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Changing patterns of concentration in the meat packing industry

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CHANGING PATTERNS OF CONCENTRATION
IN THE MEAT PACKING INDUSTRY

by

Richard Julius Arnould

A Thesis Submitted to the
Graduate Faculty in Partial Fulfillment of
The Requirements for the Degree of
MASTER OF SCIENCE

Major Subject: Economics

Signatures have been redacted for privacy

Iowa State University
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INTRODUCTION

The measures of the concentration and structure of American industry, presented in the form of concentration ratios by the Census Bureau, indicate only slight trends toward increased concentration in the last two decades. Industrial organization economists admit that measures encompassing the structure of manufacturing industries advance a limited amount of information necessary to predict the effects that concentration and market structure have on economic variables, e.g., monopoly control, pricing policies, wage policies, and the reasons for changes in a specific industry. Studies conducted at the industry level are necessary to disclose such information. Although this thesis does not involve a study of the pricing and wage policies of an industry, it is an attempt to point out and then explain the reasons for the basic changes that have occurred in the structure of the meat packing industry.

The meat packing industry has been chosen for this thesis because it presents a trend in concentration in the reverse direction. The industry has undergone a transformation that has greatly reduced the domination of the industry by four firms. A strong competitive fringe has evolved to take over the production of the majority of the output of the industry. The industry has been characterized by low profits. It has been involved in numerous labor problems. These factors and others will be considered as possible causes of the deconcentration.

The first chapter is a historical account of the industry covering the years from the late 1800's to present. Included in this chapter is

an account of the anti-trust actions taken against the peckers.

The second chapter begins with a discussion of concentration measures. The data are presented to support the hypothesis that a significant amount of deconcentration has occurred. The areas reflecting the greatest changes are pinpointed.

The reasons for the emergence of the independent peckers and the decline of the national peckers are discussed in chapter three. The implications of the findings in this study for the growth of firms are discussed in chapter four.

THE HISTORY OF THE MEAT PACKING INDUSTRY

Rapid Emergence to Dominance

The development of the meat packing industry takes on interesting features as early as the two decades prior to the turn of the century. It is in the period from 1880 to 1920 that the growth and dominance of the food industry by the five large packers became so significant that Congress called for a major investigation to be conducted by the Federal Trade Commission to see if antitrust statutes were being violated. This investigation ended in a series of charges against the packers that was settled by the action of a consent decree.

The growth of the five large packers from 1887 to 1917 was striking even in comparison to the growth of other industrial firms, in this period when industrial growth and expansion was at high levels in the country as a whole. In terms of physical equipment and plants, the group owned seven plants in 1887, twenty in 1897, and ninety-one in 1917. Even more striking was the growth in branch houses. The branch house system was the means of product distribution in this period. The slaughtered carcasses were stored in the branch houses before final distribution to the retailer. This meant that the branch house must be equipped with refrigeration facilities. Some of the branch houses were set up to do some minor processing operations. This system called for quite an intensive outlay of capital if the firms wished to develop the scale of operation set forth by the leaders. In 1884 Armour operated two branch houses. By 1900 the Big Five had five hundred ninety-one and in 1917 the number

had grown to 1120. All other interstate slaughterers had a total of one hundred thirty nine branch houses (7, part I, pp. 141-143). The branch house system was located in cities and large towns. Where localities were isolated from the branch house system, the packers used a system of car routes. The car routes were a network of refrigerated cars that carried the function of a branch house to those areas too small to warrant the capital required to build a full scale branch house. The car routes operated from an established branch house or directly from the slaughter plant. Later in this period, with the development of the motor truck, Armour and Company developed the same type of car route system with trucks rather than the rail system. This enabled them to reach an even larger number of towns not served by railroads. Table 1 gives an indication of the control The Big Five had over these means of distribution. In 1916, The Big Five owned 89 percent of the branch houses in operation. This represented an investment of over \$30 million by The Big Five. Even more significant is the fact that Swift and Armour owned 58 percent of the total number of branch houses. The same situation existed in the car route system. The system involved large outlays of capital to acquire rolling stock. This eliminated many of the smaller companies from participating in car route sales. In 1918, The Big Five controlled 90.2 percent of the car routes reaching nearly 60,000 towns. The other 9.8 percent of the car routes held by the other interstate slaughterers reached only 1,507 towns.

The importance of this system of distribution is shown by the amount of sales that were conducted by the branch house and car route systems.

Table 1. Branch houses, private cars, and car routes of the Big Five, 1916-1918^a

	Branch houses, 1916			Average per branch	Investment per dollar of sales	Private cars, 1917		Car routes 1918	
	Number of branch houses	Per cent of houses total	Book value			Number	Percent	Number of tons covered	Percent
Big Five, Total	1,120	89.0	\$30,275,550.89	\$27,031.74	\$0.039	25,850	1,297	90.2	58,012
Swift	367	29.2	11,577,197.67	31,545.50	0.038	8,628	484	33.7	23,376
Armour	363	28.8	11,422,703.43	31,467.50	.046	10,925	197	13.7	24,516
Morris	154	12.2	2,706,960.61	17,577.67	.028	2,731	229	15.9	4,019
Wilson	121	9.6	2,200,000.45	18,181.82	.033	2,112	187	13.0	1,903
Cudahy	115	9.2	2,368,688.33	20,597.29	.034	1,654	200	13.9	4,198
All others	139	11.0	--	--	--	N.A. ^b	141	9.8	1,507
Total interstate slaughterers	1,259	100.0	--	--	--	N.A.	1,438	100.0	59,519

^a Source: 16, part I, pp. 142-149.

^b N.A. = not available.

In 1916, Swift made 63.7 percent of its sales through car routes and branch houses, Cudahy made 62.9 percent of sales in this manner, and of the total sales of The Big Five, amounting to over \$1.5 billion in 1916, 58.2 percent were made through this system. This vast distribution system presented great entry barriers to any small firm wishing to engage in the interstate slaughter industry. This also put the small independents in direct competition with the large national packers because the far reaching network of car routes were extending to areas that had previously been served by local packers.

The growth and dominance of The Big Five was just as striking in terms of slaughter operations. By 1916, The Big Five were slaughtering 82.2 percent of the cattle being slaughtered by interstate firms, 76.6 percent of the calves, 86.4 percent of the sheep and 61.2 percent of the hogs (16, part I, p. 106). Swift and Armour conducted over 50 percent of the slaughtering in every category except hogs where they slaughtered 43.1 percent of the hogs slaughtered by firms engaged in interstate operations. It was suggested at the time that the large packers were not in the hog slaughter industry to the same degree as they were in the other lines of slaughter because by-products made up a much smaller portion of the live weight of hogs than in the case of other animals (16, part I, p. 107). Since the handling of by-products required large capital outlays, the large packers engaged more intensively in those lines of slaughter that yielded higher percentages of by-products per live weight of the animals. Therefore, the independents were at a disadvantage in handling by-products because of capital shortages and because their scale

of operations in slaughtering was too small for them to realize the output required for the efficient handling of by-products. Thus the independents tended to specialize more intensively in hog operations.

Another reason why the large national packers did not gain as much control over hog slaughtering was due to the state of the final product. The majority of the beef, veal and mutton sold for retail distribution was sold as fresh meat. This required the use of refrigerated facilities such as the branch house system and refrigerated railroad facilities. The large national packers, with their large distribution centers, could enter an area and sell at a reduced rate to drive out the independent. Because the independent didn't have the capital available for the necessary distribution facilities he was forced to sell on the market at the existing prices. Therefore he was very likely to be met with price discrimination by the large packers since they had the refrigerated facilities to hold their meat and protect them from losses resulting from spoilage. However, this was not the case with pork. Most pork was sold as processed or semi-processed meat. Therefore, the small firm had some control over the supply since they could hold their product off the market if a national packer moved in and engaged in price cutting. This situation could last only in the short run. In the long run the local packer would have to meet the national packers price, go out of business if the cost situation did not permit this, or find a new market. The latter suggestion was the one turned to by the independents. This was possible because their cured products didn't require refrigerated facilities to distribute them. Thus the independents could acquire enough capital to expend their

market by reaching distant cities. However, they were restricted to the local market in the sale of fresh meats.

The lack of need for refrigerated facilities also opened other markets not available to fresh meats. These markets were the board of trade and the existing national packers. Thus if a firm did not have the capital available to develop or join a wholesale group it could have sold the cured products on the board of trade, where the national packers and wholesalers were the buyers, or they could have, and did, sell partially cured or cured meat directly to the national packers.

Even though some of the independent packers could widen their market sufficiently to obtain a scale of operation necessary to give them a competitive cost structure in some lines of operation, many of the independents could not meet the capital requirements to obtain this size. This size was acquired, as is discussed above, mainly through the hog slaughter and processing operations. The curing process required that a large inventory must be held for a long period of time. This required that much capital be tied up in inventory. The firm's working capital may be reduced to the extent that it must curtail operations or obtain funds elsewhere. Since these firms were small, their source of funds was very limited. Thus many were forced to leave the industry since the local fresh meat industry did not allow them to operate at a scale that could ensure a satisfactory rate of return, or in some cases any return, in the event that they had to compete with the well established, large scale, national packers. Even though the data support this idea, the independents were still holding a larger percentage of hog operations

than any other type of operation. However, their position was not at all sound in the hog operations.

The startling situation that existed at the time was that the five leading firms slaughtered over 80 percent of the total number of cattle slaughtered for interstate shipment while 147 other interstate firms conducted less than 20 percent of the cattle slaughter. Nearly the same situation existed in all other kinds of animals. The situation is even more striking if the local wholesale slaughterers engaged in intrastate operations is added to this. If the approximately 417 firms that were engaged in cattle slaughtering were added to this, a total of over 600 firms controlled slightly more than one quarter of the slaughtering of cattle while the five leaders slaughtered nearly 75 percent of the cattle. The only significant divergence from this pattern was in hog slaughtering where about 57 percent was conducted by the five leaders and 43 percent by all others (inter- and intra-state). The reasons for this divergence of intrastate and national packers' market shares remain the same as those given above since the intrastate slaughterers faced conditions very similar to the small interstate operations.

Other Areas of Control

Among reasons for the rapid emergence of the five leading slaughterers is the control they had over many of the supporting facilities other than those dealing with the distribution of the processed product. This control was signaled in the other direction in that it dealt with the procurement of raw materials, choice plant locations, cattle loan

facilities, and rendering facilities. The control of these facilities came mainly through the ownership of the many terminal stockyards.

Part three of the Commission Report reveals that the five leading national packers, or members of their families, owned majority interests in twenty-two of the fifty leading centralized stockyards and had a minority interest in many more. The report goes on to say that more than 84 percent of all animals marketed in the United States passed through yards in which these industry leaders had an interest. Over 56 percent of the animals marketed were done so in the twenty-two yards that were controlled by the five leaders.

The Commission Report's reasons for ownership of the yards by the packers is quite contrary to the report given by the packers. The packers maintained that they were forced to take a leading position in the operation of the stockyards to provide what they termed "efficient service". They contended that the rail companies could not make sufficient returns to operate the facilities because of the enormous cost involved in establishing and maintaining the yards. However, the Commission found that many of the yards were paying very satisfactory dividends and did not require large outlays of capital for their establishment and operation. However, the success of a stockyard depended on its need, and this need was created by the packing houses located around the yards. The stockyards could make very high returns if they had meat packing plants in the same area. They did not show a profitable operation if they were maintained merely as a feeding stop along the route to a packing center. Therefore the operators of the yards gave large grants of

stock, plant sites, and cash bonuses to the packers for locating near the yards. This eventually led to putting the packer in control of the facilities. In Chicago the major packers bought land outside of the city in a threat to move their plants away from the existing yards. The threat resulted in the yards company issuing the packing firms three million dollars in bonds if they remained at the Chicago yards for 15 years. Armour was then asked to take a one-fifth interest in the yards. They did so in an effort to get funds from the stockyards to keep business at that location.

When the packing firms gained control of the yard facilities they also gained control of the buildings housing the offices of the cattle commission firms that handle the selling of livestock for producers. This at least hampered the actions of the Commission firms, if it did not, in fact, take much freedom away from them, because the packers could specify who got into the yards. In many instances cited by the Federal Trade Commission the yards company owned enough land around the yard to control the location of financial organizations, other packing plants, and what became very significant at the time, the rendering companies. At some yards the commission firms were required to sign an agreement stating that they would sell all animals that died in transit or at the yards to a specified rendering company at a price set by the rendering company before they could sell stock at the yards (16, part III, p. 69). The specified rendering company was owned or controlled by the packing house. These rendering facilities were able to show large profits because of their monopoly buying position at the central locations of

packing firms.

Various actions by members of Congress to break-up control of these facilities failed. However, the consent decree, to be discussed in more detail in the next section, required the sale of all such holdings.

Illegal Practices Used in Gaining Dominance

The rapid growth and dominance of the meat packing industry by The Big Five brought about a great deal of suspicion on the part of many groups. The loudest complaints, which brought about a full scale investigation at the direction of the President to be conducted by the Federal Trade Commission, were made by the livestock producers. The producers were faced with both low and fluctuating prices for their product that seemed to have no relation to costs of production or to short run market conditions. This led to the introduction of bills in Congress to stimulate the production of livestock by removing abuses of power through governmental regulation. However, the investigation by the Commission never undertook the task of making a full scale study of the pricing situation in the industry. Some statements can be made about the advantages that the packers had over the livestock producers.

First, the producers were faced with risks because of the long period between the outset of the livestock operation and the time of marketing. The time lapse between the purchase of livestock and the sale of meat is much shorter for the packer, except in the case of cured and processed pork. Therefore changes in the market conditions could have a much more serious effect on the producers than on the packers since most of the producers' flexibility is lost once the feeding process

has begun.

The second aspect deals with the nature of the market information available to the feeder and the packer. The dominant control of the stockyards and the adjoining facilities by the major packers were alleged to have given the packers control over the dissemination of market information. Thus the government entered into the activities of handling and compiling market information early in the history of the industry. This information was of great aid to the feeder but it was also available to the packer. Besides having this information, the packers had the necessary scale of operation to conduct research into the supply situation that it would be facing in the future. The feeder could neither obtain such information nor did he have the facilities to analyze and interpret the information available to him. On the demand side the packer had first hand information about the stocks of meat on hand. The marketing organizations also made available to the packers information about the current and prospective demands for meat. Thus the feeder was confronted with a great deal more risk because his information was more imperfect than that available to the packer.

Since the packers had such highly centralized buying organizations, they had a natural advantage over the large number of small feeders. If the market research facilities were in any way interpreting the market in a proper manner they should have led the packers to act in a relatively similar manner even without collusion.

If the packers had the power, through collusion or through separate action, to control the market, the price fluctuations that ruin the

producer could lead to large profits for the packers. The packers could lead the market up to high expectations. Then when trading was at the volume they desired they could let the price suddenly fall. This would leave the cattle feeder in a ruinous position but if carefully planned, it could prove to be most prosperous to the colluding packers. Any proof of such activities would have been very difficult if not impossible to obtain since the illegal or artificial fluctuations needed to be separated from the natural market fluctuations. Therefore, the Commission took the line of action of producing evidence to support its charge that a monopoly existed that was powerful enough to control the market in the manner indicated above. The Commission charged that at least the three leading companies had a history of more than thirty years in which they engaged in agreements, combinations, pools, and other types of activities to gain control of the meat situation.

The Commission report divided these activities into three main periods: from 1885 to 1902, the period of dressed meat price fixing; from 1902 to 1912, the great merger period; and from 1912 to the time of the report in 1917-1920, the period of a livestock pool and export pool. It is necessary to study the activities of this period, at least briefly, to understand some of the present day activities in the industry.

The period from 1885 to 1902 is characterized mainly by two large pools. The first of these began in 1885 and was known as the "Allerton Pool". The "charter members" of the meat combination were Swift and Company, Armour and Company, S. W. Allerton, Morris and Company, and Hammond and Company (16, part II, p. 13). This early pool allotted the

amount of meat to be shipped by each member and had a crude system for arriving at margins. Even though territories were not well defined and the margin system was not well established, a special Senate committee found evidence of price fixing, territorial divisions, division of contracts, and compulsory buying agreements.

In 1893 this combination enlarged to become known as the "Veeder Pool". This pool had well defined territories, a detailed system for arriving at a selling price, and a well defined set of fines for violators of the agreements. The pricing system did not cause the firms to arrive at identical margins. The cost was determined by adding to the price paid for the animals, a uniform charge for killing and cutting the animals, and deducting from this a uniform allowance for the saleable by-products. This gave what was known as the test cost. The allowances and charges used in deriving the test cost were placed low and high enough respectively to ensure a sizeable profit. Orders were sent to the branch house managers telling them whether they should work for cost or a certain positive or negative margin. The branch house managers would send reports to the central office giving the price received for the early sales. The central office then checked the margin received with that intended in the agreement. If adjustments were necessary orders would be sent back to the branch house managers.

This system worked well until the years 1896 to 1897 when Schwarzschild and Sulsberger gained a large enough share of the business to cause the pool to operate ineffectively. In 1898 this company was persuaded to join the pool. Operations again commenced with weekly

meetings to agree on shipments and margins. These agreements were policed by auditors hired to check the shipments of each company. This action was abandoned and the pool was discontinued in 1902 when the government entered an injunction under The Sherman Act of 1890 to have the enjoined parties discontinue any acts of combining or conspiring to monopolize or restrain trade. The government action ushered in a period of merger by the principal members of the pool.

Within a month after the formal filing of the 1902 antitrust case the three principal members of the old pool attempted to form a merger. Schwertschild and Sulsberger and the Cudahy Packing Company did not join because of fear of government prosecution. J. Ogden Armour, who owned approximately ninety-three percent of Armour Illinois, Gustavus F. Swift, who owned approximately sixty percent of Swift, and Edward Morris, who owned approximately ninety-three percent of Morris and Company, agreed to form a new company to be incorporated under the laws of New Jersey or some other state, to which they would sell their holdings in meat packing and other companies. In payment the sellers were to receive twenty year gold bonds on the new corporation, preferred stock, and \$25 million of the new corporation's stock valued at par. Each member was to deposit with an Illinois bank \$1 million to be forfeited if the contract was broken. The members were to purchase other corporations for the new business. Before the year had ended the two large firms mentioned earlier joined in the agreement. This plan failed in October of 1902 when Kuhn, Loeb, and Company, who were to loan the packers \$60 million, backed out because of suspicions of the plan and expectations

of an upcoming panic. Before this merger attempt had failed the packers considered alternative plans.

This alternative plan consisted of Messrs. Swift, Armour, and Morris writing notes, the amount of each being based upon the assessed value of the tangible assets of Swift, Armour Illinois, and Morris and Company as a percentage of the total of the three, for a \$15 million loan primarily to execute contracts of purchases entered before the previous loan request was refused. On the same date the loan was acquired the National Packing Company was formed. This company was given the holdings that had been acquired by the firms that were to merge earlier. This company was in existence for nine years. Throughout its duration the courts charged that its board of directors met weekly to determine margins and amounts to be shipped into various areas for all the major firms, i.e., to do the work previously done by the pool.

In March of 1910 the United States filed action under the Sherman Act for dissolution of the National Packing Company. However, the case ended in a verdict of not guilty in 1912. In the same year action was begun and approved by the Justice Department for the voluntary sales of the large company to Armour, Swift, and Morris. The Commission charged, in its report, that this did not end the collusion, that there still existed something more than a "gentlemen's agreement", and that its operations were far superior to the "pool of the nineties". The companies were very careful at this stage to not put into writing anything that would give the appearance of being an illegal agreement. The only agreement found was one dealing with the export of meat products to England.

Each company in the international pool was given an allotment in conjunction with the amount of space available on the steamships.

In the same period the Commission charged that the five leaders in the industry were using a process of rotation in price cutting to eliminate competition from smaller firms. This was done on a local basis. The packers explain it as being caused by an oversupply of some type of meat. Here again there was no decisive proof of the action. However, the Commission thought that various articles of correspondence found on the packers premises strongly implied that such action was being taken.

The most serious charge of the Commission dealing with this period was that the five leading packers agreed to divide their purchases of livestock at the leading terminal markets according to fixed percentages and that they acted collusively through their buyers and by other means to bring about more control over meat and meat prices. There is evidence that this livestock pool was in effect before the dissolution of the National Packing Company. When the company was dissolved the remaining firms in the pool were forced to readjust their percentages. One of the buyers for a leading packer testified that he got his buying orders from Chicago. These orders related to prices to be paid. Later in the day the buyer would get orders dictating the number to be purchased. He would then follow the orders as closely as possible without engaging in any action that would upset the price on the market. Records found at the various offices and those prepared by the government substantiate the fact that the packers deviated only slightly from the percentages decided upon.

Along with this came the government charge that the defendants were using their facilities to gain control of substitute foods. The extensive branch house system gave the packers an edge over most other firms in the distribution of foods requiring cold storage, i.e., fish, cheese, vegetables, fruits, cereals, eggs, etc. Besides having the facilities to handle and distribute these lines of foods, they had acquired the financial facilities, through their dominance of the meat industry, to buy many of the existing firms in the, so called, substitute foods industry.

All of these activities combined, the government claimed, were responsible for the growth of Swift, Armour, Cudahy, and Wilson (formerly Sulzberger and Sons) in the fifteen years from 1904 to 1919. In this period the combined net worth of the four increased five fold to nearly half a billion dollars. The principal corporate defendants, the individuals, and their families owned controlling interest in 574 firms and lesser interest in a great many more firms.

On February 27, 1920, the government filed a civil action under the Sherman Act against Swift and Company, Armour and Company, The Cudahy Packing Company, and Morris and Company, their subsidiary firms, and fifty of the officers, directors, and stockholders. The complaint of the government asked for an injunction prohibiting the defendants from further engaging in activities in violation of the Sherman Act such as combinations in restraint of trade, unfair competition, and other unlawful practices in an attempt to monopolize trade or commerce. In addition the defendants were to divest themselves of all facilities they had acquired in the process of restraining trade, specifically meat markets,

stockyards, market journals, terminal railways, and cold storage facilities. They were to leave the "substitute foods" industry all together.

On the same day as the complaint was filed the defendants filed separate answers dealing, in great detail, with each charge. The defendants then agreed, also on the same day, to the conditions of a consent decree in which the defendants would, without prejudicing the court, agree to discontinue any activities mentioned in the case and divest themselves of any properties in question.

This action terminated the 1920 complaint but did not terminate the history of legal conflict between the courts and the meat packers. In both 1929 and the late 1950's the defendants of the 1920 complaint petitioned for modification of the decree, testifying that the industry had changed in structure, along with those other allied industries mentioned in the decree, to the extent that the stipulations of the decree were no longer needed. Both of these petitions were denied on the basis that there was not sufficient evidence to prove that the same type of monopoly would not again emerge. Government attorneys said, in rejection of the Swift complaint that: 1, the size and dominant position of the defendants in meat packing had not changed; 2, other meat packers were not diversified in food distribution; 3, food retailers were not invading meat packing; 4, changes in the grocery business were irrelevant since the grocers were still dependent upon meat packers; 5, meat packers have not suffered great hardships; and 7, the need for the decree as a check against unfair competition has not lessened.

In 1948 the government filed another complaint against the packers

charging that they were still engaging in many of the illegal buying practices brought out in the 1920 change. This case was dismissed on motion of the government on March 17, 1954. The reason for dismissal given by the Antitrust Division was that the judge had fixed a cut-off date which limited the government's time to the extent that it could not sufficiently research the case.

Although it is apparent that the action of the court has had some affect in shaping the meat industry, the extent of this effect will never be completely known. Following the action of 1920 the industry began a period of deconcentration. It is impossible to separate the impact of the court action from such things as technological change and other factors leading to a new structure for the industry. Many indicators tracing the development of the industry after the decree all lead to the same resultant conclusion as will be shown in the following chapter.

Decentralization and Technological Change

The meat packing industry has been characterized by decentralization and deconcentration. Although these phenomena are very different in nature their causes may be very closely related. Even though this paper is primarily concerned with deconcentration it is necessary to review the aspects of the movement of the industry from the highly centralized population centers since there is a relationship between the two events.

Various types of data give an indication of the trend that is taking place. The great centers of meat packing in the 1920's have been reduced in importance by the vast movement of slaughter facilities to smaller

communities near the livestock supply. The largest shift of federally inspected plants away from the central terminal markets has occurred in the North Central Region and extreme West. An indication of the movement away from the terminal markets is given by the following table showing the change in livestock slaughter at packing plants located at thirty selected terminal markets.

It is apparent from the data that the greatest decline in cattle slaughter took place in Chicago and Kansas City with a majority of the other centers showing smaller declines. The total decrease in these thirty markets, from 54 percent to about 37 percent, indicates that the cumulative amount of decentralization in cattle slaughtering has been sizeable. The situation is very similar for the other species of livestock. The trend is even more marked in the decline of packer purchases of livestock at the terminal stockyards. The following table (Table 3) indicates this decline signifying a change in the purchasing patterns of the packers.

The figures of Table 3 indicate that the decentralization trend has been going on for a long period of time. Two reasons seem to be of greatest significance in causing the change although other aspects played at least a minor role. The two leading factors in the change seem to be the widespread use of truck transportation and the changes in plant technology.

The significance of the use of truck transportation is evidenced by the decline in the percent of livestock and livestock products shipped by rail from seventy-five percent in 1935 to twenty-five percent in

Table 2a. Livestock slaughter at packing plants located at 30 terminal markets, 1961 and 1947^a

Market	Cattle		Calves		Sheep and lambs		Hogs	
	1961	1947	1961	1947	1961	1947	1961	1947
Baltimore	59	131	10	83	10	64	110	304
Buffalo	38	120	33	48	30	96	31	36
Chicago	692	1,305	8	247	197	688	892	3,036
Cincinnati	168	317	18	58	21	37	592	699
Cleveland	200	127	25	74	51	112	16	183
Denver	567	372	3	47	1,217	572	511	600
Detroit	240	254	26	294	205	213	82	138
Evensville	88	84	10	25	22	20	485	73
Fort Worth	207	445	6	223	1,023	942	242	630
Houston	33	65	70	128	1	2	2	10
Indianapolis	167	215	9	50	49	59	629	449
Kansas City	666	842	33	211	189	853	726	401
Louisville	75	112	23	70	6	4	311	203
Memphis	89	127	5	42	--	1	447	170
Milwaukee	283	252	316	495	146	57	345	467
Nashville	49	61	20	38	23	21	168	75
Ogden, U.	47	36	1	3	309	12	95	73
Oklahoma City	219	330	8	144	66	264	436	485
Omaha	1,468	1,132	40	69	568	995	2,427	2,026
Peoria	60	52	4	24	14	7	669	403
Pittsburgh	27	115	7	62	23	86	74	452
Portland	97	126	10	27	135	127	215	203
Richmond	49	27	12	17	5	4	367	307
St. Joe	654	476	16	92	552	728	1,349	1,143
St. L. MSY	270	878	54	400	143	578	1,540	2,119
St. Paul	757	877	200	513	797	534	2,414	1,902
San Antonio	96	233	4	91	52	212	43	68
Sioux City	760	545	--	27	229	426	1,568	1,290
Sioux Falls	203	87	--	1	126	95	299	299
Wichita	191	194	--	45	--	153	564	295
Total 30 markets	8,539	9,937	971	3,648	6,229	7,962	17,679	18,539
Industry total	23,150	18,300	5,650	10,200	16,400	17,250	69,500	51,700

^aSource: 1, p. 17.

Table 2b. Percent of slaughter at 30 terminal markets, 1961 and 1947

Market	Cattle		Calves		Sheep and lambs		Hogs	
	1961	1947	1961	1947	1961	1947	1961	1947
Baltimore	.25%	.72%	.18%	.81%	.06%	.37%	.16%	.59%
Buffalo	.25	.66	.58	.47	.18	.56	.06	.07
Chicago	3.00	7.13	.14	2.42	1.20	4.00	1.28	5.87
Cincinnati	.73	1.73	.32	.57	.13	.21	.85	1.35
Cleveland	.86	.69	.44	.72	.31	.65	.02	.35
Denver	2.45	2.03	.05	.46	7.42	3.32	.74	1.16
Detroit	1.04	1.39	.46	2.88	1.25	1.23	.12	.27
Evansville	.38	.46	.18	.24	.13	.12	.71	.14
Fort Worth	.89	2.43	.11	2.19	6.23	5.46	.35	1.22
Houston	.14	.36	1.24	1.25	— ^a	— ^a	— ^a	.02
Indianapolis	.72	1.17	.16	.49	.30	.34	.90	.87
Kansas City	2.88	4.60	.58	2.07	1.15	4.94	1.04	.78
Louisville	.32	.61	.41	.69	.04	.02	.45	.39
Memphis	.38	.69	.08	.41	— ^a	— ^a	.69	.33
Milwaukee	1.22	1.38	5.59	4.85	.89	.33	.50	.90
Nashville	.21	.33	.35	.37	.14	.12	.24	.14
Ogden, U.	.20	.20	.02	.03	1.88	.07	.14	.14
Oklahoma City	.95	1.80	.14	1.41	.40	1.53	.63	.94
Omaha	6.34	6.18	.71	.68	3.46	5.77	3.49	3.92
Pecris	.26	.28	.07	.24	.08	.04	.96	.78
Pittsburgh	.12	.63	.12	.61	.14	.50	.11	.87
Portland	.42	.69	.18	.26	.94	.74	.31	.39
Richmond	.21	.15	.21	.17	.03	.02	.53	.59
St. Joe	2.82	2.60	.28	.90	3.36	4.22	1.93	2.21
St. L. MSY	1.17	4.80	.96	3.92	.87	3.35	2.21	4.10
St. Paul	3.27	4.80	3.54	5.03	4.86	3.10	3.47	3.68
San Antonio	.41	1.27	.07	.89	.32	1.23	.06	.13
Sioux City	3.28	2.98	—	.26	1.40	2.47	2.25	2.49
Sioux Falls	.88	.48	—	— ^a	.77	.55	.43	.58
Wichita	.82	1.06	—	.44	—	.89	.81	.57
Total at 30 terminal markets	36.88	54.30	17.2	35.8	38.00	46.2	25.44	35.86

^a Less than .01%.

Table 3. Packers' purchases of livestock at terminal stockyards^a

Item	% of total purchases		
	1923	1947	1961
Cattle	90%	76%	42%
Calves	86	61	23
Sheep and lambs	86	61	37
Hogs	76	37	29

^aSource 1, p. 15.

1958 (3, p. 18). The widespread use of truck transportation eliminates the shipments of livestock and livestock products on the railroad system which has a rigid nexus in Chicago. The use of trucks allows a more direct and efficient routing system due to the saving in time. Loading docks are built rather than the more costly railroad spurs. The need for carload lots and for complete trains takes much of the flexibility out of the railroad system that is inherent to truck transportation. An unpublished experical study reached the conclusion that this was the most relevant factor in the decentralisation of hog slaughter if not for the other species of livestock also (17, p. 49).

The second reason dealing with changes in technology pertains mainly to the great advances that have come about in refrigeration equipment. The modern refrigeration system does not require the plant to be near an ice supply as was necessary in the 1920's. Other changes in the technology and equipment have made the smaller decentralized slaughtering operation efficient and profitable.

There are various other reasons playing some role in the movement

of the slaughtering industry away from the centralized areas. Location theory would suggest that the movement would occur when it is cheaper to transport meat products than to transport livestock. This is valid under the assumption that the plants have similar within plant cost structures. Although this hypothesis is one of the most frequent mentioned, it seems to have warranted little empirical research. The Wallace study indicated that evidence was found that was inconsistent with this hypothesis in the case of hogs (17, p. 49).

Another factor that would play some role in the decentralization process, although impossible to measure, would be the court decision requiring the sale of stockyards. This eliminated the monopoly advantages discussed above in connection with the ownership of the yards. This appears to have eliminated many, if not most, of the advantages leading to central location of the major packers around these yards.

The last factor to be mentioned here is that the slaughter firms have moved to areas where wages are lower than in the central locations. The Wallace study revealed the fact that this was an effect rather than a cause in the case of hog slaughtering. I feel that this statement is very possibly a characteristic of the specific area being studied rather than of the industry as a whole. A report by the Department of Labor indicates that the midwest is the only region in the United States in which average hourly earnings of slaughter plant employees are higher in nonmetropolitan areas than in metropolitan areas (14, p. 12). Although it is not the purpose of this paper to prove this point, it would appear that this hypothesis may be underplayed as a factor affecting decentraliza-

tion. The wage factor will be discussed in greater detail as a cause of deconcentration.

Other factors playing some role in this process that warrant listing here are increased information to both sides, increased specialization, changes in wholesale distribution resulting in a great decrease in the need for branch house systems, changes in raw material procurement, federal grading systems, and an over all reduction in barriers to entry.

Although this list is not inclusive it lists the main reasons given in current literature. It should again be emphasized that these factors, although listed as having significant effects on the decentralization process, should not be excluded from factors affecting deconcentration. Special emphasis is made in this paper to separate the main causes of the two phenomena but not to eliminate the possibility of interaction between the causes.

THE DECONCENTRATION IN THE INDUSTRY

Introduction

The market structure of an industry may be characterized in a variety of manners. The index used is dependent upon the intent of the study, the information available, and particular characteristics of the industry. The measure of market structure for a particular industry should indicate the point where this industry maps onto the scale of structural types between the theoretical extremes of pure competition and pure monopoly. A perfect scheme dividing market structures has not been developed. The scheme should be structured in a manner such that a clear difference in conduct or performance is present in the different categories within the scheme.

The classification scheme that divides the market structures into pure competition, monopolistic competition, oligopoly, and monopoly is grossly inadequate. The extremes of monopoly and pure competition are the necessary end points and remain consistent with the conduct and performance measures expected from theory. The oligopoly and monopolistic competition categories are much too general to be of any use. The conduct of an oligopoly made up of four large firms will differ from the conduct of one made up of a few dominant firms with a strong competitive fringe or that of an industry made up of firms gradually declining in size from the largest to the smallest.

Product differentiation must be taken into consideration in oligopoly as well as in monopolistic competition. If product differentiation

exists, methods of nonprice competition must be considered in the conduct of the firm.

Problems of classification arise because there is no guarantee of a one to one correspondence between a particular type of conduct or performance and a specific market structure. The firms of an industry in any form of market structure other than pure competition have some control over the pricing of their product. The price movements should not be as frequent if some form of oligopoly exists rather than a form of monopolistic competition. A performance measure such as profits will cause similar problems. Monopoly power does not guarantee excess profits. There may be situations in which an industry under monopolistic competition has higher profits than one under oligopoly.

These examples point to a few of the difficulties involved in setting up a market structure scheme. The basic problem is one of keeping the scheme consistent with the theoretical conduct and performance expected under particular market situations.

Concentration ratios are one possible measurement that can be used for classifying industry structures. A concentration ratio indicates the percentage of industry output contributed by a specified number of firms. The ratios of various industries can then be ranked according to size. This measure, when used alone, has weaknesses similar to those discussed above. There are no clear divisions between the absolute size of the ratios needed to cause a change in market conduct or performance. However, the absolute size of the ratios does give some indication of the potential market power of the firms within an industry. A measure

of the market power of the largest firms, when compared to the structure of the remainder of the industry, can give some indication of the conduct and performance expected from that specific industry.

There are other measures that can be used to indicate a structural scheme but most of them are not as useful or are more difficult to measure than a concentration index. One possible technique is to classify the industries on the basis of a performance differential, i.e., excess profits. The obvious difficulty in using this measure is mentioned above. The second problem is that of defining excess profits. The basic conclusion is that, if the measure is estimated, the firms showing the greatest excess profits have the most monopoly control. This is a very questionable conclusion.

An index of the compensation received by executives of the firms in an industry is another possible measurement that could be used to classify market structures. This index bases the classification on a type of firm conduct. The contention is that lack of competitive pressure on the firm allows the excess premium to be paid to the executives. Therefore, the higher the compensation the less competitive the industry. This, again, is a very questionable conclusion. It does eliminate the problem of firms showing low profit rates because of high executive compensation. Very severe measurement problems are encountered. It is difficult to find a norm that can be used for a comparison of the different industries.

The basic problem involved in using a performance or conduct measure is that this implies a one to one correspondence between the market structure and the measurement factor. It was pointed out above that

this is not the case in many instances.

This is by no means a complete list of the measures that could be used in designing a classification of market structures. The classification used depends on the answers desired and the information available. For this study general concentration measures are used because the data are readily available to provide the necessary empirical results in a better form than is possible with any of the other measures. The use of concentration measures to determine industry structures is, in many circles, considered to be the best regardless of the information available for other measures. It has been suggested by some that market shares should be used, in anti-trust action since the size of the share is a reflection of market power and monopoly power. These people assume that the potential availability of monopoly performance and conduct is a sufficient threat to warrant anti-trust action.

Theoretical Aspects of Concentration Measures

The concentration of an industry may be measured in a variety of ways. The most commonly used measure is that one giving the percentage of control of some factor in the industry held by the largest three, four, eight, etc., firms. This measure has gained such widespread use mainly because census data are reported in this form and, secondly, because of the ease in calculating such a measure. There are four factors commonly used to describe different concentration ratios, those being the value added, the value of shipments, the amount of employment, and the value of assets held by a specified number of firms. These measures may be

taken on the basis of firms or establishments depending on the use to be made of the study. Since this study deals with company deconcentration I will use the firm as the unit for comparison unless otherwise stated. The concepts of firms and establishments, as well as industries, are used here as defined by the Census of Manufactures.

The quality of the measure depends on a number of factors, the first being whether or not the industry classification is adequate. The measures will be better if, for a given product class, a high percentage of that product is produced in the industry being examined. Secondly, a high percentage of the output of the industry being examined should be that product under examination. These two measures are called the coverage ratio and the specialization ratio. The former measures the extent to which the products primary to an industry are shipped by plants in the industry while the latter gives the extent to which the plants in an industry specialize in the primary product of the industry. A high ratio is desired in each case.

Both shipments and value added have defects when used in devising concentration ratios. The value of shipments is bad in many cases because of varying degrees of product fabrication involved when the industry totals are taken. The measure may be grossly overstated if there is a large amount of interfirm or even interplant shipments of semiprocessed goods. Value added is a better measure if coverage and specialization ratios are high. If not this again gives a distorted picture. If the coverage ratio is low the measure of value added is low because much of the product in question comes from other industries.

If the specialization ratio is low the value added is overstated because there are a large number of secondary products being produced by the industry. A weighting factor has been suggested that would partially correct the overstatements (18, p. 238). This weighting adjustment would be:

$$\text{value added} \frac{\text{primary product shipments}}{\text{industry shipments}}$$

Most of the other relevant faults of this type of classification come, also, from weaknesses in the Census classification of industries such as over-aggregation, inadequate aggregation, and substantial influences from local as well as regional markets rather than national markets. Various weighting schemes to correct these influences are available. The average concentration ratio of the next digit breakdown may be used to correct the problem of over-aggregation. Case two can be corrected by summing and averaging where necessary to achieve proper aggregation. The last case may be corrected by weighting the ratio of the industry with the local or regional concentration ratios (18, p. 240).

Another type of measure commonly used is the Lorenz curve. This tells the percentage of output contributed by a certain percentage of firms. The Lorenz curve will give a good indication of the static as well as the dynamic changes over time. This technique is usually criticized on the grounds that a change in the distribution of firms that leaves the Gini coefficient unchanged cannot be evaluated in terms of its effect on concentration.¹ This situation would imply that the

¹A simple definition of the Gini coefficient is $A/A+B$ where A is the area between the main diagonal and the Lorenz curve and A+B is the entire area under the diagonal.

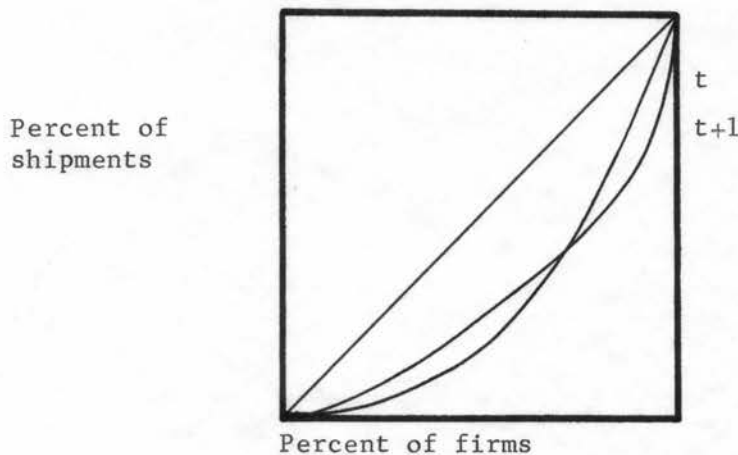


Figure 1. Hypothetical Lorenz curves

new curve for period $t+1$ intersects the curve of period t . Assume that the situation is as depicted in Figure 1. Assume also that the firms are ranked according to size, i.e., the first 20% are the smallest, etc. It can then be seen that the industry structure has changed in such a way that the small firms are now contributing a smaller portion to the industry and have become smaller relative to the total output whereas for the last $n\%$ of firms the size differential has decreased. Since in concentration measures we are concerned basically with the change in the largest firms the Lorenz curves supply adequate information to evaluate the trend. Therefore, even though the Gini coefficient gives no indication of the overall change in the size distribution, a comparison of the curves at specific points will indicate the change in market structure for that particular percentage of firms. Since the absolute number of firms and the level of sales must be known to construct the Lorenz curves the concentration measures can be computed in the form of the percent of

control by a certain number of firms, getting us back to the more prevalent technique.

The Lorenz technique is inadequate in two respects. The first weakness is just those problems associated with measuring shipments or value added. The second weakness is that the actual industry structure could be hidden by the percentage measurement of the number of firms. An example of this might be an industry made up of two firms of equal size. The Lorenz curve would indicate an equal distribution of shipments for the industry even though it is a very highly concentrated oligopolistic industry. Another industry may be made up of one thousand firms of equal size. This would give the same structure on the curve but in terms of market structure it would definitely be more competitive. The Lorenz curve analysis is useful for indicating concentration measures only when the number of firms in the industry is sufficiently large to insure against oligopoly with an even size distribution of firms. Closely related to this inadequacy is the entry and exit of firms into and out of the industry. This will have bearing on the situation in that it will change the relevant base used in computing the curve over the relevant time period.

The concentration curve is a measure similar to the Lorenz curve (10, p. 38). The concentration curve shows graphically what was described above as being calculated from the Lorenz curve. It is a regression of the number of firms (absolute) against the percentage of assets, sales, or some desired measure. Since it is based on the same information as the Lorenz curve it has similar faults. However, using the absolute number of firms solves the problem of having an equal distribution of

firms yet a highly concentrated industry.

The concentration ratio and the concentration curve are criticized, as a group, because they depend on only one point (10, p. 59). Therefore, changes in the position of the curve that leave this point unchanged are not readily apparent. This problem is alleviated to a certain extent if the area under the concentration curve is used to compare changes in an industry over time or differences between industries at a given point in time.

Another measure that escapes the latter problem is the Herfindahl index. Such a measure is made up of the sum of squares of firm sizes, expressed as a percentage of the industry totals. This measure allows for comparison on the basis of the entire distribution of the industry. The index will approach one as the number of firms decreases and the size distribution becomes more unequal.

Measures to be Used

It should be emphasized that none of the above measures will give the perfect representation of concentration. Therefore the measure used depends largely on the questions being answered or hypotheses being tested. In terms of the hypotheses to be presented in this thesis the measure dealing with the concentration of the four and eight leading firms provides the most satisfactory information. This measure covers the leading national firms as well as a few of the strongest regional enterprises. The size ranking of the firms declines very rapidly after the eight largest firms are removed from the industry data. Those remaining

tend to be mainly regional and local firms in the sense that all plants of the firm are in the same region or locality.

The second reason for choosing this measure is that most of the available data are computed in this form, comparing the four leading or eight leading firms with the remainder of the industry. Getting the data required for other measures would require the availability of the census files of the government or the direct information from the firms in question. This data is difficult to obtain from government agencies because of the disclosure laws. The firms are extremely reticent to provide even the most general data. Therefore the computed ratios will be used in most cases realizing that inconsistencies may be underlying in some cases.

Thirdly, these data are used because it presents the most readily comparable figures over the time series involved. It is acceptable because the four and eight leading firms have been quite stable in their rank in the industry over time. Therefore, when talking about the four industry leaders I will be talking about the same four firms over the entire period.

The major problems concerning the comparability of the data over time arise from changes in the industry classification schemes, changes in the products on the market, and changes in the internal structure of the firms. The industry classifications of the Census of Manufactures were quite crude and flexible until 1937. From 1947 to present the classifications have been similar enough to allow the data to be readily comparable and useful in a time series analysis. Therefore most of the

concentration measures taken will cover only this period. The second problem mentioned above causes problems mainly because the level of product fabrication has changed a great deal since the 1920's. Meat products are now sold on the market in a much more highly processed form. The third problems arise because the firms were almost exclusively engaged in slaughtering and meat packing or some closely allied industry at the beginning of the period. The same firms are now engaged in widely diversified activities making aggregate sales and investment data very misleading. However, the extent of this problem is known if the coverage and specialization ratios are known and can be corrected accordingly. These weaknesses will be pointed out in the data to be used when they are apparent and realized.

Empirical Data Depicting Deconcentration

It is very difficult to find a measure of the change in the industry that dates back to the 1920's and remains comparable to similar data in the 1950's. The measures available, as insufficient as they may be, are sales, earnings, net worth, and assets. In 1925 the sales of the four leading firms totaled \$2,315 billion. They showed a steady increase, with the exception of the depression years, to a total of \$5,341 billion in 1956. During the same period the sales of the remainder of the firms in the industry engaged in interstate commerce increased from \$1,150 billion to \$5,984 billion. Using a crude indexing system in which 1930 is the base year the change in sales in the four leading firms was from 102 in 1925 to 234 in 1956 (15, parts I and III). During the same period,

using the same base year, the remainder of the industry had a sales increase from 84 to 390. Therefore, although the four leading firms were still growing, their rate of growth in terms of sales was much lower than that of the remainder of the industry. In 1925 the four leaders in the industry accounted for approximately 67% of total industry sales. By 1956 this figure had declined to 47 percent. During the period from 1930 to 1956 the sales of Swift grew 170 percent while the sales of all other companies grew by 400 percent.

Although sales data do not give a clear indication of the details involved, the changes indicated are certainly of significant magnitude to give an indication of the trend taking place. The sales data are crude and should be interpreted with the following limitations in mind. First, the sales data given are in such a high level of aggregation that it is difficult if not impossible to determine those products entering the data. Therefore, many allied products that would not be included in the normal industry classification may be included in this set of sales data. Closely related to this problem is the case of new products being initiated on the market by some of these firms that may or may not be in the proper industry classification. Secondly, choosing the year 1930 as a base year is quite questionable since this was in the depression period and may cause the increases to be magnified. Since this year was chosen for both classifications of firms, the bias should affect both equally.

During the period from 1930 to 1956 the indexed assets of the four leaders increased from 100 to 133, using 1930 as a base year, while that

of the remainder of the industry increased from 100 to 228. During the same period the indexed net worth of the four leaders increased from 100 to 105 while that of the remainder of the industry increased from 100 to 231. Here again it can be seen that while both groups of firms increased in size over the time period the four leading firms grew in both assets and net worth at a much slower pace than the rest of the industry. The assets of the four defendants in the 1920 court case comprised 60 percent of the industry in 1925 but had declined to less than 50 percent in 1956 (15).

It should again be made clear that these data are not lacking in weaknesses. The major weakness would seem to be a lack of indication as to whether or not these data included sales of products not primary to the meat packing industry. However, since the data were used in court to support the four leading firms' belief that a large amount of deconcentration had taken place it probably is an accurate account of the meat packing situation because of the Big Four's desire to make the spread as great as possible. If the case so persists that goods are included other than those primary to the meat packing industry it would again narrow the spread rather than broaden it because the large producers represent the highest level of diversification. Therefore, these large firms would have higher sales figures because they are selling a much more diversified number of products, the smaller firms selling largely only those goods primary to the industry in which they are classified. In the light of this situation trends shown by these figures are very representative of the actual trends in the industry.

The data become much more accurate, although it still shows the same trends, if the period is reduced to that covering the years 1947-1958. These data, published by the census, include the value added by the industry, the concentration data, and the specialization and coverage ratios as indicated in the table below.

Table 4. Concentration in meat packing, 1947, 1954 and 1958^a

Year	No. of compe- nies	Value added (thousands of dollars)	Percent of value added accounted for by:			Indexes	
			4 largest firms	8 largest firms	20 largest firms	Special- ization	Coverage
1958	2,646	1,677,055	34	46	57	.98	.88
1954	2,228	1,394,486	39	51	60	.98	.87
1947	1,999	977,144	41	54	63	.96	.99

^aSource 12, part I, p. 10.

The data clearly indicate that the percentage of the values added by the four leading firms declined from 41 percent in 1947 to 34 percent in 1958. This is a decrease in their market share of 17 percent when measured as the decline in value added. The eight leading firms declined from 54 to 46 percent, a 14 percent drop, and the twenty largest firms from 63 to 57, a 9 percent drop. This clearly indicates that the major decline in market shares has been at the cost of the four largest firms. These four firms represented a 17 percent decline. The twenty largest firms declined by only nine percent. Therefore some firms in the category

necessarily increased their market share.

Another procedure for showing the above result is the following: If one subtracts the change in concentration of the four largest firms from the change in concentration of the eight largest firms the difference indicated is the effect contributed by the firms ranking five through eight. In this time period (1947-58) the change in the four largest is seven while the change in the eight largest is eight percentage units. Therefore a change of one percent is contributed by the firms ranking five through eight. If one subtracts the change of the eight largest from the change of the twenty largest the results is six minus eight or a minus two. Therefore, the firms ranked nine through twenty have actually gained a larger market share, i.e., have grown at a faster rate than the industry. Since both measures point to the greatest loss in market share by the four largest firms, at least part of the problem of pinpointing the change has been accomplished.

Before introducing new data some qualifications should be made regarding the above data. Before one should accept the census classification for nest packing, the data should be put to two tests. First, the specialization ratio must be checked. The ratio remains very high for the entire period. Thus the data are not being distorted by the entrance of products extraneous to the industry. Secondly, the coverage ratio must be checked. The ratio declines very little. Thus, the total production of the primary product is well accounted for. This decline in coverage is explained in part by the fact that many of those firms whose primary product at the beginning of the period was classified in the most

packing industry moved into the meat processing industry. Since they are still engaging in meat packing activities, e.g., slaughtering, but only as a minor activity, they are moved to a new industry classification. Therefore, the slaughter activities of these firms are not included in the data of the meat packing industry and the coverage ratio declines. The second point to be made about the data refers to the use of value added as a measurement of output rather than the usual value of shipments measurement. In the meat packing industry there is a large number of inter-firm shipments of the products at various levels of fabrication. This is exemplified by the fact that in 1961 a total of 9% of the slaughter plants did no processing. These 9 percent of the firms accounted for 4 percent of the total federally inspected slaughter. Of these plants engaged in processing and slaughtering 50 percent processed less than 50 percent of their own slaughter and on the average 14 percent of their slaughter. Ten percent of the meat packing firms processed from 50-100 percent of their slaughter and on the average 73 percent of their slaughter. Thirty two percent processed more than 100 percent of their slaughter. On the average this category processed 333 percent of its own slaughter (2). Clearly some of these firms would no longer be classified as meat packing plants but the entire set of data is given as an indication of the amount of product movement prior to its reaching the consumers market.

The use of the value of shipments would involve a significant amount of double counting for this industry since the measurement includes each of these inter-firm shipments. The value added measurement eliminates the possibility of this happening. The data, then, appear to be very

acceptable if the value added measurement is used.

The employment data published in the same Census Report is comparable from 1950 to 1958. In this period the percentage of employment accounted for by the four largest firms declined from 47 percent to 36 percent. That of the eight largest declined from 59 percent to 49 percent. The trends here are similar to those in the value added measurement giving the largest change in the four largest firms. These data are not as useful as the value added data since there has been the introduction of labor saving technologies that may be hiding the actual changes in production. In any case, since 1954 there has been an absolute decline in the number of employees in meat packing.

The next breakdown of data to be considered is the five digit classifications under meat packing, i.e., fresh beef, fresh veal, fresh lamb and mutton, fresh pork, and lard. This information is summarized in Table 5.

It becomes apparent from the data that the trends here are no different than those in the previous data. Fresh beef and fresh veal show the greatest reductions in concentration. In the case of fresh beef the reduction in the market share of the four leading firms is from 36 percent to 31 percent. No change is shown for the firms ranking five through eight. And an increase is shown in the market share of those firms ranking nine through twenty. In the case of fresh veal the four largest show a decline from 49 percent to 41 percent. The firms ranking five through eight show a decline of two, and the remainder of the firms show a gain in market share.

At first glance it is probably quite surprising to recognize that

Table 5. Concentration ratios of five digit industries^a

Classification	Product	Value of shipments (thousands of dollars)	Percent of value of shipments accounted for by:			
			4 largest companies	8 largest companies	20 largest companies	40 largest companies
20111	Fresh beef					
	1958	5,019,357	31	38	49	
	1954	3,943,145	36	43	51	
20112	Fresh veal					
	1958	414,102	41	50	65	
	1954	397,560	49	56	67	
20113	Fresh lamb and mutton					
	1958	305,161	60	69	85	
	1954	298,528	61	74	87	
20114	Fresh pork					
	1958	2,124,283	39	53	69	
	1954	1,928,756	42	56	69	
20115	Lard					
	1958	331,970	41	58	75	
	1954	383,163	45	63	78	

^aSource: L2, p. 107.

there has been very little change in the case of pork. This case will be covered more thoroughly in the next section but briefly it appears as though those in the pork industry have remained there and in fact expanded. The expansion has been in areas of prepared meats where a brand name rather than a federal grade appears to be of great importance.

Although other breakdowns are made in the meat packing industry they have been eliminated on the grounds that they make up a very small proportion of meat packing output. Of those taken, beef clearly shows the largest change and plays the dominant role because it accounts for such a large portion of the industry's output.

The data available pertaining only to the slaughter aspect of the meat packing industry give a much more specific indication of the situation than any of the above data. The data are available from 1920 to 1962 exclusive of the years 1939 through 1945 (2,15). The earlier data are broken down into species categories, where the data from 1952-62 give a breakdown by species and by region. These studies include only federally inspected slaughter which makes up about 75-80 percent of total commercial slaughter.

The four largest firms have accounted for about 49 percent of the total cattle slaughter from 1920 to 1936. From 1937 to 1956 there is a steady decline from 49 percent to 29 percent. In calf slaughter the same pattern has occurred although the four largest gained an increased market share in the early period. The decline from 1937 to 1956 was not nearly so great for calf slaughter as it was in the case of cattle. The four largest firms' market share of hogs and sheep maintained a fairly stable

percentage in the early period although in sheep slaughter they showed small gains in their market share. However, market shares of four firms in both hog and sheep slaughter declined in the latter period. It is interesting to note that the market share of the four in hogs showed the smallest decline in the latter period remaining consistent with the observations on value of shipments at the five digit level.

In direct comparison to these are the data for Swift and Company over the same period. In 1920 they accounted for 16 percent of the cattle slaughtered, 16 percent of the calf slaughter, 24 percent of the sheep slaughter and 15 percent of the hog slaughter. In 1937 the percentages were 18 percent, 22 percent, 32 percent, and 19 percent respectively. The trends in this period were almost identical to that of the four leading firms which is just as should be expected since Swift was either the leader or the second place firm over the entire period. From 1937 to 1956 Swift's percentage declined to 13 percent for cattle slaughter, 19 percent for calf slaughter, 29 percent for sheep slaughter, and 15 percent for hog slaughter. It is interesting to note again that the largest proportion of deconcentration has occurred in the cattle species. There is an overall increase for Swift in sheep, and, again being consistent with the other measures, there is very little change in hogs.

The data from the Anthony Study show in much greater detail what has happened across the country in the slaughtering industry in the time period 1950 to 1962. In this period the total commercial slaughter in the U. S. increased from 17.9 million head to 26.0 million head in the case of cattle, 12.8 million head to 16.8 million head in the case of

sheep, 69.5 million head to 79.3 million head in the case of hogs, and declined in the case of calves. In the same period the four largest firms' percentage of the total cattle slaughter declined from 51.5 to 29.5 percent. The next four ranking firms actually increased the size of their market share leaving the change of the ten largest being from 60.2 percent to 39.9 percent. Changes in the concentration of calf slaughter are shown to be equally as significant, whereas hogs and sheep show a much reduced rate of deconcentration. However, in this study both hogs and sheep show a greater decline than in the data for the previous period. For meat, as a whole, the decline in the percentage of slaughter of the four largest firms is shown to be from 50.8 percent to 35.0 percent; for those ranking five through ten, from 15.8 percent to 14.1 percent; and for the entire ten the decline is from 66.6 percent to 49.1 percent. Some of the discrepancy from the other data can be accounted for by the use of total head rather than poundage.

The study then breaks the country down into nine regions specifying the slaughter data for each region. These data are given in complete form in the Appendix and briefly summarized here. Those regions showing the greatest decline in concentration of cattle slaughter are regions three, four, five, and six. Region one is the only area showing an increase in concentration but this has little effect on the overall scene since the cattle slaughter is a great deal smaller in this area than in the next larger area. Of the regions listed above, the greatest deconcentration in total head slaughtered is shown in regions five, six, and nine. These areas all show great declines in concentration as would

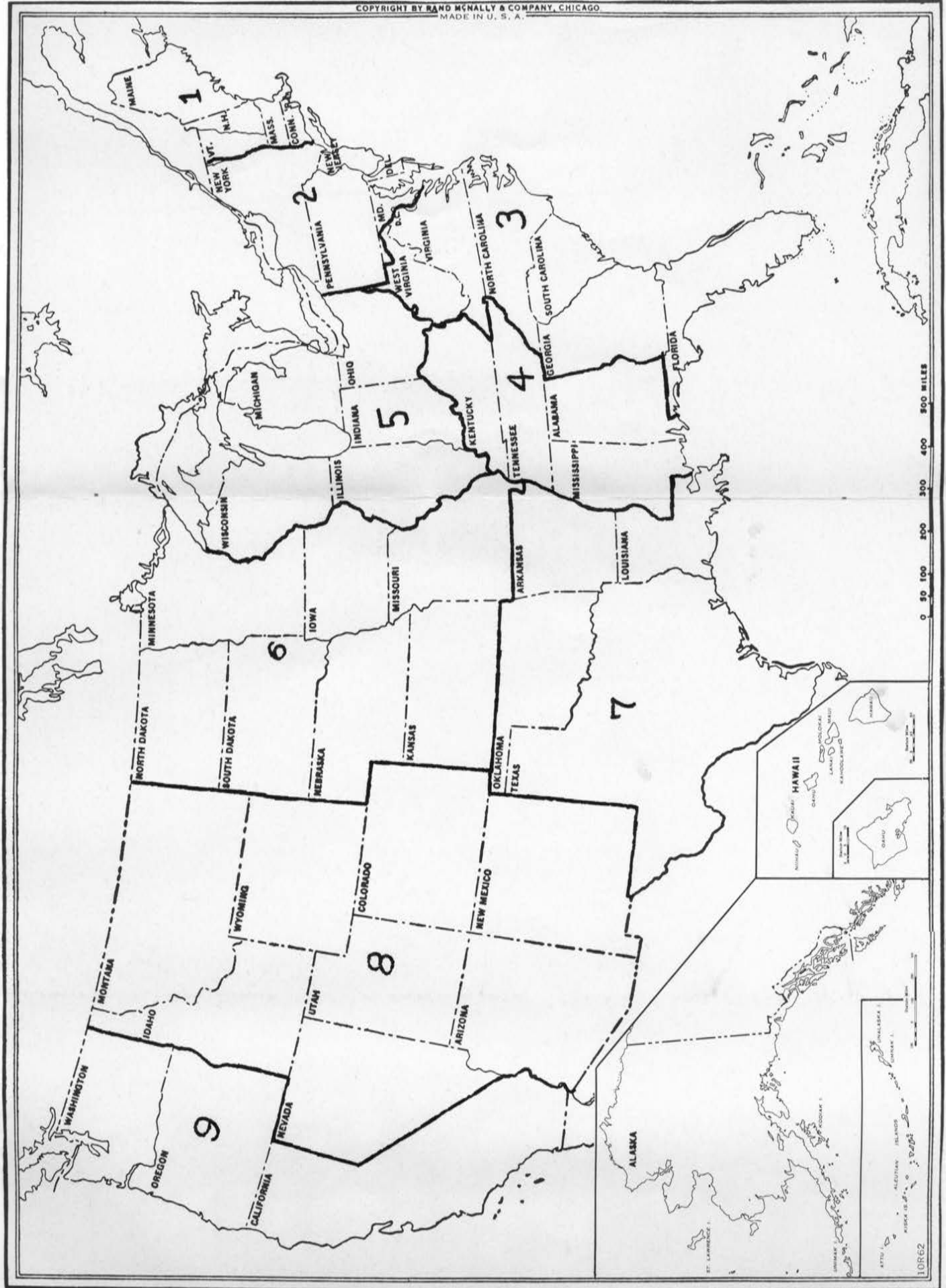


Figure 2. Nine regions of the United States

be expected since these areas were the long time centers of the "Big Four". Region three presents quite a problem since its great decline is caused by factors other than those causing the change in the above regions. This area has shown a sizable increase in head slaughtered and the greatest decrease in concentration. No answer was found to the situation here although it is suspected that the growth of livestock herds and small slaughtering plants has been quite simultaneous since the larger concerns were never established in this area to the extent that they were in other areas. Also, there is a small total number of firms in the area.

The regional trends in calf slaughter are shown to be quite different than those in cattle slaughter. In calf slaughter most regions remained relatively constant with slight declines in concentration. Here again, the greatest decline is in region three and seven. In this species regions four and six show an increase in concentration.

In the case of sheep major declines are in region six and seven with most of the other regions showing increases in concentration. For hogs the only region showing a sizable decline in concentration is region five with region six relatively close. The other regions show little change with some showing slight increases.

Although the data by region may be very useful in giving a detailed picture of what is occurring in specific regions they do have weaknesses. First, it can give a very biased picture of the impact of decentralization. Firms such as Swift, Armour, and other large producers were, early in history, located with a high percentage of their productive capacity in Chicago, Omaha, and various other terminal-market cities. Gradually

these firms have been locating plants in various decentralized locations while at the same time they have reduced the production (and in some cases completely ceased production) at the terminal-market locations. If this relocation involved crossing regional borders, it would have two impacts on the data. First it would show a great reduction in concentration in the region where the old (typically large plant) was shut down. Secondly, it may involve spreading the firm over so many regions that it shows no great concentration within any one region. But when considering the firm at the national level, it may still have just as large market share as before the plants were decentralized. As it turns out, this does not seem to be the case since the large firms have typically lost grounds in the overall picture.

Secondly, in some regions the number of firms is so small that there is a great spread in the size ranking. If there is one very large firm with a number of small firms in a specific region, in selecting the four largest firms we are comparing these two extremes across the board. It might be much better to leave the large firm by itself and compare the three others with the remaining small firms. This would be advantageous if we were looking at such things as wages, pricing, financing, etc., in relation to the size of firm.

In summary, it can be said that the majority of the deconcentration in the meat packing industry has taken place in the cattle species. In addition to this it has been shown that most of this came from the slaughter line in regions three, five, six, and nine. However, it should be emphasized that almost every aspect of the industry shows some degree

of deconcentration in enough regions to make a general decline for the United States as a whole. Adding to the significance of this is the fact that the number of meat packing companies rose from 1,999 in 1947 to 2,228 in 1954. The number of plants operated by these firms increased from 2,154 in 1947 to 2,367 in 1954. These data definitely point to the fact that there has been a sizable amount of deconcentration as well as decentralization in the industry.

REASONS FOR THE CHANGE IN STRUCTURE

Introduction

Explanations expressing the causes of the general deconcentration seem to center around two general phenomena, the inflow of small packers stemming from reductions in the barriers to entry, and the decline in the growth rate of the large national packers in relation to the growth rate of the industry as a whole. The hypotheses put forth in this thesis will recognize this general breakdown. This breakdown does not imply that the two categories are independent and mutually exclusive nor does it imply that the deconcentration of the industry is unrelated to the decentralization of the industry. It appears to be virtually impossible to have boundaries on the effects that result from certain causes. In most cases the data are so lacking that only trends and general indications can be set forth based on what would be expected in the theoretical situation.

The Emergence of Independent Packers

The inflow of new firms into an industry historically dominated by industry giants is a clear indication of reductions in the barriers to entry. The reductions in the barriers to entry have come in a variety of ways. The first reductions came in the 1920's when the large packers were required to divest themselves of holdings in stock yards and the surrounding and supporting facilities. This eliminated those advantages discussed earlier in the thesis. New firms could now get market informa-

tion. The costs of rendering functions were reduced. The independent producer could now buy at these markets without being surrounded with necessary facilities dominated by the large packers. This comprised only a small fraction of what was to come.

The next reduction came in the late 1920's when the major packers were forced to cease using the test cost for arriving at identical or very similar prices. This system and similar ones believed to exist prior to this period are described in detail in chapter one. Little can be said in addition to that description since conclusive proof of the actions is not available. However, the elimination of price fixing on the part of the buyers as well as the discontinuance of exclusive market areas for the firms and purchasing quotas at the terminal markets enhanced competition in the industry. At the same time the smaller producers could now purchase and sell raw materials and the final product to a greater advantage than when they faced the group's collusive actions.

When speaking of reductions in the barriers to entry one usually thinks first of reductions in the optimal size of the plant reducing the capital required to establish a new firm. This allows a large inflow of smaller more efficient firms. Some light can be shed on this aspect of the reduction in barriers to entry of the meat packing industry although much of the data necessary to test this hypothesis are lacking. Comparable data that cover a sufficient time span to include that period when the large full line plants began to decline in importance up to the present situation are lacking in consistency and even existence in some cases. The beginnings of this decline would probably date back to the

1930's and early 1940's. The rapid increase in the number of plants that were built after 1937 along with the rapid emergence of new firms indicates the change that was taking place. Between 1947 and 1951 eight hundred forty two firms entered the meat packing industry. Of these firms four hundred forty three were new businesses and three hundred ninety nine were entrants from other industries. Some reasons that account for the change in the structure at this later date are technological innovations, improvements in transportation, specialization of species, and processes, changes in the retail and wholesale market for meat, and changes in the factor markets. In addition to these factors, the increased demand for meat caused by the wars placed great strains on the existing capacity of the industry. These demands encouraged the development of new firms.

There has been a variety of innovations emerging in the new firms in terms of both small and large changes. Without going into a detailed listing of these changes one could classify the ones having the most significant impact on the structure as being labor saving or capital intensive innovations. These labor saving innovations have not been so great in meat packing as in many other industries. Nevertheless they are very apparent and in many cases quite substantial in the meat packing industry. Any change in this direction is very beneficial to the smaller producers. The innovations are more advantageous to the new firms because these firms typically have not been confronted with strong union rigidities. The large national packer has been plagued by union resistance toward the introduction of these techniques. This factor allows

the new firm to innovate at a faster rate than the national packers who are faced with the strong union resistance. These innovations would be advantageous to the small decentralized packers that many times operate in areas that have a labor shortage. Examples of these innovations are electric cutting knives, mechanical killing lines, on-the-rail systems, mechanized kill lines, as well as many others.

The single advancement that has been of greatest aid to the meat packer is that of the refrigeration techniques. These advancements have brought about a great change in the inplant conditions. They have made it possible to hold larger quantities of slaughtered meat for a longer period of time at a reduced cost. Since the large national packers have sizable amounts of money tied up in refrigeration equipment in their plants as well as in the branch houses on which the depreciation was not depleted, and in many cases far from being so, they were quite unwilling to put additional capital in the new cost reducing refrigeration equipment. This again gave the new packers an advantage over the established firms although it is doubtful that it has had much, if any, effect on reducing the optimum size. The advantages came in the cost reductions made available to those willing to take advantage of them.

The second set of advantages the firms have received from the developments in refrigeration techniques are those occurring from refrigeration of the product in transit. The industry developed around the railroad centers. The early refrigeration equipment was developed for the railroad. With the upsurge of the motor truck the entire system has changed. Efficient methods of refrigeration on motor trucks make it highly

advantageous for packers to ship the dressed meat rather than livestock. This means that the new firm does not have to tie up large sums of capital in truck lines and rail facilities, as well as in the branch houses and ice plants that were inherent to the older rail facilities. A significant reduction in the amount of capital necessary for the development of a firm is attributable to this factor.

The development of refrigeration equipment is only a small part of the change in transportation techniques that has allowed it to play such a major role in changing the meat economy. Many factors other than improvements cited above have had a great deal of influence on the adaptation of the motor truck for transport purposes. The major improvements in the highway systems have made it possible for the truck to reach many more communities in much less time than would be involved if the product were shipped by rail. Time is saved in loading and unloading with the truck because in many instances the point of destination does not have a rail spur. This makes it necessary to use some means of transport other than rail to get the meat to its final destination. The motor truck is much more versatile in regard to the load size. In servicing a small community or small orders in any community, the use of rail transport requires the standard size of car whereas in using truck transport the smaller load can be hauled by a smaller truck. This represents a cost reduction in the distribution of the finished product again making it cheaper to transport the product in the slaughtered stage rather than transporting it as unslaughtered livestock. The cost data in this area strongly suggest that as the length of haul increases the cost differen-

tial declines explaining why one still sees many refrigerated cars on the grounds of meat packing firms. A model has been used by Wallace (17, p. 24-60) using time series regression to check the changes in response to economies of shipping by rail. When regressing the changes in transport costs on the amount shipped by rail and truck respectively, using per capita income as a measure of regional changes, correlation coefficients with absolute value of .5 or better were obtained in a sufficient number of cases to indicate the major effects the changes in transportation techniques have had. The changes in transportation have their major influence on the decentralization process even though they do allow a reduction in capital requirements as mentioned above. It is these factors fostering decentralization (and the building of smaller, more specialized country operations) that have in part (and probably very significantly) brought about reductions in the barriers to entry. With these reductions in the barriers to entry reduced even further by the fact that the large national packers did not expand with the expansions of the industry as will be discussed in the next section, we get the accompanying high levels of deconcentration. Therefore it is impossible to separate the two phenomena in many cases.

Both horizontal and vertical specialization in the industry have been responsible for a marked change in the structure of the industry. Horizontal specialization refers to the emergence of large numbers of firms that slaughter less than the complete line comprising of all four species. The following table gives clear evidence of this change over a twelve year period. The decade prior to the one shown in the table

Table 6. Horizontal slaughter plant specialization in the federally inspected plants of the U.S.: 1950, 1954, 1958, 1962^a

Year	Number of plants slaughtering			
	One species	Two species	Three species	Four species
1950	73	81	128	175
1954	109	98	129	143
1958	145	112	127	127
1962	193	154	136	84

^aSource: 2, p. 33a, 33b.

resulted in the same type of change. Firms slaughtering one or two species have emerged most rapidly. Little change is seen in those slaughtering three species but a great decline in those slaughtering four species is made obvious by the data. The one species responsible for the greatest part of this increase in specialized firms is cattle. In 1950 there were thirty-four firms slaughtering only cattle. In 1962 this number had grown to 127. The increase in the number of firms specializing in single species is centered in regions one, five, six, and nine with the most occurring in Iowa, Illinois, and California.

The growth of the single species and double species firms is accompanied by the decline of the huge centralized complete line plants that have dominated the industry for most of the first half of this century. The new firms that came into the industry at a comparatively smaller scale have been able to do so with a much lower outlay of capital

since they handle only one species. This is not to say that the output of a single species plant is smaller than the output of that respective species in a multispecies plant. In most cases the reverse is true but the overall output, if a comparison could be made, is still higher in the multispecies plant. At the same time, the size of the single species plant has increased in average size, e.g., in 1950 the average slaughter for a beef slaughtering firm was 9120 head. This increased to 16,500 head in 1962. Even though this increase in size has taken place the barrier to entry placed on the industry by the necessity of a full line plant has been greatly reduced.

It is somewhat surprising to see that in the same period the average size of firms (taking all federally inspected firms of any level of integration) has increased. This is answered in part by the fact that the one, two, and three species firms have increased in average size enough to offset the decline in the number and size of four species firms. Even though the absolute number of four species firms has declined the average size has increased. These increases, in any case, are not sufficient to offset the reductions in the barriers to entry that have occurred through specialization.

There has been a marked increase in the amount of vertical specialization in the meat packing industry. In the U. S. in 1961, 50 percent of the slaughtering firms processed less than 50 percent of their slaughter, or an average of 14 percent, 10 percent processed from 50-100 percent for an average of 73 percent of their slaughter, and 32 percent process more than 100 percent of their slaughter for an average of 333 percent.

In the same year 65 percent of the processing plants did no slaughtering (2, pp. 36, 36a). The low percentage of firms processing most of their slaughter, and showing little specialization in either activity indicates a great movement to specialization in each area. The specialization in processing is centered around the older firms that have an established brand name (4, p. 67). The specialization in slaughtering is being carried on by the newer firms. This should indicate that the small localized firm can offer slaughtered products at a reduced cost over the national packer. The next task is to test this hypothesis.

Testing an hypothesis that a cost differential exists between the large national firms and the smaller independent firms is not a simple task. A sufficient set of cost data for such a test is completely non-existent and the correspondence encountered with the national packers indicated their unwillingness to disclose such information. Most of the researchers engaged in in-plant cost studies have turned to equipment manufactures for engineering estimates of costs. The most complete studies of this nature were conducted by Logan and King (6) who set up a group of synthesized plants comparing the costs of on-the-rail systems with conventional systems. This study shows that the long run cost curve for the on-the-rail system lies below that of the conventional plant, the divergence becoming greater as the size of plant increases (6, p. 102-3). The long run average cost curve is declining over the entire range of output considered in the study. The largest plant considered was slaughtering 250,000 head annually. Since many of the new plants are developing the on-the-rail system this suggests some reason

for a cost differential. However, it sheds no light on what has occurred over time. It is strongly suggested by many that this differential does exist and is simplified by a downward shift in the entire cost curve over time. Probably the best evidence to support this is the loss in the share of the market handled by the larger packers. Trade representatives of both large and small firms indicated that the large national packers have a "cost umbrella" over the small packers caused by older less efficient plants, higher overhead expenses and higher advertising and promotion expenditures (4, p. 63).

It is suggested that union pressure on the national packers is sufficiently stronger than on independent packers to cause considerable differences in wages as reflected in labor costs. This would be quite a significant factor in causing cost differentials since labor is second only to materials in its share of the total cost of operation. The data are sufficient to support a wage differential between small and large firms. In each region except the Pacific, earnings of workers in multi-plant companies are higher than those of workers in single plant companies (14, p. 1). Taken nationally, the average divergence between multi-plant and single plant firms is 75 cents per hour. In the midwest the difference is 60 cents per hour (14, p. 7). In federally inspected plants the average hourly earnings are reported to be \$1.02 higher than in nonfederally inspected plants. In metropolitan areas the average hourly wage is 24 cents higher than nonmetropolitan plants. The average hourly wage is 68 cents higher in plants with 500 or more workers than in smaller plants. There is a \$1.15 difference between these plants

where the majority of the workers are under union contract and those having none or a minority of union employees (14, p. 7). It is interesting to note that only in the Middle West is the nonmetropolitan wage higher than the metropolitan wage. This is caused by the major decentralization of the leading companies centered in Chicago, Omaha, and other midwest cities. The majority of their new plants have remained in the area but at nonmetropolitan areas. Even though the large firms indicate that union contracts covering existing establishments are not binding on the new establishments, there is a very high correlation between the existing wages and the wage scales in new plants. The wage chronologies on Swift and Co. and Armour and Co. give very nearly identical wage structures for the respective companies within a given region. In addition to the wage differential there is also a significant non-wage differential between those firms under major union control and the nonunion or local union firms.

In summary, the independent firm can locate in a nonmetropolitan area and pay lower wages and escape such of the labor difficulties the national packer would incur at the same location. If both firms are in competition at this location the labor cost differential may still exist but is greatly reduced.

The changes in procurement have not at all been systematic. There is suspicion that the changes that have occurred have given the independent firms the advantage since these firms adopted the practices more rapidly. As would be expected, the procurement area for the smaller firms is smaller. The independent firms engage in more direct buying in

relation to their total purchases than do the national packers. The industry still relies to a great extent on auction buying. In moving closer to the livestock the firms have increased the amount of purchases made by packer buyers. This gives an advantage to the livestock producer in that he knows the price he will receive before shipping. No data were found to prove or disprove the existence of a cost differential in procurement for either of the two types of firms at similar locations.

A factor causing a substantial price differential and also having a great effect on the reduction of the barriers to entry is the structural changes in the wholesaling and retailing of meats. Related to these changes are the differences in advertising and promotion between the two classes of firms. The change in the wholesale structure has been the major decline of the branch house system. This has been followed by the rapid emergence of independent wholesalers and direct buying. The decline of the branch house is covered in an earlier section of this thesis. The activity of the independent wholesaler increased by 108 percent from 1939-1954 (15, p. 124). The branch house system has been a very capital intensive means of marketing. Therefore, only the very large packers could support the necessary chains of branch houses. Along with these changes in wholesaling came a great reduction in the necessary outlay of capital required for the distribution of the products of the independents. This represents a great decline in the barriers to entry.

The emergence of the independent wholesaler and direct buying has been caused by two factors: the federal grading systems and the changes in the structure of the retail market. Federal grading emerged during

the war and has been a major influence on the post war buying patterns of retailers. U. S. grading put the independents in direct competition with the national packer since a United States grade is a homogeneous product in terms of quality regardless of who produces it. This, in fact, gave the independents a great advantage over their previous competitive position because it greatly reduced the significance of brand names and private grading. The national packers have large sums of money tied up in advertising and brand promotion that has become of little significance to those wanting federally graded meat. The independents are able to compete with the national packers quite favorably when confronted with customers desiring federal grades of meat.

The most important economic affects of the distribution of meat by federal grades in addition to those mentioned above are spelled out in a recent government study (13, p. vii-viii). The results of this report can be summarized as follows:

1. Federal grading may have tended to increase the demand for beef and stimulated the production of beef;
2. Federal grading has contributed to the demand for higher quality beef reflected in the increased demand for choice grades. This has been promoted by retail advertising;
3. Federal grading has contributed to more efficiency in pricing policies by giving the buyer more information concerning the quality of the product and thusly increasing the buyers competitive position; and
4. Reduced marketing costs along with the increased sales of higher quality beef have been advantageous to the producer.

This system of federal grading, as has been highly accepted by the retailers, has forced national packers to move into areas of production in which their brand is of significance. This fact is seen in the movement of the national packers into areas of processing (particularly pack products) where a brand is still very desirable, leaving much of the slaughtering for the independents with unestablished brands.

The change in the retail structure that is still very much in process is the growth and dominance of food retailing by large chains and cooperative purchasing organizations. In the early thirties the meat packer had a strong competitive advantage over his purchasers. The purchasing agents were large in number but relatively small in size. Two factors occurring simultaneously greatly reduced the superiority of the packer. The number of packers increased, giving the retailer a wider choice of suppliers. Secondly, the retailer grew in size into the very large chains that exist today. The chains are now large enough to obtain market knowledge that is superior to the information that they had prior to this period. This has occurred in accordance with their increases in bargaining power. The large chains have rapidly adopted the practice of purchasing by grades rather than brands because it facilitates quality control and consistency, it aids them in buying, it broadens the base of suppliers, and it aids in reducing and in many cases eliminates their dependence on any one brand. This movement has put a large segment of the retailers of meat in a position in which buying from the national packers was no more suitable or advantageous than buying from the independents. The retailers favor more direct buying from the packers

to avoid some of the difficulty in dealing with the highly organized sales forces of the national packers. In some cases a retailer dealing with a national packer has to deal with one salesman for beef and a different one for pork. The salesman of a smaller packer seems to have more control and flexibility in dealing with the retailers (4, p. 64).

In summary, the large chains, and the cooperative buying practices of many of the nonchain stores, have gained in their competitive position and find it advantageous to purchase and deal with independents.

Other factors playing a role in the emergence of independent wholesalers are the increase in hotel and restaurant trade and the increased specialization of independent packers discussed above.

The facts seem to quite obviously support the hypothesis that the independent packer can produce the product at a reduced cost under the current situation. This in turn gives the independent a higher profit rate than the national packer can achieve in the independent's area of specialization. However, the independent must take a return under that of the major packer in other areas of business because the independent does not have the interindustry investment opportunities. This leads to some basic questions concerning why specific firms have been established, where is the capital obtained to establish these firms and if they have capital, why has it been put into meat packing?

The reductions in the barriers to entry have been covered above. These reductions allow the inflow of new firms. But there must be some type of incentive on the part of the entrepreneurs to get firms to enter

the industry. As it turns out there are a variety of factors at stake, none of which appears to be strong enough to enable a great deal of generalization. First, there has been a great drive for industry in non-metropolitan towns to stem the tide of a rapid economic decline in many of these areas. The drive for industry, particularly in many midwestern communities, has been supported and fostered by local capital. This is felt in two ways. Of minor importance is the fact that there is a great competitive struggle between localities to get national as well as independent packers to locate within their particular area, regardless of the source of the ownership of the plant. The capital is furnished by the community through taxes in the form of industrial sites, utility advantages, etc. One incidence of this nature involved the location of a national packer in a midwestern state in the early 1960's. The cities were located approximately twenty miles apart and had very similar economic structures. The city boards became engaged in a very heated dispute over the offerings that the two communities would extend to the firm. In both cases it involved large capital expenditures in sewage disposal facilities among other things. This is merely an example of this type of development.

The second factor regarding local capital outlay is the desire of the community to have industry that is controlled by the community and operated by the talents of local concerns. It is the feeling that this type of operation will be much more responsive to the needs and attitudes of the community. These firms have emerged as cooperatives, through other types of stock issues, and by private, single or multiowned part-

nerships.

If the capital is available why has it been used in meat packing rather than other higher profit returning industries? The answer to this is not at all obvious. The meat packing industry shows a much lower rate of return on net worth, total assets, and sales than most other industries. However, the returns of the independents are somewhat higher than those of the "Big Four". As an example the rate of return on net worth of these firms was 11.4 percent in 1956 compared to 5.7 percent for the "Big Four" in the same year. The return on total assets to the former category was 7.7 percent compared to 3.3 percent for the latter type. The extreme case is that of Iowa Beef Packers, one of the largest independents. In 1963 they ranked 309 in total sales in the Fortune report of the 500 largest United States industrial corporations. Their sales per dollar of invested capital ranked number one, being \$32.11. Their profit as a percent of invested capital was 21.3 percent.

The opposite extreme is clearly witnessed by the amount of exit from the industry. Between 1947 and 1951 842 firms entered the industry while 548 left the industry. The major cause of exit was insufficient profits.

The psychological reaction to the profit position of various firms seems to be that a potential entrant puts more weight on the successful plant than on the unsuccessful one. The entrant then looks at a highly successful operation such as Iowa Beef Packers and stereotypes his plant with this one not realizing, or, if realizing, not placing significant weight on the amount of exit. The eventual outcome is that some succeed that have high quality management and other desirable attributes but many

become exit and failure statistics. There is, in effect, a "follow-the-Jones" activity related to this. Communities deemed it desirable to have a packing plant by looking at the successes of other communities. The problem turns out to be one of underplaying the failures and having false interpretations about the causes of failure.

In answering the question presented it appears that the community may be able to get capital but the community has a limited set of alternatives available for investment. In the agricultural areas those industries being closely related to agriculture are the most feasible because the rural surrounding area can supply the industry with the desired raw materials. The producers desiring to move closer to the livestock producing areas set the stage for the development in this industry. In many cases the nonagricultural industries showing higher profit rates present barriers to entry in the form of capital requirements sufficient to eliminate their development in the small community. The community may have sufficient capital to start a slaughtering firm but insufficient capital for the development or support of an auto producer, a cement plant, an electrical equipment producer, etc. The community may be hindered by an insufficient supply of labor and skills in these and other areas as well. These factors greatly reduce the alternatives available to the local community for developing local industry.

It is the common consensus that the smaller firm will have more difficulty obtaining additional funds than the large firm. The reasons usually given imply that financial institutions engage in credit rationing on the basis of size. Also, the larger firm would have absolutely

more funds available to retain in the business.

It was suggested by Penrose that it is the quality of management, the stability of the firm, and the managements inventiveness, rather than its size, that determines its ability to acquire funds. This seems to be demonstrated by Lockett and Lages in a study performed on small businesses (7, ch. 2). Although the study does not include meat packing in its sample of small businesses it concludes, for those chosen, that the only time a firm is discriminated against merely on the basis of size is in dealing with the very conservative bankers. There are no reasons to imply that this data would not carry over to the meat packing industry. The small operator is hindered from the standpoint that he is not nationally known. Therefore the lending services available to him are much smaller in geographical area. He has little credit outside the region of his location.

The small businesses seem to make up for this by using other means of credit. The most commonly used in many cases is trade receivables. They tend to value more highly, the use of their capital for the duration of the payment period rather than taking advantage of discounts for early payment.

Other sources of funds are available. There seems to be no universal pattern of financing. As stated above, the floating of a stock issue in a local community was sufficient in many cases. In other cases, a nonlocal cooperative built the plant.

In summary, there appears to be no general reasons for the movement into the industry. The barriers to entry were broken. People saw a

potential profit and had a source of supply so they moved in. As the exit data above indicates, there are many that have not made a return in the industry as they expected to do.

The Decline of the National Packers

On the other side of the coin is the question of why the large packers have not grown as rapidly as the industry. Many of the factors are obviously the reverse image of those presented in the preceding section. There are some reasons to be added to these.

First, the profit position of the meat packing industry has been very low compared to other major industries outside as well as within the food industry. This is indicated in Table 7. The position of the four industry leaders is even worse. These data are given in Table 8. Since it has been shown that the smaller packers can provide the service at a reduced cost this may indicate a misallocation of capital. It was indicated earlier that the capital holdings and capital availability of the national packing firms are large enough to allow it to enter industries that are completely out of the range of availabilities for the smaller enterprise. The limiting factors of the small enterprise are location and supply within a locational boundary, as well as capital. The small firm can overcome these factors in the meat packing industry, as was indicated earlier.

The above statement is evidenced by the movement of the national packers into processing areas where larger sums of capital are needed. Also desirable in this area of production is the promotion of a brand.

Table 7. Net income after taxes of leading manufacturing corporations, 1961-62 (ranked according to return on sales, 1962)^a

No. of co's.	Industry group	Return on sales		Return on net assets		Income after taxes (million dollars)	
		1962	1961	1962	1961	1962	1961
21	Cement	12.5%	11.2%	10.4%	11.3%	\$ 97.4	\$ 98.1
40	Drugs and medicines	10.3	10.5	17.9	18.4	372.0	350.7
122	Petroleum products and refining	8.7	8.7	10.5	10.4	3,298.5	3,073.3
33	Office, computing equipment	8.0	7.5	16.5	16.1	311.5	261.1
99	Chemical products	7.6	7.3	12.3	11.8	1,269.0	1,145.7
13	Autos and trucks	7.5	6.1	19.4	13.2	2,077.4	1,352.2
51	Other stone, clay products	7.4	7.6	10.7	1.07	275.0	261.1
15	Glass products	7.2	7.1	11.7	11.1	159.3	145.6
53	Hardware and tools	7.0	6.7	13.9	12.6	99.8	85.1
17	Soft drinks	6.9	6.8	15.9	15.6	74.5	68.1
84	Instruments, photo goods, etc.	6.9	6.7	13.4	12.4	290.8	248.8
59	Nonferrous metals	6.2	5.8	7.2	6.8	385.6	349.6
36	Soap, cosmetics, etc.	6.1	6.2	16.7	17.2	220.4	204.6
23	Paint and allied products	6.0	6.4	11.8	12.5	84.8	85.9
15	Tobacco products	6.0	6.1	14.1	14.8	281.9	277.4
27	Lumber and wood products	5.3	5.3	7.6	6.6	90.9	77.0
80	Paper and allied products	5.2	5.2	8.3	8.1	425.5	394.2
213	Other machinery	4.8	4.5	9.6	8.9	457.3	401.9
17	Household appliances	4.7	4.2	10.6	9.2	96.7	80.6
96	Miscellaneous manufacturing	4.4	4.7	11.0	11.6	189.6	185.5
54	Fans, constr. equipment	4.4	3.4	8.1	5.8	242.9	172.9
47	Automotive parts	4.4	3.3	10.6	6.8	143.2	89.9
92	Printing and publishing	4.3	4.7	10.4	11.9	125.2	128.6
91	Other food products	4.3	4.3	12.7	12.8	464.5	439.5
78	Iron and steel	4.1	5.1	5.4	6.4	605.5	714.2
17	Brewing	4.1	4.1	9.3	9.5	38.6	37.4
14	Distilling	3.9	4.0	7.8	8.1	115.2	114.9
80	Other metal products	3.9	3.2	9.1	7.3	186.5	145.3

^a Source: L.

Table 7. (Continued)

No. of co's.	Industry group	Return on sales		Return on net assets		Income after taxes (million dollars)	
		1962	1961	1962	1961	1962	1961
308	Electrical equipment	3.8	3.6	11.3	10.0	899.5	743.1
47	Rubber and allied products	3.7	4.1	9.5	10.2	245.5	250.0
13	Railway equipment	3.7	3.4	6.4	5.1	54.1	42.7
79	Clothing and apparel	3.6	3.5	11.3	10.7	80.6	70.3
13	Sugar	3.4	3.0	7.9	6.6	35.3	30.0
34	Furniture and fixtures	3.1	3.3	6.9	7.1	24.8	24.4
62	Textile products	3.1	2.7	7.3	5.8	167.5	128.4
27	Shoes, leather, etc.	3.1	1.8	10.0	5.4	47.9	26.0
50	Building, heat, plub. equipment	3.0	2.4	6.3	4.6	71.1	51.8
16	Baking	2.7	2.7	9.8	9.7	61.1	59.0
12	Dairy products	2.7	2.6	10.6	11.0	109.4	104.0
47	Aircraft and space	2.4	0.9	12.9	4.4	351.1	119.5
21	Meat packing	0.6	0.6	5.4	4.6	53.6	45.4
Total manufacturing companies		2,316	2,316	10.9	9.9	\$14,681.0	\$12,683.8

Table 8. Meat packers annual rates of return on net worth^a

Year	Swift	Four defendants combined	All non- defendant packers
1925	6.6	5.6	5.9
1926	6.6	5.1	5.2
1927	5.2	2.6	1.4
1928	6.2	5.1	7.6
1929	5.5	4.6	4.9
1930	5.2	3.6	3.6
1931	3.5	(3.0)	(.4)
1932	(2.4)	(.4)	(1.8)
1933	4.3	4.2	1.4
1934	4.7	5.4	3.9
1935	5.9	5.9	3.9
1936	4.7	5.0	3.9
1937	3.5	3.8	1.4
1938	(1.4)	(1.6)	2.0
1939	4.1	4.4	7.2
1940	4.3	5.0	7.8
1941	6.8	8.5	9.3
1942	6.3	7.7	10.6
1943	6.2	8.0	11.7
1944	5.5	7.0	12.5
1945	4.3	5.4	5.9
1946	5.6	11.1	21.1
1947	11.0	14.6-13.4	17.7-18.8
1948	8.6	5.3	14.8
1949	7.6	4.2	7.7
1950	4.8	6.2	10.0
1951	3.6	4.9	9.7
1952	6.4	3.0	8.0
1953	9.2	6.6	6.8
1954	5.1	2.4	5.1
1955	6.0	5.6	10.9
1956	3.7	5.7	11.4

^aSource: 15.

This requires large sums of money for advertising. This statement is also evidenced by a large volume of investment of some of the packers in chemicals (Armour being the standout), some in leather goods (Wilson is in sporting goods and Swift has been in and out of leather processing), large fertilizer and feed plants, and various other areas. The packers have engaged in a great deal of conglomerate integration. Swift has had holdings in insurance. Recently they purchased a large firm carrying insurance on banks. These are only a few examples.

The question coming out of this is the following: have these firms made enough total investment in other areas, such that if the investment had all gone into meat packing, there would have been no reduction in their market shares? This question is very difficult to answer because none of the four leading firms would supply investment data. The following table made up of the additions, at cost, to the property accounts of the four industry leaders gives a good indication of their total investment for the years 1956 through 1962. The Census of Manufactures reported the total capital expenditures for the industry in meat packing plants and equipment to be \$63,129,000 in 1958. This is the only year for which comparable census data exists. The census data seems to indicate that the fluctuations in capital expenditures in the meat packing industry have been around \$60 to \$70 million from 1947 to 1958. The trend over the period is downward rather than upward. The downtrend is probably influenced by the recessions of 1954 and 1958. The 1962 AMI report (1, p. 11) indicates that a sample of 9 national, 20 regional, 35 sectional, and 22 local packers had total capital expenditures of \$96.6 million in 1961 and \$86.9 million in 1962. These data are biased downward because they

Table 9. Additions to the property accounts, evaluated at cost, for the four industry leaders^a

	Wilson and Co.	Cudahy	Swift	Armour	Total
1962	4,121,616	937,480	25,808,104	29,048,223	59,915,423
1961	3,488,615	4,771,077	32,625,168	28,284,770	69,169,630
1960	3,659,989	2,426,088	26,422,362	9,632,774	42,141,213
1959	3,878,472	1,649,084	22,659,192	20,486,229	48,672,977
1958	7,711,601	3,186,156	24,391,918	8,771,869	45,061,544
1957	9,457,896	5,228,970	28,826,802	11,286,505	54,800,173
1956	3,989,511	2,562,847	45,404,129	10,834,611	62,791,098

^aSource: 9.

do not cover the entire industry. Most of the firms eliminated are local and sectional packers that account for a very small portion of the investment so the bias is not strong.

Although the data do not cover a large time span, it is obvious that in the time covered these four firms could stop the deconcentration if they so desired. The correspondence with these firms indicated that their profit position was at such a low state that they are compelled to put their market position in second place and diversify to improve their returns.

Connected with the factors influencing the movement into other industries is the fact that they had large sums of capital tied up in older meat packing plants centrally located at the terminal markets. The building of new plants would require the abandonment of these. If they were not abandoned they would only add to the problem of cyclical over

capacity, the one of year around over-capacity. The centrally located plants have long been plagued with the problem of having over-capacity of productive facilities since their supply of livestock is being robbed by decentralized firms. The nature of the centralized plant's cost structure makes it unfeasible to move out as rapidly as one would expect. Some lines of the plant, or even some processes within lines, may become highly unprofitable but other lines may be making a sizable return. This makes it unfeasible to abandon the plant if the marginal costs of building and moving to a new location outweigh the losses taken on the established plant. There are hidden costs involved in such a move in addition to the costs of building and equipment. In many cases the firm moves into a locality in which the new labor supply is completely unfamiliar with the conditions necessary in a slaughter plant. This has led to severe labor problems. There is a certain amount of immobility in the management ranks also. The experienced management must then be replaced by new management which has to be trained for the positions. These factors all place a natural unwillingness on the part of the entrepreneurs, to be hasty about moving to new locations when large sums of assets are already tied up in plants. Therefore, their moves into other industries are justified since they may have advantages of similar technology, use of by-products, and an established trade mark to carry with them. The management problems are not much different than those accompanying the moves to new locations. The increased returns in these other industries in accordance with these factors are sufficient to encourage the diversification.

This entire movement into other industries for the reasons given and

for other reasons is directly tied to the concept of risk aversion by integration. Although risk aversion is usually described as a vertical movement in an attempt to obtain a guaranteed supply of materials as well as in the other direction to obtain a guaranteed market place for the product, the concept is applicable to horizontal as well as conglomerate integration. The concept in its original form applies to this industry in the attempt of the major packers to have the consent decree of 1920 removed. This would allow the packers to move into other areas of the food industry and into the retailing of meat products. All attempts at this move have been refused by the courts on the grounds that the meat packers have sufficient advantages over the established firms in these areas that would give them unjust monopoly power. Thus, they must move into other industries. A possible vertical movement in the backward direction is that of contractual purchasing with the livestock producers. This involves a contract with a producer indicating the amount of a certain grade and species of livestock to be produced by the farmer. This agreement gives the farmer a guaranteed market and price. At the same time it gives the producer a guaranteed supply. A very insignificant amount of this has been done in livestock although it is a widespread practice in the poultry industry.

Conglomerate integration as a means of risk aversion is such more widespread among the major packers (as was described above). The basic factor here seems to be that characterized by the old saying, "don't put all your eggs in one basket". A case at point is that a major downswing in the meat packing industry could be accompanied by good economic conditions in the chemical industry. The risk of a disastrous profit situation

is alleviated by diversification into the chemical industry. A bad year in any one industry will not necessarily mean a bad year for the diversified firm. Clearly the diversification of the meat packers has been influenced more by the long trend downward in the profits of the meat packing sector than by short term risk aversion but the latter does have a role in the adjustments. This role is indicated, also by the large holdings of government securities and long term receivables by the firms.

The last factor to be mentioned in this section is the one most frequently mentioned by the agriculture extension people interviewed. It is believed that a very inactive management exists in some of these very large firms. This factor is completely unmeasurable and even unpredictable without witnessing, over an extended period of time, the actual process of decision making. An underestimation of the previously mentioned factors causes an overestimation of this factor. In reviewing the background of a sample of those in high decision making positions it was found that a great majority of these people moved up from low sales positions. They have been with the industry a long time, many in excess of twenty years. This indicates that they have a great knowledge of the industry. At the same time it greatly facilitates an incentive motive. There is a loss, or at least a reduction, in the inflow of new ideas and management techniques from other industries that are applicable to this industry. Diversification has fostered a need for this inflow of information and techniques. The reorganization that has taken place in some firms in the areas of market research, economic research, and statistical diversions to enhance better communication between these divisions has proven to be

very beneficial to the decision makers. This type of reorganization has come about much slower in this industry than in other industries, e.g. the auto industry.

In any event, if the factor of inactive management does exist it cannot be verified to any extent and certainly would not be unique to the meat packers.

These factors are the basic ones causing a reduction in the growth of the major firms in the meat packing industry. It should be repeated that some of those factors enhancing the growth of the independents act against the growth of the major firms. The introduction and widespread use of federal grading increases the competitive position of the independents at the cost of the major packer. The cost advantages of the smaller firms impinge on the advantageous previously held by the major packer. The changed demand for meat has been at the cost of the major packer. All of these factors encompass the answer to the question presented at the beginning of this section.

IMPLICATIONS FOR THE THEORY OF THE GROWTH OF FIRMS

At this point I will break away from the general concentration discussion to point out how the factors that were discussed above fit into the theory of the growth of firms and what light the factors shed on additions to this theory, if any. The theory of the growth of firms is in no way the same thing as that of market structure. However, they are very highly related in that the growth and development of firms within an industry will have a major influence on the development and changes in the market structure. A variety of factors affect the growth of a firm. Among these are the management and entrepreneurial unit that may or may not be the same thing, the production function, the resource supply situation, and the aggregate demand for the product being produced.

The entrepreneurial unit must be the basis for all growth in the firm. The study of growth is a study of the changes in productive opportunities (11, p.32). A firm can expand only if the entrepreneur is willing to search for these opportunities and is willing and able to act upon the opportunities when they are found. The best way to find new opportunities is to allocate a portion of management to research. The extent to which research can be fostered is going to be determined by the funds available to support research.

The greatest advances to the growth and development that can be attributed to management along economic grounds are those gains received through the managerial division of labor. In a small firm the manager may have to be the decision maker, the organizer, the financier, the

economist, etc. Even though the individual may be highly qualified in these areas, it is hard to envisage this multiheaded monster whose superiority is such that the total operation would not be improved if he specialized in one area and hired superior talent in other areas. Once the management is enlarged there is an added incentive to grow to take up idle capacity in terms of management time.

Once the division has been made and the functions of the firm have been enlarged to the capacity of the management unit the basic advancement is over and the firm is well beyond the take-off stage of growth. Since the activities of any specialized group do not grow in direct proportion to the output of the firm, an increase in output at this stage will not require such drastic changes in the managerial unit.

Even though it is argued by many that the managerial unit does not place an absolute limit on the size of the firm, the management unit does place limits on the rate of growth. Management can be considered a scarce resource. It takes time to find qualified people and train them to fulfill a position. This factor will reduce the rate of growth. It seems that this problem is quite relevant to the meat packers. An industry showing a very low rate of return is not going to look the most desirable to an aspiring management trainee. They, therefore, have to find other factors to overcome this shortcoming. The most relevant seems to be to offer higher wages. But since finances are also a scarce resource this may not be a solution easily turned to. Therefore, the firms are plagued with a dilemma as to whether to place more funds in wages at the cost of some other activity hoping to improve the long run situation or to maximize in the short-run with the hope that this will improve the

profit position.

The second factor influencing growth is that of financing the firm. This certainly will never limit the absolute size of a firm but it has very strong influences on the rate of growth. One of the important characteristics involved in acquiring funds has already been taken care of. It was stated in the last section that there does not appear to be credit rationing on the basis of size alone. The second factor is that the quality and inventiveness of the financial unit of the firm influences the amount of funds made available.

Self imposed restrictions often place a limit on the financing, e.g., a family firm may be unwilling to spread the ownership or a certain liquidity position may be required. These factors do not limit the size of the firm but they do place severe restrictions on the amount of capital available for expansion at any one time. This places a boundary condition on the rate of growth attainable by the firm.

Physical and technological factors will have an ^e affect on growth. There are two factors at stake here. First, there are gains in the specialization of blue collar labor that directly parallel those gains from managerial specialization. Without specialization time is lost in moving from job to job. A specialized worker develops a time saving rhythm of motion when all of his efforts are concentrated on performing one task. Therefore, there are sizable gains from specialization.

Secondly, increased growth allows a firm to become more mechanized. Growth within a mechanized firm allows for larger machines. In most cases the increase in cost of operating a larger machine is less than

proportional to the increase in output. If this is not the case the firm can build parallel systems once the optimal output for one system has been achieved. These gains could be summarized as the gains from mass production.

This leads us directly into vertical integration. To keep a process running at the scale of output that is most efficient in terms of the machines and labor it might possess at any time, the firm must be assured of a steady supply of inputs from the previous process. If the existing suppliers cannot do this, the firm may be forced to purchase a supply unit and operate it to meet its needs. This suggests only backward integration. The main argument that applies for both forward and backward integration is that there are certain economies gained from having a continuous line of processes at one location or under the control of one firm.

In industries where the closeness of processes is not essential to efficient operation the firm may vertically disintegrate. This involves a high degree of specialization in some intermediate process. By specializing, the firm can gain all of those previously mentioned advantages from other types of specialization. This type of disintegration has been particularly important in the meat packing industry. The specialization in slaughtering one species is indicated in the data in an earlier section. This specialization that has been aided by federal grading, changes in the wholesale industry for meat, etc., has allowed these firms to gain cost advantages. However, their growth has been limited by the market for the product at the particular level of fabrication that they perform. Their rate of growth, then, is strongly dependent upon the demand for

slaughtered meat by the retailers and the processing firms.

Horizontal integration is a movement that seems natural to a growing firm considering the technological limitations placed upon it. The firm may achieve the most efficient scale of output within the realm of the equipment it has. If this equipment is of the most modern level of technology it must (until new technology is developed) not enlarge its present plant but build more units identical to the present one. As this is done, the new plants are located within a favorable supply area.

Conglomerate integration, that has been so prevalent in the meat packing industry, is done for three basic reasons. First, it allows a movement into higher profit industries. Second, it reduces risk. And third, if one industry has a highly cyclical fluctuation in labor demands, the industries can be started up in such a way that the periods of high labor demand for each plant alternate. Of course this can occur only within a given location and with a willingness of labor to make the necessary shifts. The new lines allow it to take up excess capacity not only in labor but in plant and equipment, if similar processes are present.

The rate of growth by integration is limited by legal structures and the competitive situation at the existing firm's location (and industry) in comparison to the area in which it is moving. The legal structure does not place maximum size on the firm. In many cases, however, the actions taken by the courts are very similar to that of placing a limit on the market share of any one firm.¹ This again retards the rate of growth

¹This must be interpreted in a very general manner because no case has actually placed a limit as such. The results of some cases appear to have been close to this though.

rather than the actual size. The second factor also has its affect on the rate of growth rather than absolute size.

It is interesting to summarize the development structure of firms in a manner completely parallel to the Tinbergen framework of economic development in nations. It then becomes more apparent how the tools of economic development apply to the development of firms (8, ch. II). The targets in the Tinbergen framework become the goals of the firm. These goals might be profit maximization, total revenue maximization, to remain in business, to keep all the work people employed, to maintain a certain level of dividends, or some combination of these. It should be emphasized that these may all be overridden by some major long term goal, e.g., the desire of a family head to leave substantial inheritance to his heirs. All of these factors have a strong influence on the goals and must be taken into account. The goals can be said to state the efforts of the firm. Some goals may be very hard to quantify. The instruments of the firm are many. These are stated by the courses of action to be taken by the firm. The instruments may be classified as those set by general policy, e.g., quality standards, willingness to engage in diversification, financial criteria, etc.; those determining the line of business; those dealing with integration; the technologies available; and the factor situation (8, pp. 23-24).

The boundary conditions or behavioral assumptions take three forms. First are those that are selfimposed. These include such things as:

1. a set liquidity position, 2. control of ownership, 3. use of outside credit, and 4. those factors set in the general policy.

The second type of boundary conditions are the past-imposed restrictions. These conditions will usually consist of such things as the past development. This has a definite influence on the capital available at present. It is interesting to note in relation to this that an empirical study found that in 1000 firms in the United States there existed no correlation between the size of the firm and the growth rate.

The third set of boundary conditions are those external to the firm. These would be the status of the national economy, the legal structure, and the demand for the product or products being produced, among other things.

These factors can all be estimated and set up in a system of simultaneous equations just as in the Tinbergen case. In many cases a programming framework is apparent in which the goals become the objective function subject to the conditions of the instruments and the boundary conditions. A study using a framework similar to this was made by Mackintosh to evaluate the effects of tax structures on the development of firms. He used actual data from thirty-six firms. A similar study would be very relevant to the meat packing industry and would shed much light on the development of the industry. There is a problem in defining exogenous and endogenous variables in many cases of studies of this type. However, such a study is beyond the scope of this thesis.

SUMMARY AND CONCLUSIONS

There has been a significant amount of deconcentration in the meat packing industry since the 1920 consent decree. The major inflow of new firms has occurred since 1937. The deconcentration has been at the cost of the market position of the four leading firms in the industry. The greatest deconcentration at the product level has been in the slaughtering of beef. The other species have shown some deconcentration but the change has not been nearly so marked. Hog production has been the least affected by the changing structure. The regions in which the greatest change has occurred are the southeast, the middle west, and the far west.

The emergence of the independent firms has been brought about by the reductions in the barriers to entry. The reductions have been in the form of reduced capital requirements, increased product specialization, changes in the demand for meat, and federal grading. An increase in the average size of the firms is caused by the rapid growth of firms specializing in one and two species.

The independents can offer the products at a reduced cost. The cost differentials are caused by lower labor costs, less advertising and promotion, the use of the more efficient technologies, a more confined procurement area, and the movement by the independents away from the branch house system of distribution.

The major packers have declined in significance. The decline has been promoted by the factors allowing the emergence of the independents. It has been demonstrated that the major packers could stem the tide of deconcentration by placing their entire annual investment in the meat packing

industry. They have engaged in a process of diversification to enhance their profit position. The major packers have been slow to abandon obsolete plants because of the large sums of fixed costs tied up in these plants and because of the poor outlook of the industry.

This thesis has not covered the entire list of factors that may be influencing the change in the industry, but it has presented those factors that can be supported by data (as incomplete as the data may be) and that are the most influential forces at work in the industry.

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APPENDIX

Table 10. Percent of slaughter by 1-4, 5-10, and 1-10 largest firms, by region and U.S. total, by species, 1950, 1954, 1958, 1962^a

Region	Size rank	1950	1954	1958	1962
Cattle					
1	1-4	60.7	63.0	63.8	77.2
	5-10	34.9	32.8	35.4	21.5
	1-10	95.6	95.8	99.2	98.7
2	1-4	39.3	36.4	28.0	33.3
	5-10	23.8	23.9	29.1	27.4
	1-10	63.1	60.3	57.1	60.7
3	1-4	81.5	74.3	55.4	50.0
	5-10	17.4	21.3	30.0	32.3
	1-10	98.9	95.6	85.4	82.3
4	1-4	64.3	54.8	55.8	47.6
	5-10	26.4	30.7	32.7	32.5
	1-10	90.7	85.5	88.5	80.1
5	1-4	50.2	48.7	40.4	29.8
	5-10	17.5	17.4	18.0	16.9
	1-10	67.7	66.1	58.4	46.7
6	1-4	64.6	58.6	51.2	45.6
	5-10	17.9	18.5	19.2	17.4
	1-10	82.5	77.1	70.4	63.0
7	1-4	54.1	54.0	44.0	40.5
	5-10	24.0	24.8	25.7	28.7
	1-10	78.1	78.8	69.7	69.2
8	1-4	47.4	41.3	47.4	46.9
	5-10	35.9	33.4	33.5	29.8
	1-10	83.3	74.7	80.9	76.7
9	1-4	40.0	24.6	20.9	19.0
	5-10	17.0	17.2	17.7	15.9
	1-10	57.0	41.8	38.6	34.9

^aSource: (2, p. 13a, 13b, 13c, 13d, 13e).

Table 10. (Continued)

Region	Size rank	1950	1954	1958	1962
U.S.	1-4	51.5	45.2	35.7	29.5
	5-10	8.7	10.0	10.5	10.4
	1-10	60.2	55.2	46.2	39.9
Calves					
1	1-4	84.1	85.6	91.5	84.2
	5-10	13.3	12.8	8.4	15.3
	1-10	97.4	98.4	99.9	99.5
2	1-4	49.5	49.9	43.1	43.9
	5-10	28.7	31.7	28.5	25.4
	1-10	78.2	81.6	71.6	69.3
3	1-4	89.8	91.3	83.7	45.1
	5-10	10.2	8.7	16.0	12.5
	1-10	100.0	100.0	99.7	57.6
4	1-4	91.8	87.1	92.8	97.3
	5-10	7.8	12.6	7.0	2.7
	1-10	99.6	99.7	99.8	100.0
5	1-4	69.6	72.8	66.3	63.9
	5-10	19.4	17.9	21.8	27.3
	1-10	89.0	90.7	88.1	91.2
6	1-4	80.3	88.3	91.5	96.8
	5-10	18.3	10.7	8.1	3.1
	1-10	98.6	99.0	99.6	99.9
7	1-4	76.5	76.7	56.9	53.4
	5-10	17.2	16.6	32.5	33.7
	1-10	93.7	93.3	89.4	87.1
8	1-4	62.5	69.1	70.2	62.7
	5-10	27.5	24.2	24.1	29.1
	1-10	90.0	93.3	94.3	91.8
9	1-4	59.8	45.4	53.6	49.5
	5-10	16.6	26.2	29.1	30.4
	1-10	76.4	71.6	82.7	79.9

Table 10. (Continued)

Region	Size rank	1950	1954	1958	1962
U.S.	1-4	58.0	59.3	49.7	39.9
	5-10	12.9	11.7	13.9	16.3
	1-10	70.9	71.0	63.6	56.2
Sheep					
1	1-4	99.8	100.0	100.0	98.2
	5-10	.2 ^b	. ^b	. ^b	1.8
	1-10	100.0	100.0	100.0	100.0
2	1-4	81.8	88.0	83.3	80.5
	5-10	14.6	11.4	16.4	18.8
	1-10	96.4	99.4	99.7	99.3
3	1-4	97.5	99.4	98.1	92.8
	5-10	2.5	.6	1.9	7.2
	1-10	100.0	100.0	100.0	100.0
4	1-4	99.9	100.0	100.0	99.9
	5-10	.1	. ^b	. ^b	.1
	1-10	100.0	100.0	100.0	100.0
5	1-4	86.4	87.9	82.8	91.9
	5-10	12.1	11.6	16.7	7.0
	1-10	98.5	99.5	99.5	98.9
6	1-4	75.2	77.1	79.1	59.7
	5-10	24.7	22.8	20.9 ^b	31.8
	1-10	99.9	99.9	100.0	91.5
7	1-4	95.4	97.2	95.4	85.6
	5-10	4.6	2.8 ^b	4.6 ^b	14.4
	1-10	100.0	100.0	100.0	100.0
8	1-4	85.8	90.8	89.3	92.6
	5-10	13.4	8.9	10.0	7.1
	1-10	99.2	99.7	99.3	99.7

^b Remaining firms have negligible share of the total slaughter.

Table 10. (Continued)

Region	Size rank	1950	1954	1958	1962
9	1-4	58.2	58.4	67.5	75.3
	5-10	24.3	30.7	27.1	22.7
	1-10	82.5	89.1	94.6	98.0
U.S.	1-4	69.6	68.7	64.4	58.9
	5-10	15.9	16.1	17.2	17.1
	1-10	85.5	84.8	81.6	76.0
Hogs					
1	1-4	92.9	91.8	99.7	100.0
	5-10	7.1 ^b	8.2	.3	--
	1-10	100.0	100.0	100.0	100.0
2	1-4	50.4	50.3	49.2	48.5
	5-10	40.7	40.6	38.5	39.6
	1-10	91.1	90.9	87.7	88.1
3	1-4	59.4	51.9	48.8	57.3
	5-10	32.4	39.5	39.1	34.2
	1-10	91.8	91.4	87.9	91.5
4	1-4	59.5	54.7	58.6	52.8
	5-10	33.7	32.8	32.0	32.4
	1-10	93.2	87.5	90.6	85.2
5	1-4	50.5	52.4	49.1	37.4
	5-10	22.7	25.0	25.0	31.9
	1-10	73.2	77.4	74.1	69.3
6	1-4	60.1	62.5	58.8	50.9
	5-10	33.0	32.5	32.7	24.4
	1-10	93.1	95.0	91.5	75.3
7	1-4	77.1	78.4	64.0	67.3
	5-10	17.7	19.2	32.9	30.1
	1-10	94.8	97.6	96.9	97.4
8	1-4	69.4	68.0	81.1	85.7
	5-10	24.3	25.9	16.7	11.2
	1-10	93.7	93.9	97.8	96.9

Table 10. (Continued)

Region	Size rank	1950	1954	1958	1962
9	1-4	59.2	60.3	56.0	73.0
	5-10	29.0	29.6	31.1	23.4
	1-10	88.2	89.9	87.1	96.4
U.S.	1-4	48.5	48.4	41.3	39.0
	5-10	22.1	23.0	23.4	21.5
	1-10	70.6	71.4	64.7	60.5
Host					
U.S.	1-4	50.8	46.6	38.9	35.0
	5-10	15.8	16.1	15.9	16.1
	1-10	66.6	62.7	54.8	49.1