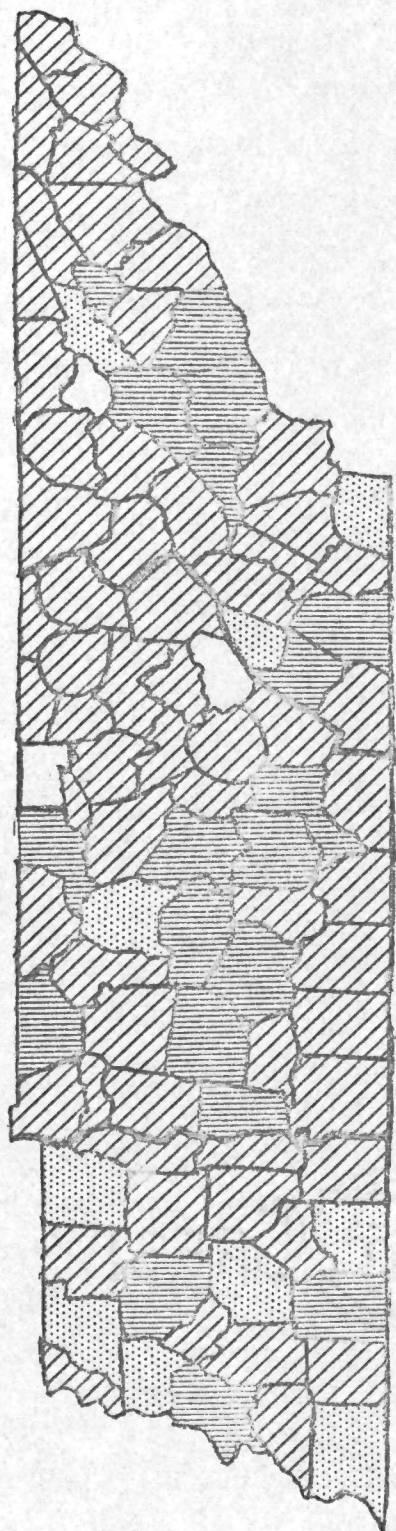
Source: Table V, pages 23-25.

shown in Figure 2. A little over half of the counties of Middle Tennessee sold almost 80 percent of the calves from this area. The highest concentration of calves sold per county included those counties in the middle section of this area (Figure 2, p. 29). The lowest concentration was along the western and upper eastern section of this area. The average number of calves sold for all counties in this area was 6,920 head. The Middle Tennessee area accounted for some 50 percent of the calves marketed in Tennessee in 1964. In West Tennessee the average number of calves sold per county was 6,335 head. The range in numbers was from 213 to 13,333 head per county. This area sold 23.2 percent of the calves marketed in the state. A majority of the counties sold above the state average for number of calves sold per county. The exceptions being Lake county and the counties located in the southeastern section of the area (Figure 2, p. 29).

Average Size and Size Distribution of Production Units

Two measures will be used in discussing the size of the production units. The first will be the average number of cattle or calves sold per farm by county, area, and the state. This information is for commercial farms and is contained in Table V, and illustrated in Figures 3 and 4. The other measure will be the size distribution given as the number of farms falling into the classification of selling 1 to 4, 5 to 19, 20 to 99, and 100 or more head of cattle and calves by county, area, and the state. The first measure will be for commercial farms. The second measure was only available for all farms and is found in Tables VII and VIII.

The average number of cattle sold per commercial farm reporting



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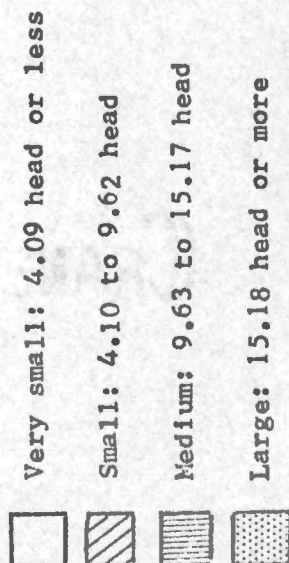
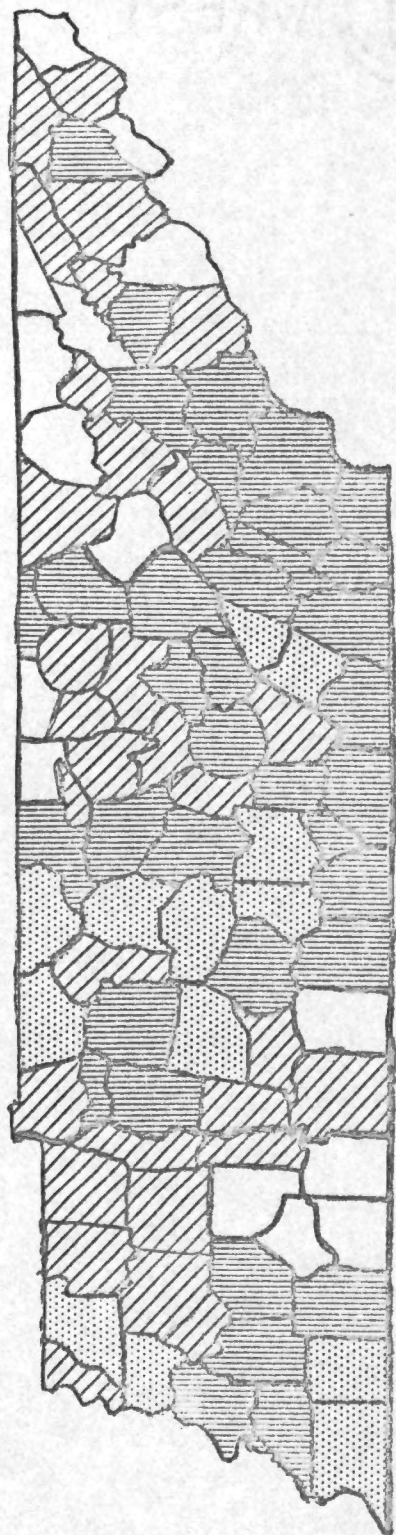


Figure 3. The average number of cattle sold per commercial farm by category for each county in Tennessee in 1964.

Source: Table V, pages 23-25.



Legend

-  Very small: 8.56 head or less
-  Small: 8.57 to 11.96 head
-  Medium: 11.97 to 15.36 head
-  Large: 15.37 head or more

Figure 4. The average number of calves sold per commercial farm by category for each county in Tennessee in 1964.

Source: Table V, pages 23-25.

TABLE VII

NUMBER OF FARMS SELLING CATTLE OR CALVES BY CATEGORY OF NUMBER OF HEAD SOLD,
BY AREA AND COUNTY FOR ALL FARMS IN TENNESSEE IN 1964

Area and County	Cattle				Calves			
	Number of Head Sold				Number of Head Sold			
	1 to 4	5 to 19	20 to 99	100+	1 to 4	5 to 19	20 to 99	100+
-----Number of Farms-----								
East Tennessee								
Anderson	209	66	8	3	235	151	29	1
Bledsoe	127	63	24	5	142	156	72	3
Blount	389	176	46	8	480	382	118	3
Bradley	234	96	21	1	268	239	75	3
Campbell	166	81	17	1	271	131	25	-
Carter	187	97	12	-	335	162	28	1
Claiborne	490	112	26	1	971	492	60	3
Coke	315	67	11	2	545	358	54	2
Grainger	387	113	21	1	632	423	59	-
Greene	1,354	336	51	2	1,355	1,634	250	4
Hamblen	280	104	15	1	348	319	80	1
Hamilton	154	73	16	1	192	201	45	3
Hancock	264	59	29	2	538	210	37	-
Hawkins	604	169	20	3	940	635	106	3
Jefferson	402	184	28	2	487	475	120	2
Johnson	259	129	27	2	554	222	21	1
Knox	473	184	51	3	591	440	96	3
Loudon	255	124	19	6	285	309	89	-
McMinn	323	138	29	2	443	351	134	5
Marion	120	43	11	1	119	162	42	-
Meigs	94	47	9	1	110	119	46	2
Monroe	378	140	24	-	517	399	115	2
Morgan	123	32	4	-	163	83	9	1
Polk	63	29	9	2	102	67	19	2

TABLE VII (CONTINUED)

Area and County	Cattle				Calves			
	Number of Head Sold				Number of Head Sold			
	1 to 4	5 to 19	20 to 99	100+	1 to 4	5 to 19	20 to 99	100+
	-----Number of Farms-----				-----			
Rhea	117	43	10	-	152	157	39	3
Roane	222	60	16	1	236	205	43	-
Scott	75	29	4	-	120	82	15	1
Sequatchie	47	25	8	1	62	61	36	2
Sevier	432	179	55	1	678	407	77	4
Sullivan	503	181	45	1	704	467	90	3
Unicoi	62	17	3	-	182	36	5	-
Union	192	33	5	-	297	159	23	1
Washington	561	216	50	6	685	680	155	2
Area	9,883	3,445	724	60	13,719	10,374	2,212	61
Middle Tennessee								
Bedford	497	238	62	5	335	735	224	3
Cannon	291	114	22	-	355	367	61	-
Cheatham	153	77	14	-	162	198	45	-
Clay	233	65	8	-	308	247	43	-
Coffee	354	176	61	3	395	422	99	4
Cumberland	189	61	13	2	289	209	66	1
Davidson	249	194	47	5	275	301	111	4
Dekalb	312	104	19	1	336	421	79	2
Dickson	330	132	33	1	375	391	92	8
Fentress	165	57	9	1	304	194	61	4
Franklin	390	214	41	1	400	530	140	3
Giles	633	314	66	5	565	919	240	5
Grundy	83	30	8	-	92	100	22	-
Hickman	217	130	51	-	244	246	61	7
Houston	91	45	6	-	99	111	19	1

TABLE VII (CONTINUED)

Area and County	Cattle					Calves				
	Number of Head Sold					Number of Head Sold				
	1 to 4	5 to 19	20 to 99	100+		1 to 4	5 to 19	20 to 99	100+	
	-----Number of Farms-----					-----				
Humphreys	177	83	16	-		99	111	19	1	
Jackson	300	83	10	-		456	460	72	2	
Lawrence	594	169	29	3		753	412	47	1	
Lewis	81	29	4	-		87	95	20	1	
Lincoln	608	225	45	2		533	883	238	3	
Macon	473	87	10	1		600	558	49	-	
Marshall	456	235	46	3		296	668	184	3	
Maury	568	319	87	9		473	774	248	6	
Montgomery	325	147	30	8		255	480	177	11	
Moore	150	44	29	3		139	219	47	-	
Overton	289	85	10	-		422	344	64	3	
Perry	115	50	10	1		116	150	29	-	
Pickett	89	21	3	-		182	117	39	3	
Putnam	453	138	23	2		604	412	64	1	
Robertson	445	240	46	2		367	648	261	9	
Rutherford	676	372	86	8		547	885	224	3	
Smith	515	168	25	3		403	822	145	2	
Stewart	157	48	10	-		165	153	26	-	
Sumner	700	298	78	13		768	752	195	10	
Trousdale	178	37	10	1		137	267	52	-	
Van Buren	78	14	3	-		96	116	22	-	
Warren	429	160	31	-		451	561	164	1	
Wayne	254	79	14	-		333	193	50	1	
White	319	102	24	-		389	435	122	2	
Williamson	446	302	81	9		377	661	226	12	
Wilson	659	297	72	4		487	974	260	1	
Area	13,721	5,783	1,292	96		14,171	17,633	4,451	118	

TABLE VII (CONTINUED)

Area and County	Cattle				Calves			
	Number of Head Sold				Number of Head Sold			
	1 to 4	5 to 19	20 to 99	100+	1 to 4	5 to 19	20 to 99	100+
-----Number of Farms-----								
West Tennessee								
Benton	145	51	6	-	200	132	23	-
Carroll	458	149	26	2	503	414	96	2
Chester	170	35	7	-	233	134	17	-
Crockett	286	90	23	3	260	342	87	3
Decatur	176	69	16	1	201	184	44	-
Dyer	244	144	92	18	198	310	135	6
Fayette	375	141	38	5	396	338	174	18
Gibson	582	253	81	7	628	701	171	6
Hardeman	284	105	31	6	323	264	100	3
Hardin	177	56	11	1	290	178	30	-
Haywood	271	98	38	-	363	322	134	1
Henderson	285	113	23	2	397	295	39	-
Henry	358	226	48	3	402	435	104	4
Lake	9	8	2	-	7	6	5	-
Lauderdale	214	99	37	8	219	222	92	7
McNairy	217	56	9	-	392	159	13	-
Madison	262	101	27	6	310	309	100	6
Obion	286	230	101	20	231	505	226	9
Shelby	277	156	63	10	267	254	123	7
Tipton	300	147	33	3	312	365	112	2
Weakley	573	268	62	4	527	669	143	1
Area	5,949	2,595	774	99	6,659	6,538	1,968	75
State	29,553	11,823	2,790	255	31,204	34,545	8,631	254

Source: United States Department of Commerce, United States Census of Agriculture, 1964, Tennessee, Vol. I, Part 31, Bureau of the Census (Washington: Government Printing Office, 1966), pp. 358-367.

TABLE VIII

PERCENTAGE OF FARMS SELLING CATTLE OR CALVES BY CATEGORY
OF NUMBER OF HEAD SOLD, BY AREA FOR ALL
FARMS IN TENNESSEE IN 1964

Number of Head Sold	Area			
	East	Middle	West	State
	-----Percent-----			
Cattle				
1 to 4	70.0	65.7	63.2	66.5
5 to 19	24.4	27.7	27.7	26.6
20 to 99	5.1	6.2	8.2	6.3
100 +	0.4	0.5	1.1	0.6
Total	99.9 ^a	100.1 ^a	100.2 ^a	100.0
Calves				
1 to 4	52.0	39.0	43.7	41.8
5 to 19	39.4	48.5	42.9	46.3
20 to 99	8.4	12.2	12.9	11.6
100 +	0.2	0.3	0.5	0.3
Total	100.0	100.0	100.0	100.0

^aPercentages do not add to 100.0 because of rounding.

Source: Calculated from Table VII, pages 33-36.

sales, was 9.63 head for the state (Table V, p. 25). The vast majority of the counties had average farm sales of less than the state average (Figure 3, p. 31). For all farms in Tennessee reporting cattle sales, 66.5 percent of these farms sold less than five head of cattle (Table VIII, p. 37). Another 26.6 percent of the farms sold between 5 and 19 head. Only 6.3 percent of the farms sold between 20 and 99 head. The remaining 0.6 percent sold 100 or more head. Using all farm data would tend to increase the number of small farms, increasing the percentage in the lower categories. Even with these inflated statistics for the small farms, with a commercial farm average of less than 10 head, we can conclude that most farm production units are quite small.

Calf sales per farm reporting sales, averaged almost 12 head per commercial farm for the state (Table V, p. 25). Less than half of the counties had farm sales below this average (Figure 4, p. 32). Only 41.8 percent of all farms reporting sales, sold less than five head, while some 46.3 percent sold between 5 and 19 head (Table VIII, p. 37). The last two categories, 20 to 99, and 100 or more head, were 11.6 percent and 0.3 percent respectively.

Looking at the three areas of the state, an average of 8.06, 8.65, and 13.40 head of cattle per commercial farm was sold from East, Middle, and West Tennessee, respectively. The average number of calves sold was 10.52, 12.93, and 12.02 head in East, middle, and West Tennessee. The West Tennessee cattle farms were significantly larger in average sales than the other areas of the state. Middle and West Tennessee calf sales per farm were somewhat larger, but not significantly larger than East Tennessee.

The distribution of size moved from smaller to larger size operations in cattle sales moving from East to West areas. The percentage of farms selling over 100 head of cattle in West Tennessee more than doubled the East. Even so, the percentage of farms selling 100 or more cattle was very small, a little over one percent of all farms. The percentage of farms selling 20 to 99 head of cattle rose from 5.1 to 8.2 percent going from East to West. The first category (1 to 4 head) dropped from 70 percent in East to 63.2 percent in West.

The percentage changes for calves by area was not as noticeable. Middle Tennessee had the largest percentage of farms in the second category (5 to 19 head), and the smallest percentage in the first category (1 to 4 head), when categories are compared by areas. The western area had a high percentage of farms selling in the categories of five or more head than did the East. The percentage in the largest category (100 or more head) was more than doubled the East, while the 20 to 99 head category increased over half.

III. SWINE PRODUCTION

Number and Location of Production

The sale of live hogs and pigs were widely spread throughout Middle and West Tennessee (Table IX). The average number of swine sold per county from commercial farms for the state in 1964 was 13,268 head. The average for East Tennessee was only 2,907 head per county. Middle Tennessee sold an average of 15,464 head, while West Tennessee sold over 25,000 head of hogs and pigs per county. Figure 5 illustrates the concentration of hogs and pigs sold by county and area.

TABLE IX

THE TOTAL NUMBER OF SWINE SOLD, AND THE AVERAGE NUMBER SOLD PER FARM FROM COMMERCIAL FARMS, AND THE NUMBER OF FARMS SELLING SWINE BY CATEGORY OF NUMBER OF HEAD SOLD FOR ALL FARMS, BY AREA AND COUNTY FOR TENNESSEE IN 1964

Area and County	Commercial Farms		All Farms				
	Number	Average	Number of Hogs and Pigs Sold				
	of Live	Number					
	Hogs and Pigs Sold	Sold Per Farm	1-9	10-49	50-99	100-199	200+
-----Number of Farms-----							
East Tennessee							
Anderson	1,375	33.54	88	19	4	3	3
Bledsoe	12,141	68.21	33	138	54	39	7
Blount	6,500	69.15	79	73	23	10	7
Bradley	867	21.68	35	27	6	-	-
Campbell	918	16.69	51	26	3	-	1
Carter	290	14.50	19	14	2	-	1
Claiborne	1,591	13.26	99	52	6	1	-
Cocke	2,983	37.76	57	37	5	3	4
Grainger	2,499	22.51	91	52	11	5	-
Greene	5,408	21.04	160	135	19	10	1
Hamblen	5,729	43.08	39	88	28	12	2
Hamilton	2,499	48.06	39	47	14	5	3
Hancock	1,476	13.67	87	38	4	2	-
Hawkins	2,504	21.22	85	63	7	3	1
Jefferson	4,308	30.13	103	82	9	10	3
Johnson	620	24.80	19	14	3	-	1
Knox	4,419	45.56	76	88	18	7	3
Loudon	2,721	34.44	48	57	13	2	3
McMinn	2,677	44.62	63	34	7	1	4
Marion	4,060	42.74	27	89	20	9	2
Meigs	838	28.90	11	24	7	-	-
Monroe	2,680	32.68	57	52	12	5	3
Morgan	2,941	49.85	67	43	3	4	5
Polk	896	33.19	21	16	2	2	1
Rhea	2,607	46.55	28	46	11	7	3
Roane	2,932	42.49	52	45	12	5	3
Scott	3,055	46.29	43	53	12	7	3
Sequatchie	2,306	49.28	17	46	10	9	-
Sevier	7,047	37.89	127	122	27	11	4
Sullivan	2,568	25.68	83	58	9	5	2
Unicoi	177	12.64	16	11	-	-	-
Union	311	14.14	31	13	-	1	-
Washington	1,972	18.78	91	67	8	1	1
Area	95,925	34.67	1,942	1,769	369	179	71

TABLE IX (CONTINUED)

Area and County	Commercial Farms		All Farms				
	Number of Live	Average Number	Number of Hogs and Pigs Sold				
	Hogs and	Sold Per					
	Pigs Sold	Farm	1-9	10-49	50-99	100-199	200+
-----Number of Farms-----							
Middle Tennessee							
Bedford	19,873	48.83	100	378	77	34	10
Cannon	14,094	51.07	72	263	84	17	10
Cheatham	9,742	53.23	74	158	39	18	12
Clay	12,829	42.76	103	206	51	22	12
Coffee	19,510	52.73	108	340	120	39	13
Cumberland	10,806	65.49	85	177	54	19	9
Davidson	6,321	59.63	56	118	36	14	11
Dekalb	12,191	44.49	72	221	53	16	7
Dickson	14,402	62.35	105	235	54	17	13
Fentress	8,557	44.34	87	163	45	22	6
Franklin	22,693	57.31	100	322	85	38	21
Giles	20,633	50.20	131	334	98	31	12
Grundy	5,579	43.59	19	115	35	14	1
Hickman	27,728	96.95	71	191	91	62	33
Houston	3,472	41.83	41	70	16	7	2
Humphreys	18,294	96.79	55	173	53	28	19
Jackson	14,479	41.13	113	231	64	30	9
Lawrence	13,982	41.12	152	276	89	29	9
Lewis	2,832	38.27	31	82	17	6	1
Lincoln	26,737	49.70	137	392	107	39	19
Macon	11,071	29.84	144	247	56	17	2
Marshall	11,196	41.93	81	251	63	24	4
Maury	21,964	55.19	95	266	102	38	13
Montgomery	21,903	63.67	66	227	71	41	18
Moore	5,401	48.22	29	102	28	8	2
Overton	9,245	34.11	115	239	40	19	3
Perry	11,621	67.56	28	162	65	17	11
Pickett	6,367	43.02	59	102	24	14	4
Putnam	17,549	44.54	149	350	86	40	10
Robertson	26,837	46.67	147	363	76	47	21
Rutherford	26,100	55.06	133	468	109	58	22
Smith	32,744	58.46	73	416	116	55	20
Stewart	12,908	76.38	51	161	35	17	6
Sumner	20,272	49.32	135	310	82	19	19
Trousdale	4,790	44.77	35	67	27	9	2
Van Buren	4,796	53.29	23	93	23	11	2
Warren	20,431	50.45	128	368	108	43	14
Wayne	14,173	49.73	103	271	82	39	6
White	25,605	67.03	105	343	116	43	17

TABLE IX (CONTINUED)

Area and County	Commercial Farms		All Farms				
	Number of Live	Average	Number of Hogs and Pigs Sold				
	Hogs and	Number					
	Pigs Sold	Sold Per					
		Farm	1-9	10-49	50-99	100-199	200+
-----Number of Farms-----							
Williamson	20,550	58.38	97	254	73	41	16
Wilson	23,744	53.72	142	382	110	52	12
Area	634,021	52.69	3,650	9,887	2,759	1,154	453
<u>West Tennessee</u>							
Benton	7,854	46.20	51	162	45	13	5
Carroll	32,824	51.05	174	451	142	58	17
Chester	12,143	39.05	84	212	54	19	6
Crockett	10,698	35.31	109	174	37	10	11
Decatur	21,889	79.60	62	208	64	45	25
Dyer	21,518	53.13	71	253	73	39	15
Fayette	12,134	33.89	210	166	30	16	9
Gibson	67,961	71.54	154	603	195	116	63
Hardeman	19,896	58.01	117	218	56	24	20
Hardin	28,592	70.95	79	255	106	61	28
Haywood	10,969	26.05	177	243	35	19	3
Henderson	38,112	65.26	91	329	157	88	37
Henry	26,328	59.43	120	293	106	58	20
Lake	2,614	87.13	6	13	6	2	3
Lauderdale	13,393	38.05	139	209	40	17	11
McNairy	31,050	56.15	154	343	114	48	34
Madison	19,882	52.32	102	240	83	28	9
Obion	67,268	108.32	63	272	183	119	85
Shelby	5,433	31.40	107	124	18	9	7
Tipton	13,119	43.30	132	186	38	15	15
Weakley	66,859	83.57	130	532	209	121	58
Area	530,536	60.14	2,332	5,486	1,791	925	481
<u>State</u>	1,260,482	53.36	7,924	17,142	4,919	2,258	1,005

Source: United States Department of Commerce, United States Census of Agriculture, 1964, Tennessee, Vol. I, Part 31, Bureau of the Census (Washington: Government Printing Office, 1966), pp. 294-303, 358-367.

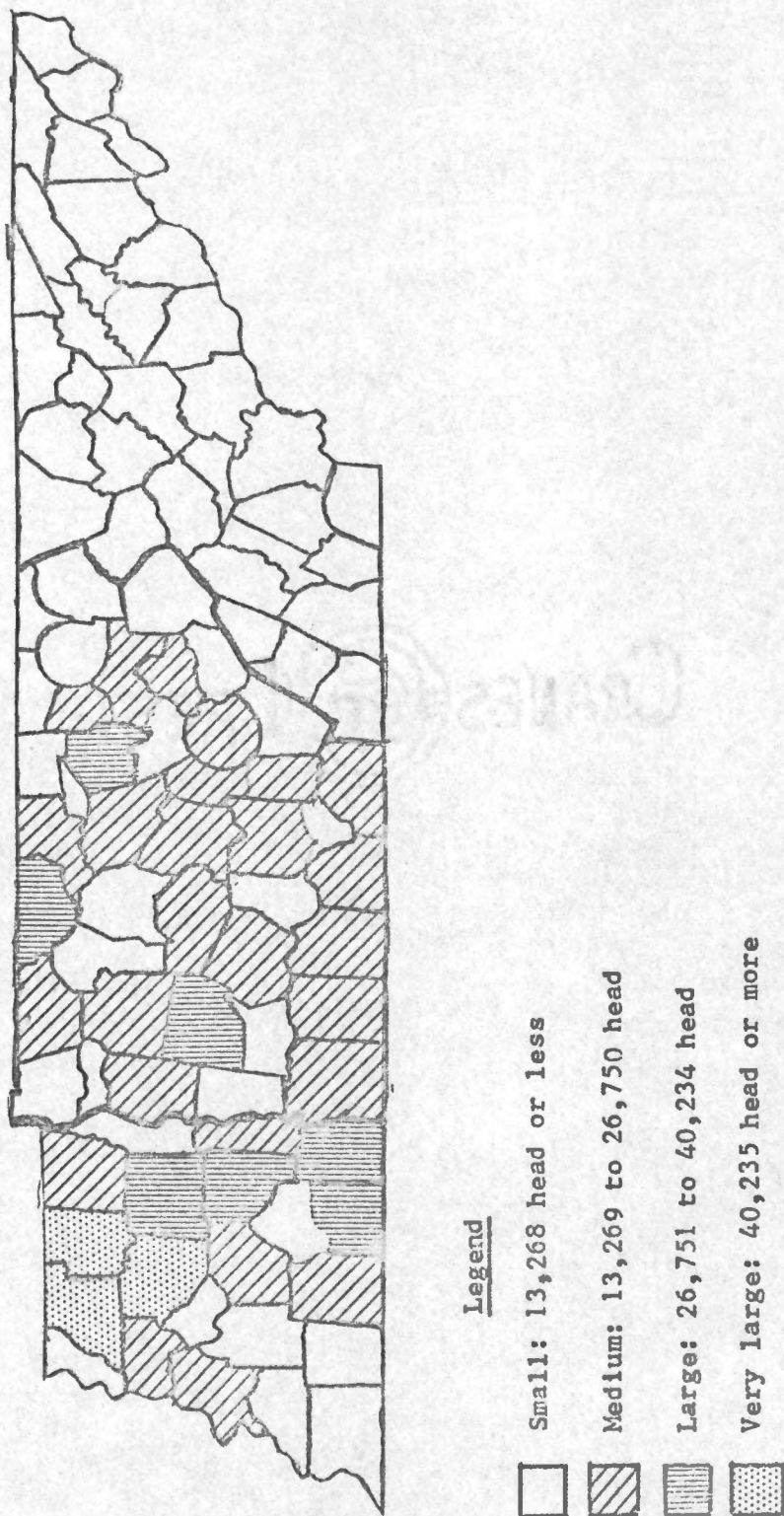


Figure 5. The number of live hogs and pigs sold from commercial farms by category for each county in Tennessee in 1964.

Source: Table IX, pages 40-42.

East Tennessee sold less than eight percent of all the hogs and pigs marketed in Tennessee in 1964 (Table X). Not one county in this area produced the state average per county of 13,268 head (Figure 5). A little over 50 percent of all the hogs and pigs sold in the state were from Middle Tennessee. Most of the counties in this area were classified as small or medium in size by total sales per county. The largest swine producing county in Middle Tennessee was Smith with 33,744 head sold. The remaining 42 percent of the swine sold in Tennessee were from West Tennessee. The largest swine producing counties in the state were the West Tennessee counties of Gibson, Obion, and Weakley which sold over 66,000 head per county. The Western area had counties with total sales from small through very large, however (Figure 5).

Average Size and Size Distribution of Production Units

The average sale per commercial farm reporting selling some swine was 53.36 head of hogs and pigs for Tennessee in 1964 (Table IX). The average number of hogs and pigs sold per commercial farm having some sales was 34.67, 52.69, and 60.14 head for East, Middle, and West Tennessee, respectively (Table IX). East Tennessee as would be expected, had the largest concentration of counties with very small production units (Figure 6). Middle Tennessee had a large number of counties in the upper Eastern section with small producers, a middle section containing mostly medium size units, with the largest units located along the western boundry, with the exception of White county in the eastern section. West Tennessee had the largest farms by county in the upper western section and the lower eastern counties of Decatur and Hardin. The smaller firms were located in the lower western section of the area.

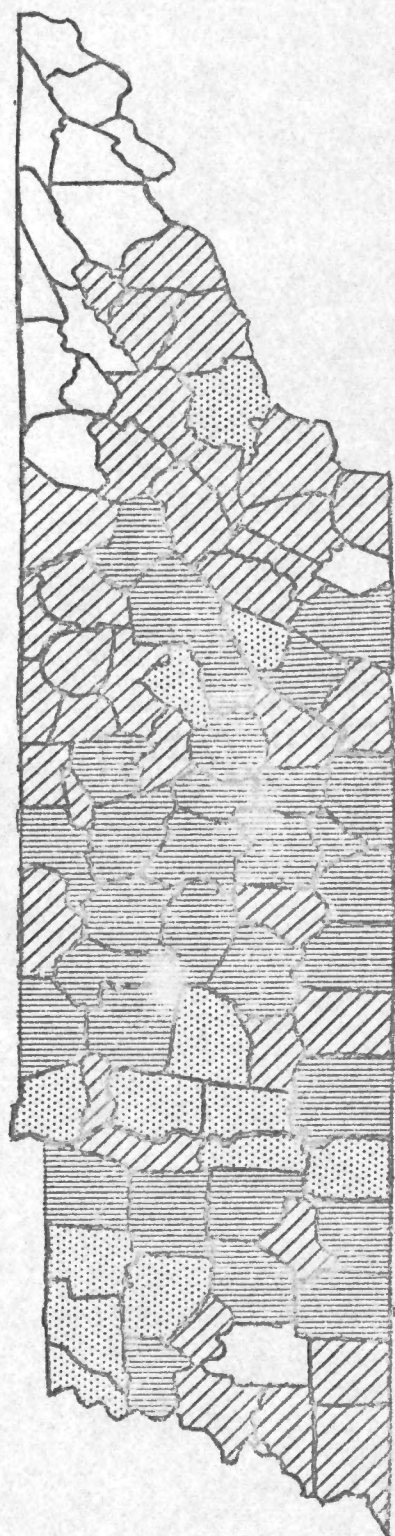
TABLE X

THE PERCENTAGE OF LIVE HOGS AND PIGS SOLD FROM EACH AREA FROM
COMMERCIAL FARMS AND THE PERCENT OF FARMS SELLING SWINE
BY CATEGORY OF NUMBER OF HEAD SOLD FOR ALL FARMS,
BY AREA AND COUNTY IN TENNESSEE IN 1964

Item	Area			
	East	Middle	West	State
	-----Percent-----			
Live Hogs and Pigs Sold	7.6	50.3	42.1	100.0
Farms Selling Swine by Number of Head Sold:				
1 to 9	44.9	20.4	21.2	23.8
10 to 49	40.9	55.2	49.8	51.6
50 to 99	8.5	15.4	16.3	14.8
100 to 199	4.1	6.5	8.4	6.8
200 +	1.6	2.5	4.4 ^a	3.0
Total	100.0	100.0	100.1 ^a	100.0

^aPercentage did not add to 100.0 because of rounding.

Source: Calculated from Table IX, pages 40-42.



Legend

- Very small: 28.30 head or less
- ▨ Small: 28.31 to 47.02 head
- ▤ Medium: 47.03 to 65.76 head
- ▥ Large: 65.77 head or more

Figure 6. The average number of hogs and pigs sold per commercial farm by category for each county in Tennessee in 1964.

Source: Table IX, pages 40-42.

For all farms in the state selling swine, about 24 percent of the farms sold from 1 to 9 head, while over 51 percent of the farms sold between 10 and 49 head (Table X). The remaining 24.6 percent of the farms sold 50 to 99 head (14.8 percent), 100 to 199 head (6.8 percent), and 200 or more head (3.0 percent). In East Tennessee the first two categories (1 to 9 and 10 to 49) contained over 85 percent of the farms, with an additional 8.5 percent selling between 50 and 99 head. The remaining six percent of the farms reporting sales of swine sold 100 or more head.

Middle Tennessee tended to have a greater percentage of the farms in the larger categories. A little over 20 percent of the farms sold less than 10 animals, while 55 percent sold 10 to 49 head. The third category (50 to 99 head) contained about 15 percent with the remaining five percent of the farms selling 100 or more head of swine.

West Tennessee had the largest average farm sale in the state with a 60.14 head sold per farm. The distribution of farms by size had almost 50 percent of all the farms reporting some sales of hogs and pigs in the 10 to 49 head category. An additional 21 percent sold less than 10 head, while 16.3 percent sold 50 to 99. Some 12.7 percent sold an average of 100 or more head per farm.

IV. POULTRY PRODUCTION

Most of the poultry sold in Tennessee in 1964 was from farms producing broilers and other meat-type chickens. Hens and roosters make up the remaining poultry slaughtered and their numbers were also included.

Number and Location of Production

Broiler production is highly concentrated with only 55 counties having any production (Table XI). The average number of birds sold per county for those counties was 658,548 broilers. Hens and roosters sold for slaughter were more evenly spread throughout the state. Every county sold at least some, while the average per county was 28,115 birds (Table XI). These statistics were for all farms reporting some sales of poultry in Tennessee in 1964.

East Tennessee produced an estimated 52 percent of the broilers in Tennessee in 1964². Six counties sold over one million birds. East Tennessee also produced 40 percent of the hens and roosters sold for slaughter. The average number of broilers sold per county for those counties with some sales was 721,282 birds.

Middle Tennessee sold 43 percent of the broilers and 41.5 percent of the hens and roosters in the state. The average number of broilers sold from those counties reporting some sales was estimated to be 676,575 birds. The average number of hens and roosters sold per county was 26,991 birds.

West Tennessee had only six counties producing some broilers, with those counties producing only an estimated 5.3 percent of the birds sold in Tennessee. The average sale per county was estimated to be 317,600 birds. The average number of hens and roosters sold per county in West Tennessee was 23,294 birds.

²Estimated because of withheld data. See footnote a, Table XI for estimating procedure.

TABLE XI

THE NUMBER OF HENS AND ROOSTERS SOLD FOR SLAUGHTER, THE NUMBER OF FARMS SELLING BROILERS AND OTHER MEAT-TYPE CHICKENS, THE TOTAL NUMBER OF BIRDS SOLD, AND THE AVERAGE NUMBER OF BIRDS SOLD PER FARM, BY AREA AND COUNTY FOR TENNESSEE IN 1964

Area and County	Number of Hens and Roosters	Broilers and Meat-Type Chicken		
	Sold for Slaughter	Number of Farms	Number of Birds	Average Sale Per Firm
<u>East Tennessee</u>				
Anderson	17,117	-	-	-
Bledsoe	1,772	-	-	-
Blount	75,178	7	90,028	12,861
Bradley	79,056	137	4,178,962 ^a	30,503
Campbell	27,868	1	110,275 ^a	110,275
Carter	4,795	-	-	-
Claiborne	6,954	3	153,000	51,000
Cocke	66,195	64	2,027,818 ^a	31,685
Grainger	24,100	1	110,275 ^a	110,275
Greene	28,349	6	230,151	38,359
Hamblen	7,947	2	220,550 ^a	110,275
Hamilton	127,202	24	1,192,918	49,705
Hancock	664	17	231,200	13,600
Hawkins	31,575	3	82,400	27,467
Jefferson	90,902	7	182,075	26,011
Johnson	9,268	-	-	-
Knox	71,711	9	236,498	26,278
Loudon	43,053	6	261,688	43,615
McMinn	50,994	18	874,836	48,602
Marion	22,965	28	1,169,250	41,759
Meigs	10,639	3	219,000	73,000
Monroe	9,284	24	1,338,900	55,788
Morgan	8,262	24	768,226	32,009
Polk	13,832	14	394,939	28,210
Rhea	22,120	-	-	-
Roane	24,106	4	72,900	18,225
Scott	28,590	91	3,358,669	36,908
Sequatchie	10,854	6	175,636	29,273
Sevier	59,509	17	711,544	41,195
Sullivan	42,106	-	-	-
Unicoi	3,393	4	180,781	45,195
Union	6,575	-	-	-
Washington	48,214	4	180,800	45,200
Area	1,075,149	524	18,753,319	35,789
Percent	40.25	59.95	51.78	-

TABLE XI (CONTINUED)

Area and County	Number of Hens and Roosters	Broilers and Meat-Type Chicken		
	Sold for Slaughter	Number of Firms	Number of Birds	Average Sale Per Firm
Middle Tennessee				
Bedford	111,094	9	330,200	36,689
Cannon	2,798	-	-	-
Cheatham	7,277	1	110,275 ^a	110,275
Clay	1,612	1	110,275 ^a	110,275
Coffee	6,835	4	242,400	60,600
Cumberland	6,912	24	1,015,820	42,326
Davidson	29,331	1	110,275 ^a	110,275
DeKalb	855	-	-	-
Dickson	6,913	-	-	-
Fentress	4,183	119	5,631,861	47,327
Franklin	98,266	2	220,550 ^a	110,275
Giles	12,956	-	-	-
Grundy	32,507	117	4,817,112	41,172
Hickman	4,182	-	-	-
Houston	590	-	-	-
Humphreys	2,840	1	110,275 ^a	110,275
Jackson	5,028	3	44,800	14,933
Lawrence	9,887	-	-	-
Lewis	7,529	15	563,500	37,567
Lincoln	39,423	2	220,550 ^a	110,275
Macon	4,608	1	110,275 ^a	110,275
Marshall	20,954	-	-	-
Maury	24,590	-	-	-
Montgomery	44,457	-	-	-
Moore	3,628	-	-	-
Overton	31,239	1	110,275 ^a	110,275
Perry	2,196	-	-	-
Pickett	5,913	5	215,800	43,160
Putnam	4,032	2	220,550 ^a	110,275
Robertson	179,590	2	220,550 ^a	110,275
Rutherford	18,014	2	220,550 ^a	110,275
Smith	27,524	1	110,275 ^a	110,275
Stewart	929	-	-	-
Sumner	126,703	5	432,500	86,500
Trousdale	5,891	-	-	-
Van Buren	5,109	-	-	-
Warren	29,558	3	172,000	57,333
Wayne	14,876	-	-	-
White	3,786	-	-	-

TABLE XI (CONTINUED)

Area and County	Number of Hens and Roosters Sold for Slaughter	Broilers and Meat-Type Chicken		
		Number of Firms	Number of Birds	Average Sale Per Firm
Williamson	26,535	-	-	-
Wilson	135,466	2	220,550 ^a	110,275
Area	1,106,616	323	15,561,218	48,177
Percent	41.53	36.91	42.96	-
<u>West Tennessee</u>				
Benton	2,526	-	-	-
Carroll	24,660	-	-	-
Chester	11,103	-	-	-
Crockett	1,659	-	-	-
Decatur	792	-	-	-
Dyer	28,821	2	220,550 ^a	110,275
Fayette	101,066	-	-	-
Gibson	90,854	1	110,275 ^a	110,275
Hardeman	36,984	-	-	-
Hardin	12,270	3	134,000	44,667
Haywood	4,442	-	-	-
Henderson	4,381	-	-	-
Henry	6,782	-	-	-
Lake	136	-	-	-
Lauderdale	7,239	-	-	-
McNairy	13,545	17	1,007,500	59,265
Madison	16,072	-	-	-
Obion	56,290	3	323,000	107,667
Shelby	30,481	1	110,275 ^a	110,275
Tipton	16,985	-	-	-
Weakley	22,085	-	-	-
Area	489,173	27	1,905,600	70,578
Percent	18.31	3.09	5.26	-
<u>State</u>	2,670,938	874	36,220,128	41,442

^aThese county figures were estimated by multiplying the number of firms in the county by the average sale per firm where data were not available. This average was found by dividing by the total number of firms where data were not available, by the difference between the state total and the total of the counties where data were given.

Source: United States Department of Commerce, United States Census of Agriculture, 1964, Tennessee, Vol. I, Part 31, Bureau of the Census (Washington: Government Printing Office, 1966), pp. 368-373.

Average Size of the Broiler Firm

The average size of the firm is quite large, while the number of firms involved in broiler production is relatively small. A total of 874 firms produced over 36 million birds, for an average size firm of 41,442 broilers sold per year (Table XI).

East Tennessee had 524 or almost 60 percent of the firms. These firms ranged in average sales from 12,861 to 55,788 birds for those counties where data were given.

Middle Tennessee had 323 broiler firms selling an average of 48,177 birds. The range in sales per farm for those counties with data was from 14,933 to 86,500 birds.

West Tennessee had 27 firms in six counties. The average number of broilers sold per firm for the three counties where data were available, was 63,674 birds. The range in sales per farm for these counties was from 44,667 to 107,667 birds.

There were 19 counties in the state with 27 firms for which data were not published for broilers. Because of this, figures were not used to illustrate concentration. The average size for these deleted firms was 110,275 birds. It would appear then, that the more isolated broiler firms were also the largest producers.

V. SUMMARY

About 27.4 percent of the income derived from farm production in Tennessee in 1964 was from the sale of livestock and poultry. The most important source of income was from the sale of cattle and calves (\$90 million). Hogs and pigs were next in importance with sales of \$34.5

million. Broilers added another \$16.7 million to farm income. The remaining livestock and poultry sales accounted for about \$3.5 million.

Cattle and calf production was widely spread throughout the state. The heaviest concentration of cattle by county was found in upper East Tennessee with some exceptions, the central section of Middle Tennessee, and the western part of West Tennessee. Calf sales were more scattered in East Tennessee, generally located in the central section of Middle Tennessee, and highly concentrated in western West Tennessee. The average number of cattle sold for the state for commercial farms reporting sales, was 9.63 head per farm. The number of farms selling in the smaller size categories was relatively large. Some 66.5 percent of all the farms reporting cattle sales, sold less than five head. Some 93.1 percent of all farms sold less than 20 head. This means that most farm cattle sales were on a very small scale. A very few farms (0.6 percent) sold over 100 head of cattle.

Calf sales per commercial farm for the state averaged almost 12 head per farm. About 80 percent of the farms reporting calf sales sold less than 20 head, while the larger classification (5 to 19 head) contained 46.3 percent of the farms. The number of large operations (100 or more head) was smaller than cattle however. The size of the calf operation tended to be somewhat larger than the cattle operation, except for the largest size category.

Swine production was an important enterprise in upper West Tennessee. Middle Tennessee raised more hogs and pigs than West Tennessee, but production was more scattered throughout the area with smaller sales per county. East Tennessee produces very few hogs. The

average size commercial farm selling some swine in West Tennessee was 60.14 head per farm. This compares to 52.69 head in Middle Tennessee, and 34.67 head in East Tennessee. The West Tennessee area had the highest percentage of farms in the 10 to 49 head sold category (49.8 percent). About 21 percent of the farms sold less than 10 head, and a little over 29 percent sold 50 or more head. Middle Tennessee had about 55 percent of all farms in the 10 to 49 head classification, with 20 percent below and about 25 percent above, so that Middle Tennessee had somewhat smaller production units. East Tennessee tended to have even smaller production units.

Broiler production took place in large specialized operations. Only 874 farms produced broilers with the location of these firms primarily in the East, and secondarily in Middle Tennessee. The average size of the firm was large (41,442 birds) with the counties with the fewest firms having the larger size units.

CHAPTER IV

MARKETING CHANNELS

I. INTRODUCTION

The movement of livestock and poultry from the production unit to the processing firm usually requires some type of marketing activity. The exception to the above would be vertically integrated operations where production and processing occur under one management. Most broiler operations are vertically integrated, while little or no integration occurs in livestock production in Tennessee.

The primary purpose of this chapter is to define the type, determine the number and importance, and identify the location of livestock markets in Tennessee. Of secondary importance will be a discussion of the marketing of broilers in Tennessee.

II. TYPES OF LIVESTOCK MARKETS¹

The types of markets through which livestock move are usually classified in the following manner: Terminal markets, auction markets, and country markets. This first section will be concerned with defining each of these markets.

Terminal markets are usually centrally located so that large numbers of livestock can be concentrated for sale. The producer brings his livestock to these markets and consigns them to a commission firm.

¹This section is primarily taken from W. F. Williams and T. T. Stout, Economics of the Livestock Meat Industry [31, pp. 153-158].

Neither the commission firm nor the terminal market take title to the livestock. The commission firm acts as an agent for the producer in selling the livestock. For providing this service the commission firm is paid a fee. The terminal market also receives a fee for providing the facilities. There must be two or more commission firms operating in the market for it to be classified as a terminal market.

Another method of selling livestock is to consign them to an auction sale. "A livestock auction may be defined as a stockyard and related facilities at which livestock is offered publically for sale simultaneously to prospective buyers and is sold to the buyer making the highest bid" [31, p. 156]. For providing these services, the auction receives a fee. In a strict definition of this market, the auction does not take title to the livestock. A sale is usually held once a week. A posted auction market means that sales involve interstate transportation of livestock, and therefore the market is regulated by the Packers and Stockyard Act.

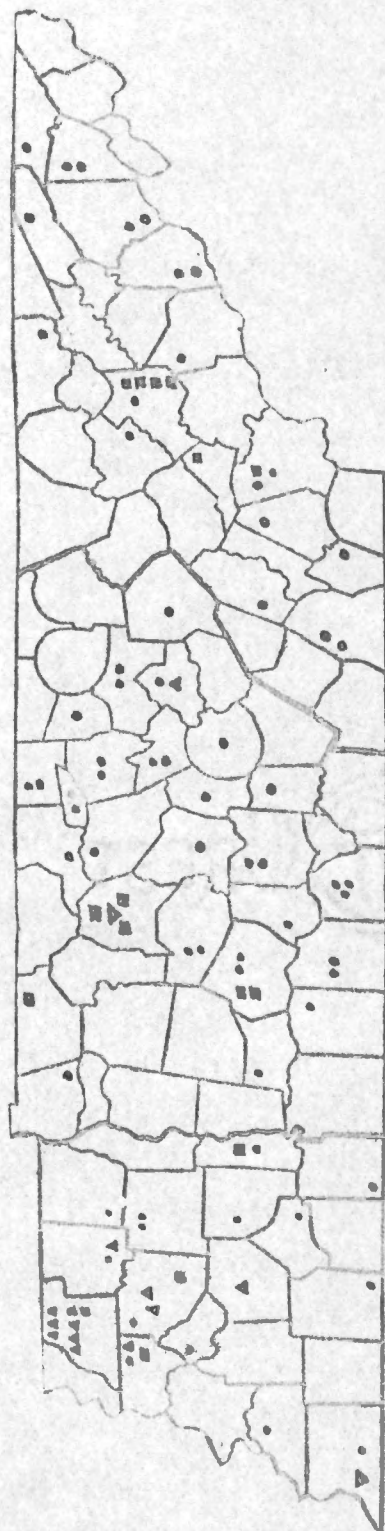
Country markets describe all those markets not included in the above classification of auction or terminal. The markets in this category which operate a stockyard are packer buying stations and local buying stations. Both take title to the livestock they buy from producers and dealers. The packer buyer takes title for the slaughter firm. The local buying station takes title and resales mostly to packers and order buyers. Order buyers do not take title to livestock but act as agents in buying livestock for packers, producers or dealers. A dealer takes title to the livestock and performs about the same function as the local stockyard, but without the physical facilities for handling livestock.

While the above classifications describe the particular type of market, in reality two or more types of marketing channels may operate from one location. The terminal market located at Memphis operates as an auction market three days a week. The commission firms located at both terminal markets are also registered as livestock dealers. Most of the auction markets are also registered as dealers and some of the dealers are registered as order buyers. This illustrates some of the problems in attempting to classify markets by type.

III. NUMBER AND LOCATION OF LIVESTOCK MARKETS

At the present time, there are two terminal stockyard markets operating in Tennessee. One terminal market is located in Memphis, the other is in Nashville. In Memphis, there are four commission firms available from which the producer can choose to consign his livestock. This market also operates a cattle auction twice a week and a hog auction once a week. In Nashville, there are five commission firms selling livestock for the producer. All nine of these commission firms are also registered as livestock dealers.

In 1969 there were 68 posted auction markets operating in Tennessee which sold livestock. Each of these markets are depicted by a circle in the county where they are located in Figure 7. The Middle Tennessee region had the largest number of livestock auctions (34) and the highest percentage of counties with markets (83 percent). Lincoln county had three auctions, while Maury, Bedford, Williamson, Giles, Dekalb, Smith, Trousdale, Putnam, and Macon had two auctions. The remaining 13 markets were located one per county, with 18 counties having no auctions



Legend

- ▼ Terminal markets
- Posted auction markets
- Packer buying stations
- ▲ Independent buying stations

Figure 7. The location of terminal markets, posted auction markets, and packer buying and independent buying stations for livestock by county in Tennessee in 1969.

Source: United States Department of Agriculture, Packers and Stockyard Administration.

available for marketing livestock in this area. This means that 56 percent of the counties had at least one auction market in which livestock could be sold. The location of markets in this area closely parallel the location of the highest concentrations of cattle and calves, as described in the previous chapter.

West Tennessee had the least number of livestock auctions (14), but the second highest percentage of markets per county for an area (67 percent). Only one county, Carroll, had two auctions, with 12 counties having one, and eight counties having no auction markets. About 62 percent of the counties in this area had at least one auction market in which to sell livestock. Auction markets are located in most of the largest livestock producing counties, with the exception of Obion county. The auction market in Wheakley county is located close to Obion county, however.

East Tennessee had 20 auction markets and the lowest percentage of markets per county of the three regions (61 percent). Hamilton, Monroe, Greene, Cocke, and Washington counties each had two auctions. The remaining 10 auctions were located one per county, with 18 counties in East Tennessee having no livestock auctions.

Buying stations, packer and other, are also identified by county in Figure 7. West Tennessee had the largest number of buying stations (16) of the three regions. All but one of the independent buying stations in the state was located in this area. Obion county, while containing no auction markets, had eight buying stations. Six of these markets were independent with the remaining two being packer buyer stations. Decatur, Gibson, and Dyer counties each had one packer

buyer while Weakley, Dyer, and Madison county had one, and Gibson county had two independent buying stations.

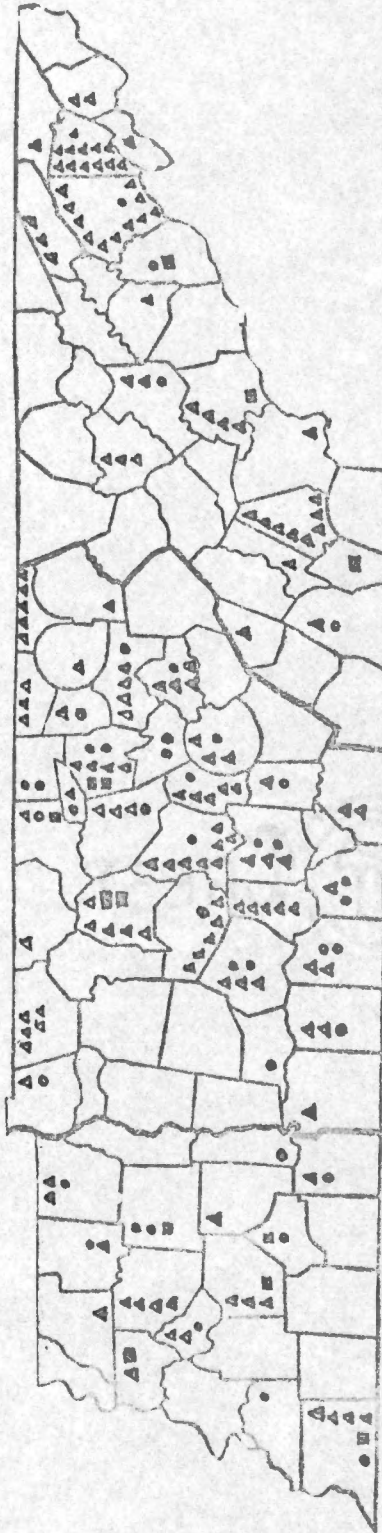
In Middle Tennessee, Davidson had three, Maury two, and Montgomery county one packer buying station. White county had the only independent buying station East of the Tennessee River.

East Tennessee contains seven packer buying stations. These were located in Knox (four), Loudon (one), Monroe (one), and Hamblen (one) counties.

Order buyers provide an alternative in some locations for marketing livestock. Figure 8 locates these buyers by county. Only 13 such buyers were registered in the state. West and Middle Tennessee each had five buyers, while East Tennessee was the location for three buyers. Two order buyers also operated a buying station, one in Dyer, the other in Madison county.

Dealers registered to operate in Tennessee are quite numerous. All the commission firms operating in the terminal markets are registered as dealers. Furthermore, 43 of the 68 auction markets are also registered as dealers. These firms, as well as the other 157 dealers registered to operate in Tennessee are also identified by county in Figure 8.

The highest concentration of dealers is in the central region of Middle Tennessee and the counties of Greene and Washington in East Tennessee. Middle Tennessee had 84 dealers located in 27 counties. West Tennessee had 19 dealers in 10 counties, while East Tennessee had 54 dealers in 14 counties.



Legend

- Auction markets also registered as dealers
- Order buyers
- ▲ Dealers

Figure 8. The location of registered dealers and order buyers by county in Tennessee in 1969.

Source: United States Department of Agriculture, Packers and Stockyard Administration.

IV. RELATIVE IMPORTANCE OF EACH TYPE OF MARKET

In the past 25 years, the importance of the terminal market as a channel for buying and selling livestock in the United States has declined. From 1960 to 1964, the percent of cattle, calves, and hogs purchased by packers from terminal markets in the United States had declined 7.3, 6.6, and 6.5 percent, respectively (Table XII). During the same time period, country buying by packers increased for cattle by six percent, decreased for calves by 10.8 percent, but increased for hogs by 2.1 percent. Auction markets increased their volume in all three categories, cattle by 3.3 percent, calves by 17.4 percent, and hogs by 4.4 percent. In 1964 terminal markets handled 36.5 percent of the cattle, 18.8 percent of the calves, and 23.8 percent of the hogs sold to packers. Auction markets handled 18 percent of the cattle, 47 percent of the calves, and 13 percent of the hogs. Country buying involved 43 percent of the cattle sold, 35 percent of the calves, and 61 percent of the hogs.

Comparative statistics by state are more difficult to obtain. As Table XIII shows, Tennessee had 597,000 head of cattle, 403,000 head of calves, and 1,636,000 head of hogs marketed in 1967. In addition, Table XIII gives the number of cattle, calves, and hogs marketed through the terminal stockyard and those marketed by auction sales. The terminal figures, but more importantly, the auction numbers are overestimated by speculator transactions. One animal may be sold several times before it is finally sold for slaughter. Feeder calf sales, mainly, but some breeding stock sales also, inflate the number of marketings. From a study conducted in the 1950's on auction markets,

TABLE XII

PERCENT OF PACKER LIVESTOCK PURCHASED THROUGH DIFFERENT
MARKET OUTLETS IN THE UNITED STATES FOR THE YEARS
1960 AND 1964

Year	Cattle	Calves	Hogs
	-----Percent-----		
<u>Terminal Markets</u>			
1960	45.8	25.4	30.3
1964	36.5	18.8	23.8
<u>Auction Markets</u>			
1960	15.6	32.1	8.7
1964	18.9	49.5	13.1
<u>Country Buying</u>			
1960	38.6	42.5	61.0
1964	44.6	31.7	63.1

Source: National Commission on Food Marketing, Organization and Competition in the Livestock and Meat Industry, Technical Study No. 1 (Washington: National Commission on Food Marketing, 1966), p. 3.

TABLE XIII

THE NUMBER OF CATTLE, CALVES, AND HOGS MOVED THROUGH TERMINAL
AND AUCTION MARKETS, AND THE TOTAL NUMBER OF ANIMALS
MARKETED IN TENNESSEE IN 1967

Item	Cattle	Calves	Hogs
		-----Head-----	
Terminal Marketings ^a	279,867	28,489	187,050
Auction Marketings ^b	602,640	349,613	404,210
Total Marketings ^c	597,000	403,000	1,636,000

^a These numbers include intrastate, as well as interstate shipments of animals and include one head for each time an animal is marketed.

^b These numbers include total marketings and result in double counting for speculator sales and other types of reselling. These numbers will also include feeder stock moved out of the state and some animals moved into the market from adjoining states.

^c These numbers include interstate shipments but excludes interfarm sales within the state. Because of this fact and the exclusion of other formal marketing channel statistics, these numbers are not the sum of the other two rows.

Source: Terminal and Auction Market numbers were obtained from the Packers and Stockyard Administration; Total Marketing figures were obtained from, United States Department of Agriculture, Livestock and Meat Statistics, 1968, Supplement for 1968 to Statistical Bulletin No. 333, Economic Research Service (Washington: Government Printing Office, July 1969), pp. 28, 32.

the results stated that packer buyers purchased 53 percent of the cattle sold, farms purchased an additional 20 percent of the cattle and calves, while the remainder was purchased by speculators and auction management [2, p. 5]. Livestock auctions handle a large part of the marketing, especially for cattle and calves.

The terminal markets at Memphis and Nashville do provide a marketing channel for the immediate area, but the majority of the state must depend on other marketing channels.

Buying stations seem to be the most popular where there is a high degree of concentration of fed livestock and near slaughter and processing firms. This is shown by the number of packer and independent buying stations located in upper West Tennessee, especially Obion County. This channel provides a market for the high concentration of hogs and cattle in this area.

Dealers and order buyers play an important part in the marketing system, however, no data are available on their volume. They may provide the only channel for those areas which lack other types of markets, or at least add some competition in an area where few markets are available.

V. BROILER MARKETING

The production, marketing, processing, and distribution of broilers is so dissimilar to livestock, broiler marketing will be discussed in this section as a separate topic.

The poultry industry is concentrated in the hands of a relatively few farm cooperatives, meat packers, food processors, and feed companies.

"Nearly 95 percent of commercial broilers are produced under the management of business organizations which own or control some combination of hatcheries, feed mills, processing plants, marketing services, and research facilities" [15, p. 102]. About 75 percent of the broilers produced in the United States were under contract, while the remaining 20 percent were raised on company owned farms [5, p. 207]. Today these figures may even be higher. This type of arrangement, either contracting production or producing for oneself, is called verticle integration, because the different sectors or types of firms are brought under one management.

This type of arrangement has been very successful in the South-eastern United States. Underemployed farmers coupled with the willingness of the financial communities to provide capital for facilities are attributed as the original incentives for locating such a high percentage of the production in this area. In the early 1960's, a decline in the freight rates for transporting feeds to this area enhanced the competitive position of this area even further [12, pp. 10-11].

The result of such an arrangement is that very few broilers enter a live market. The producer usually provides only the labor and the facilities and in return receives ". . . a flat cents per pound of gain, as adjusted for some measure of efficiency such as the feed-conversion ratio, on one of the various kinds of profit sharing" [5, p. 210].

The livestock marketing sector performs the function of collecting the animals from a large number of small producers and grading them before moving them to the processing sector. Broilers are already concentrated and because of their genetic quality and controlled environment,

grade is standardized. The result of these factors is that broilers do not have the usual distinction of moving through three sectors, but actually one sector, with the first marketing or pricing done at the wholesale level.

CHAPTER V

THE SLAUGHTERING AND PROCESSING INDUSTRY

I. INTRODUCTION

The last sector to be discussed will include those firms which slaughter or eviscerate and/or process meat and poultry for human consumption. This chapter will be concerned with defining the type of plants, the number and location of these plants and the size of the plant operation.

The slaughter and processing firms play an important role in the Tennessee economy. In 1967, Tennessee commercially slaughtered 572,000 head of cattle, 1,500,000 head of calves, and 3,033,000 head of hogs [16, p. 67]. The value of the shipments from this sector was \$420,600,000, and employed 6,500 persons [18, pp. 2, 3].

Most of the data in this chapter were obtained from the records of the Division of Food and Drugs, the Tennessee Department of Agriculture. The information obtained was for firms which were to operate under the Tennessee Meat and Poultry Inspection Act in 1968.

II. TYPE OF PLANTS

All slaughtering, eviscerating, and processing of meat and poultry is now performed under the regulations of a state or federal agency. For those firms which process meat or poultry that will cross a state boundry before retail sale, the federal agency regulates. For all other firms in this sector, the state maintains regulating powers. In both

cases, the animal or bird is inspected before and after slaughtering. The facilities and methods are also inspected for sanitary requirements.

The slaughtering or processing plants in the state were divided into various classes by the following delineation:

I. Slaughtering Plants

A. Non-federally inspected plants. These plants were restricted to intrastate sales of animal products and were classified by the number of animals slaughtered per year. These plants are to be state inspected.

1. Slaughtering over 10,000 animals.
2. Slaughtering 4,000 to 10,000 animals.
3. Slaughtering 1,000 to 4,000 animals.
4. Slaughtering less than 1,000 animals.

B. Federally inspected plants. These plants slaughtered animals or poultry and their products are sold interstate. No volume figure was available; however, each plant will be large in volume slaughtered relative to the state inspected plants.

C. Custom slaughtering. These plants provide the service of slaughtering and processing for a fee, but are not permitted to sell meat. The animals and birds slaughtered are not inspected; however, the plant is periodically inspected for sanitary procedures and facilities by the state.

II. Meat and Poultry processing Plants

A. Non-federally inspected plants processing meat. These state inspected plants were involved in interstate sales of meat and were divided into the following categories by annual gross receipts:

1. Annual gross receipts in excess of \$1,000,000.
 2. Annual gross receipts \$500,000 to \$1,000,000.
 3. Annual gross receipts less than \$500,000.
- B. Non-federally inspected poultry eviscerating and processing plants. These plants are also state inspected and are involved in intrastate sale of poultry. They were divided into the following categories by annual gross receipts:
1. Annual gross receipts in excess of \$1,000,000.
 2. Annual gross receipts \$1,000,000 or less.
- C. Federally inspected plants. Includes plants which are involved in processing only. The meat processed will move interstate. No estimate of gross receipts was given; however, the size of the plant will be large relative to the state inspected plants.

Plant specialization is another attribute of the firm that can provide even a more detailed classification of the type of firm in the slaughter and processing industry. There are two dimensions to specialization, horizontal or verticle [1, p. 21]. Horizontal specialization is defined by the number of different species slaughtered by a plant. Vertical specialization is concerned with the degree of processing on the raw product. The more processing put into the product, the lower the degree of specialization.

For the most part, the type and degree of specialization of the firm will not be discussed. The remaining sections will be concerned with the other characteristics of firms in this sector in Tennessee.

III. NUMBER AND LOCATION OF PLANTS

In 1968, there were 271 plants operating in the slaughter and processing sector in Tennessee (Table XIV). Some 25 plants were regulated by federal inspection, with the remaining 246 plants to be inspected under state regulations. Also included in the state regulated plants were 54 custom slaughtering plants. These plants slaughtered and processed animals for a fee, but were not permitted to sell meat or poultry for human consumption. The remaining 217 plants slaughtered and processed animals and poultry for entry into the wholesale and retail sector and, therefore, will be the only plants under consideration.

There were 16 federally inspected slaughtering plants (Table XIV). Twelve of these plants slaughtered livestock, with the remaining four slaughtering poultry. The location of these plants are shown in Figure 9 (livestock slaughter) and Figure 10 (poultry slaughter). The urban counties of Shelby, Davidson, Knox, and Hamilton contain 12 of these plants. Obion, Montgomery, Bedford, and Fentress counties contain the remaining plants.

Figure 9 locates the state inspected plants which slaughtered livestock. There were 88 of these plants with 32 plants located in East, 32 in West, and 24 in Middle Tennessee.

Beside the four federally inspected poultry slaughtering plants located above, there were three state inspected poultry eviscerating and processing plants. These plants were located in Davidson, Hamilton, and Knox county (Figure 10).

There were 101 meat processing plants under state inspection. These plants were spread throughout the state with the greatest

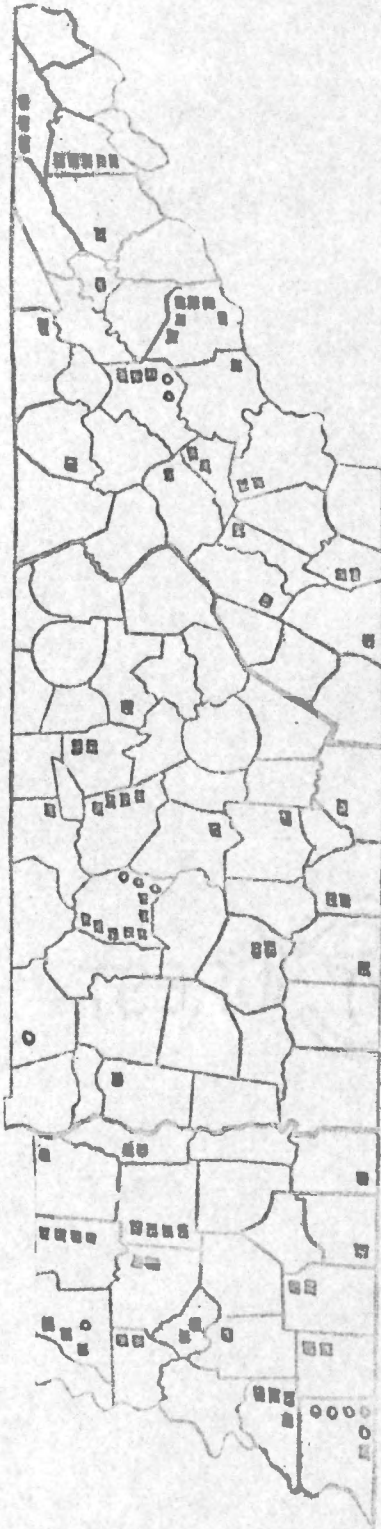
TABLE XIV

THE NUMBER OF PLANTS BY SIZE, WHICH SLAUGHTERED OR
PROCESSED MEAT AND POULTRY IN TENNESSEE IN 1968

Type and Size of Plant	Number of Plants
Slaughtering Plants	
State Inspected	
Slaughtering over 10,000 animals per year	9
Slaughtering 4,000 to 10,000 animals per year	7
Slaughtering 1,000 to 4,000 animals per year	25
Slaughtering less than 1,000 animals per year	47
Custom slaughtering	54
Total	142
Federally Inspected ^a	
Slaughtering livestock	12
Eviscerating poultry	4
Total	16
Processing Plants	
State Inspected	
Processing meat with gross sales in excess of \$1,000	7
Processing meat with gross sales of \$500,000 to \$1,000,000	7
Processing meat with gross sales of \$500,000 or less	87
Poultry eviscerating and processing with gross sales of \$1,000,000 or more	1
Poultry eviscerating and processing with gross sales of \$1,000,000 or less	2
Total	104
Federally Inspected ^a	
Processing meat or poultry	9
Total	9
Total Plants	271

^a Size of federally inspected plant was not obtained. In 1962 federally inspected plants slaughtered over 70 percent of all commercially slaughtered animals in the Southeast, with an average size annual slaughter of 19,975 animals [1, pp. 26, 31, 35].

Source: Tennessee Department of Agriculture, Division of Foods and Drugs, 1968.

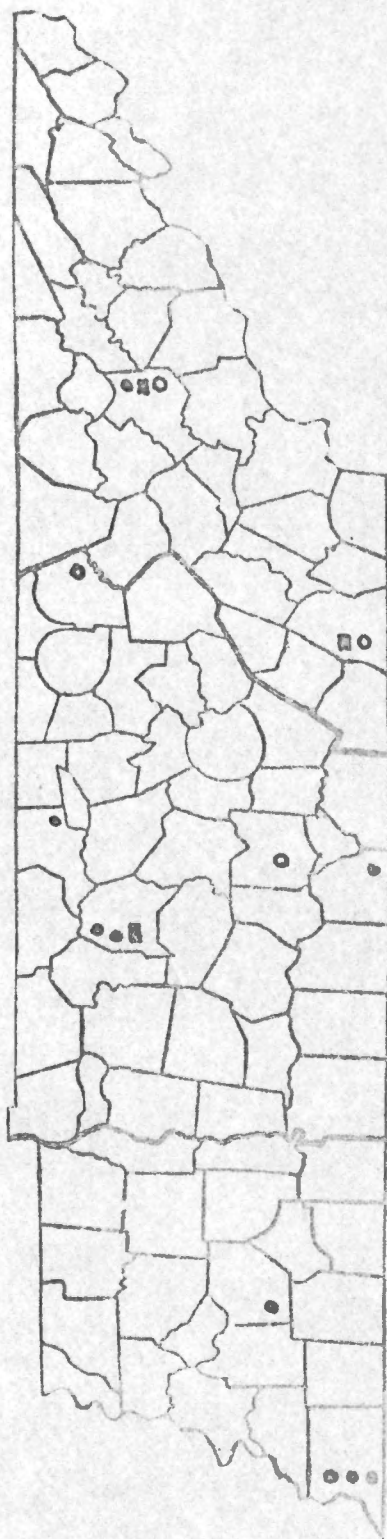


Legend

- O Federally inspected livestock slaughtering plants
- State inspected slaughtering plants

Figure 9. The location by county of all Federal and State inspected livestock slaughtering plants in Tennessee in 1968.

Source: Tennessee Department of Agriculture, Division of Foods and Drugs.



Legend

- Federally inspected poultry slaughtering plants
- Federally inspected meat or poultry processing plants
- State inspected plants eviscerating and processing poultry

Figure 10. The location by county of all state inspected poultry eviscerating and processing plants, Federally inspected poultry slaughtering plants, and Federally inspected plants which processed meat or poultry in Tennessee in 1968.

Source: Tennessee Department of Agriculture, Division of Foods and Drugs.

concentration in or near the large urban areas (Figure 11). The federally inspected processing plants were not broken down into red meat or poultry, but are located in Figure 10.

IV. SIZE OF PLANTS

The state inspected slaughtering plants were grouped by size, number of animals slaughtered annually, in Table XIV. Disregarding the custom slaughtering plants, the remaining 88 plants were 40.6 percent of all plants in the sector. The distribution of firms by size highly favored the smaller size plants. About 53 percent of the state inspected slaughtering plants slaughtered less than 1,000 animals annually. The next size category, 1,000 to 4,000 animals, added another 28 percent of the plants. The largest size firms, 10,000 or more animals, made up 10 percent of these plants. The smallest number of plants were located in the 4,000 to 10,000 animal category.

There were 101 state inspected meat processing plants (Table XIV). This was 46.5 percent of all the commercial plants in the sector. Some 86 percent of these plants had less than \$500,000 worth of gross sales annually. The remaining 14 percent of these plants were evenly distributed between the two larger categories of gross sales. Again, these numbers indicate a small average size per plant.

There were three poultry eviscerating and processing plants that were state inspected. Two plants had gross sales of less than \$1,000,000, the other plant was larger. Because poultry production and

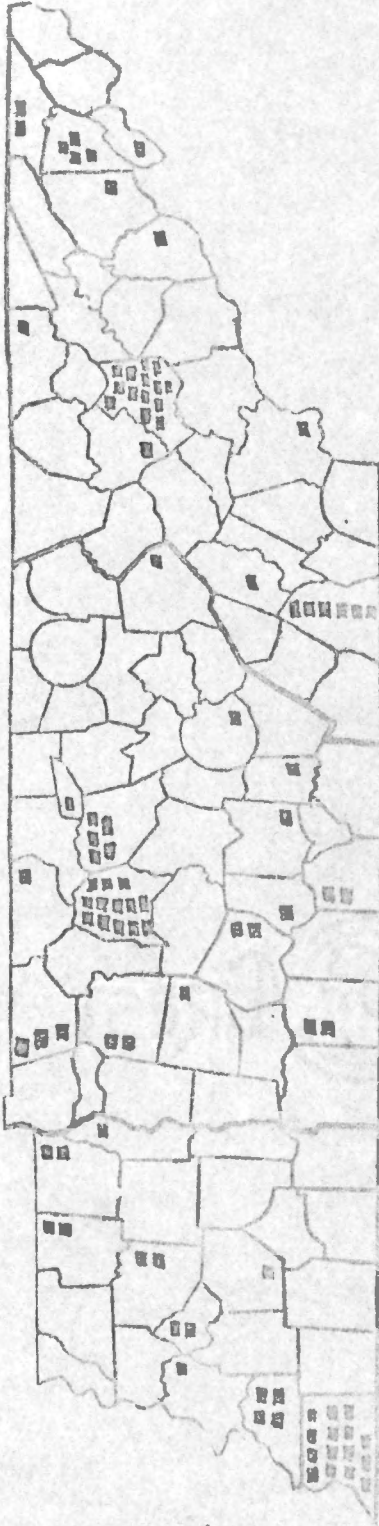


Figure 11. The location by county of all State inspected plants processing meat in Tennessee in 1968.

Source: Tennessee Department of Agriculture, Division of Food and Drugs.

processing is such a highly integrated area, the number of processing plants is few and large.

Size figures for federally inspected plants were not available for Tennessee. However, for plants operating in the Southeast in 1962, the size was quite large. The average number of head slaughtered per plant per year in this region was 19,975 animals [1, pp. 26, 31, 35].

Some additional data on the size of the plant by employment is given by the Census of Manufactures. This information was gathered from all plants which employed one or more persons. The size of the plant in terms of the number of employees is given in Tables XV and XVI. The information contained in Table XV provide the final results of the 1963 census which divided the plants into six classifications. The latest census figures (Table XVI) are preliminary estimates with only two size classifications available. The total number of plants in this sector did not change appreciably between the two census dates; however, the number of meat processing plants have increased, while the other types of plants have declined. A majority (55 percent) of the plants in this sector employed less than 20 men in 1963, while this size classification has risen to 66 percent in 1967. With the exception of poultry dressing plants, the sector contains a large number of small plants. The discrepancy between the total number of plants counted in the state data and the total counted in the census data, 217 to 104, was in the most part due to the number of meat processing plants counted. The remaining differences must have been the result of an incomplete sample, or the plants did not employ any outside labor.

TABLE XV

THE NUMBER OF MEAT SLAUGHTERING, MEAT PROCESSING AND POULTRY
DRESSING PLANTS BY SIZE OF EMPLOYMENT IN TENNESSEE IN 1963

Type of Plant	All Plants	Plants with Employment of					
		1-19	20-49	50-99	100-249	250-400	500-999
		-----Number-----					
Meat slaughtering	73	42	15	4	6	4	2
Meat processing	20	14	4	1	1	-	-
Poultry dressing	12	2	3	1	4	2	-
Total	105	58	22	6	11	6	2

Source: United States Department of Commerce, "Location of Manufacturing Plants by Industry, County, and Employment Size: Part 1, Food and Kindred Products: Tobacco Products", Census of Manufactures, 1963, Special Report MC63(S)-3.1 (Washington: Government Printing Office, June 1966), pp. 6, 7, 17.

TABLE XVI

THE TOTAL NUMBER OF MEAT SLAUGHTERING, MEAT PROCESSING AND
POULTRY DRESSING PLANTS, AND THE NUMBER OF THESE
PLANTS WITH 20 OR MORE EMPLOYEES IN TENNESSEE
IN 1967

Type of Plant	Total Plants	Plants with 20 or More Employees
	-----Number-----	
Meat slaughtering	68	26
Meat processing	26	6
Poultry dressing	10	6
Total	104	36

Source: United States Department of Commerce, "Preliminary Report: Meat Packing Plants and Sausage and Other Prepared Meats", Census of Manufactures, 1967, Preliminary Report MC67(P)-20A-1 (Washington: Government Printing Office, December 1969), pp. 3-4; United States Department of Commerce, "Preliminary Report: Poultry Dressing Plants", Census of Manufactures, 1967, Preliminary Report MC67(P)-20A-2 (Washington: Government Printing Office, September 1969), p. 2.

V. SUMMARY

The slaughtering and processing sector is characterized by a rather small number of plants (217). These plants are located throughout the state with the largest plants and the greatest concentration of plants in or near the large urban areas. The average size of these plants was rather small, with the possible exception of poultry eviscerating and processing. Most of the meat processing plants were small, as well as many of the slaughtering plants. The 25 federally inspected plants in this sector were assumed to be large in size of operation.

CHAPTER VI

SUMMARY AND IMPLICATIONS FOR FUTURE RESEARCH

I. SUMMARY

The purpose of this study was to provide information on the structure of the broiler and livestock-meat industry in Tennessee. The structural variables examined, the number, the size, and the location of firms in the industry, are important factors in determining the structure, conduct, and performance of the industry. Three sectors were identified for this study. They were the production sector, the marketing sector, and the slaughtering and processing sector. A brief summary of the structural variables of these three sectors follow.

The production sector includes all those farms producing livestock and poultry. The most important species in terms of total sales for Tennessee in 1964, was cattle and calves. Hogs and pigs were second in importance, followed by broilers, and then hens and roosters sold for slaughter.

The location of cattle and calf production was widely spread throughout the state. Of the total number of cattle sold, Middle Tennessee was the largest producing area, followed by West Tennessee, with East Tennessee having the smallest number of cattle sold from the three areas. The greatest concentration by county was observed to be in middle Middle Tennessee and upper West Tennessee. Middle Tennessee also

sold the highest percentage of calves of the three areas observed. The greatest concentration of calves sold per county was also found to be in middle Middle Tennessee. The western and upper sections of West Tennessee were the next most concentrated areas of the state.

The average number of cattle sold per commercial farm with some sales was 9.63 head for the state (Table V, page 25). For all farms reporting cattle sales, 66.5 percent of these farms sold less than five head, 26.6 percent sold between 5 and 19 head, 6.3 percent sold between 20 and 99 head, with the remaining 0.6 percent selling 100 or more head of cattle (Table VIII, page 37). The average size of the commercial farm sale of cattle was significantly larger in West Tennessee, than in Middle or East Tennessee. The percentage of farms selling in the larger categories increased as one moved from East to the West area. The size of the cattle farm in the state can be summerized as mostly small but with a few large units, and the average size unit increasing as we move from East to West Tennessee.

The average number of calves sold per commercial farm with some sales was 11.97 head for the state (Table V, page 25). For all farms reporting some calves sold, 41.8 percent sold less than five head, 46.3 percent sold between 5 and 19 head, 11.6 percent sold between 20 and 99 head, and 0.3 percent sold 100 or more head of calves (Table VIII, page 37). East Tennessee had the largest percentage of small producers when compared to the other areas. West Tennessee had a large number of producers in the smallest category then did Middle Tennessee, but closely approximated Middle Tennessee in the two largest size categories. The size of the calf production unit can be summerized as

small with the smallest size firms in East Tennessee, followed somewhat closely by West and then Middle Tennessee farms.

Hog and pig production is highly concentrated in certain sections of West Tennessee, scattered generally throughout Middle Tennessee, with very few hogs and pigs sold in East Tennessee. The largest hog and pig producing counties in the state are located in upper West Tennessee. Production of swine per county is highly variable between counties in both West and Middle Tennessee, however. The average number of hogs and pigs sold per commercial farm with some sales was 53.36 head for Tennessee in 1964 (Table IX, page 42). East Tennessee had the smallest average sale per commercial farm, followed by Middle Tennessee, with West Tennessee having the largest average size sale. This area can be summarized as having mostly small producers with only a few large producers. Middle and West Tennessee had about the same percentage of farms in the very small category with West Tennessee having a larger percentage of farms in the three largest categories. This indicates that West Tennessee swine producers were somewhat larger than swine producers in Middle Tennessee.

Broiler production took place primarily in East Tennessee, secondarily in Middle Tennessee, with West Tennessee producing very few birds. The production units were quite large, with the state average of 41,442 birds per firm (Table XI, page 51). Therefore, we can conclude that broiler production occurs on a relatively few but large production units in Tennessee.

The marketing sector is made up of three types of livestock markets. These types are usually classified as terminal, auction, and country markets. In reality however, it is not unusual for a firm to perform

the function of more than one type of market. The organized markets considered in this study were the terminal, auction, and both independent and packer buying stations. Also considered was the country buying by order buyers and dealers.

There were two terminal markets available for the sale of livestock. These markets were located in Memphis and Nashville. Auction markets were generally located throughout the state with 34 located in Middle Tennessee, 20 in East Tennessee, and 14 in West Tennessee (Figure 7, page 58). Country buying stations were located mostly near the packer plants. There were 18 packer buying stations and 12 independent buying stations (Figure 7, page 58). There were only 13 order buyers in the state, and were generally located throughout Tennessee (Figure 8, page 61). Registered dealers were quite numerous in the state. All the commission firms, 43 of the auction markets, and then 157 firms were registered as dealers. The highest concentration of dealers was in Middle Tennessee, with dealers generally located throughout East and West Tennessee.

The importance of the various markets could not be ascertained. Data on livestock sold to packers is not available for markets other than the terminal market.

Most broiler production is organized by a vertically integrated firm, with the result that few broilers enter a live market. With a lack of volume to establish broiler prices in a formal market, not much can be said about the characteristics of this market, except that it is vertically integrated.

The slaughtering and processing industry contains a relatively few

firms. Furthermore, most of the meat slaughtering and processing firms are small. Many of the slaughtering plants, especially the large federally inspected plants are located in or near the large urban areas. The same is true of meat processing plants. Poultry eviscerating and processing occur in a very few firms with a large volume. Most of these firms are located in Davidson, Knox, and Hamilton counties (Figure 10 page 74).

II. IMPLICATIONS FOR FUTURE RESEARCH

The primary purpose of this study was to provide a beginning source of information on the effect the Tennessee Meat and Poultry Inspection Act may have on the structure of the slaughtering and processing sector. Given the framework of this study, one could attempt to examine changes in the number, size, and location of firms as these changes have evolved over the past two years. The pertinent question will be to determine if there was a change in the structural variables. If there was a change in the variables, can the change be attributed directly to the Act, or were there other contributing factors? The next question would be concerned with determining the effect of changes in the structure on the conduct and performance of the firms in the sector. Will the change in the structure affect the type or quantity of output or the prices charged for the output? For the firms which have experienced the costs of reorganizing their technique and changing their facilities, there will probably be some change in their relative performance or efficiency. If the plants expand and take

advantage of economies of size, there could be a more efficient sector to evolve. This question should also be examined. If the number of firms involved in slaughtering and processing decline, the relative bargaining power in determining prices for outputs may increase in this sector. This question could also be examined.

The poultry and livestock-meat industry is a very important part of the Tennessee economy. The affect of any legislative change, as well as any other change in the social or economic conditions in this sector will therefore affect the economy of Tennessee and deserves careful consideration. Furthermore, the structure will change as we grow to meet the expanding meat needs of a growing population and changing tastes and preferences. Providing the needed services in the most efficient fashion in this industry should be the primary purpose of future work in this field of study.



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