MARKET STRUCTURE OF THE DAIRY INDUSTRY IN ARIZONA

by

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A Thesis Submitted to the Faculty of the

DEPARTMENT OF AGRICULTURAL ECONOMICS

In Partial Fulfillment of the Requirements
For the Degree of

MASTER OF SCIENCE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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ACKNOWLEDGMENTS

The author wishes to acknowledge the guidance and help of Dr. Robert C. Angus throughout the preparation and writing of this thesis.

To Dr. M. M. Kelso and Dr. Warren J. Stull, the author expresses appreciation for counsel and direction.

The author is indebted to Warren Austin, H. J. Shouse, Wilson M. Haverfield, James Hill, Eldon H. Towner, and W. Ralph Van Sant for their patience and time in answering many questions concerning the dairy industry in Arizona.

The author gratefully acknowledges the cooperation of the milk handlers and producer-distributors of Arizona who provided the basic information for this thesis.

Also appreciated are the efforts of the secretaries of the Department of Agricultural Economics who deserve special credit for typing the rough draft.

Sincere appreciation is due to my wife, Ann, whose patience and consideration helped make this thesis a reality.

To all of the above mentioned persons my sincerest thanks and appreciation are extended.

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ABSTRACT OF THESIS

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The principal objective of this thesis is to describe the market structure of the Arizona dairy industry in order to facilitate future research in structure-performance relationships. Historical incidents that affected the growth of the dairy industry have been described and market structure with respect to producers and distributors was quantified. Market conduct was examined in terms of producer milk pricing, milk wars, and non-price competition. An attempt was made to show the divergence between optimum and actual market performance.

It was found that milk producing and distributing firms had decreased in numbers but grew in size from 1943 to 1963. The four largest distributors are currently handling a smaller share of all milk produced than in years past. The majority of dairy farms, milk cows, producer-distributors, distributors and consumers are located in Maricopa County. Most all distributors were organized as corporations

whereas the majority of producer-distributors were individual proprietorships and partnerships.

It appears that competitive behavior in the Arizona milk market diverges from the optimum criterion of pure competition but does not approach monopoly conditions. Areas of research have been suggested that may be helpful in explaining the competitive behavior of market participants with respect to the goals of social welfare.

Chapter 1

INTRODUCTION

Changes have been observed in the Arizona dairy industry in terms of farms and cow numbers, production per cow, number and size of handlers, and market shares. These variables describe some of the structural dimensions of the industry. It is hypothesized that changes in structural dimensions of an industry can affect its performance in the attainment of the goals of society. Comparing of actual performance and optimum performance and relating the divergences to market structure is the aim of this research project. The objectives of this study encompass the preliminary work in gathering data on market structural variables in the Arizona milk market. The main purpose of the research was to develop quantitative information on the dimensions of market structure of the milk industry in Arizona. A secondary purpose was to propose testable hypotheses concerning the relation of structure and performance.

The author found no research directly associated with market structure of the Arizona dairy industry except an historical study done by R. N. Davis.[1] The procedure followed in this research was to examine literature of market structure research to discover the theoretical

1. R. N. Davis, History of Dairying in Arizona (Arizona Agricultural Experiment Station, Tucson, Arizona) 1959.

basis for the concepts of market structure, conduct and performance and the methods to measure them. This review includes an examination of research relating market structure and performance in the bakery and grocery industries together with several studies concerning the milk industry. This literature reviewed in Chapter 2 becomes the basis for choosing the variables on which to collect data.

Information on structural variables for the Arizona market was gathered by mailing a questionnaire to each handler and producer-distributor.[1] Data concerning the number of firms in the industry by type and year was obtained from the Dairy Commissioner's office. Supplementary data was made available by the market administrator, James Hill,[2] and other individuals associated with the industry.

Chapters 3 through 6 present information gathered on structural variables. An historical review of aspects of the industry which describe changes in its organization were included in Chapter 3. Information concerning market structure measurement is divided into two parts, the first dealing with producers and the second with distributors. Changes in structure were determined over a ten year period, 1953 to 1963, by comparing firm numbers, firm sizes, milk production and market shares. Chapter 6 described the market in terms of pricing policy, product

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1. Refer to Appendix 1.

2. James Hill, Research Associate, Department of Agricultural Economics, University of Arizona.

differentiation, and exclusionary tactics. Past institutional methods of price determination were investigated by examining written testimony concerning the establishment of the federal milk marketing order. The deposition taken at the preliminary hearing of Co-op Dairy vs. Meadow-Gold, et. al. also revealed past behavior of some market participants.

Relationship of market structure to the differences between industry performance and optimum performance criteria is the objective of future research. A preliminary step toward this goal would be to suggest optimum criteria and tentatively compare them with actual performance. An attempt has been made to show the divergence between optimum performance norms and existing conditions in the market, Chapter 7. The last steps taken in this thesis toward the overall research goal are the percursory examination of the relations between structure and performance and the proposing of testable hypothesis relating structure and performance in the Arizona market.

Chapter 2

REVIEW OF THE LITERATURE

The development of concepts in market structure associated with the free enterprise marketing system is attributable to a number of economists.[1] Joe Bain, among others, suggested ways to quantify market structure.[2] Considerable research has used his theoretical framework as a basis. The first part of this chapter has been devoted to an explanation of market structure concepts as they have been defined by Bain. It is followed by a section which outlines some of the methodological procedures used in two recent market structure studies. Finally, the methodology and results of a number of market structure studies of the dairy industry are described.

Concepts and Definitions of the Market

Bain defines private enterprise sectors as the largest measurable units in the economy in terms of individual businesses. For

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1. Robert L. Clodius, Joe S. Bain, E. H. Chamberlain, William Fellner, W. W. Cochrane, Willard D. Arant, William H. Nicholls, J. M. Clark and Stephen H. Sosnick. Other economists associated with the development of market structure theory are listed in the Journal of Farm Economics, Vol. 43, August 1961, pp. 513-553.

2. Joe S. Bain, Industrial Organizations (New York; John Wiley and Sons, Inc.) 1959.

example, agriculture is a private enterprise sector made up of a number of farm units. Each of these units uses similar production processes and they sell like products.

Small businesses comparable in terms of inputs used and outputs produced are subgrouped into industries. Agriculture is an enterprise sector but dairying, a part of agriculture, is an industry. An industrial breakdown also can be based on location, such as Arizona's dairy industry as distinguished from California's dairy industry. Bain suggested that an industry was "strictly a group of sellers of close substitute outputs who supply a common group of buyers."[1] The interest in industrial units is emphasized because industry is the focus of competitive forces. Its structure is the logical and convenient unit of study in considering the conduct and performance of enterprises.[2]

Industries have been defined to include sellers and buyers while markets have been defined to mean a closely interrelated group of sellers and buyers. Therefore, industries become closely related to markets in terms of buyer and seller participants. When measuring market structure variables of a given market, in essence, the components of the related industry are being measured.

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1. Ibid., p. 6.

2. Ibid., p. 7.

Bain points out that market structure refers to those characteristics of organization in a market which seem to influence strategically the nature of competition and pricing within the market.[1] Organizational characteristics of a market include the number and size of existing firms, concentration of buyers, degree of product differentiation and the general conditions of entry.

"Market conduct refers to the patterns of behavior which enterprises follow in adapting or adjusting to the market in which they sell or buy."[2] Conduct is observed in pricing policies, product policy, price leadership, differential pricing and the presence or absence of predatory or exclusionary tactics directed against rivals.

"Market performance refers to the composite of end results in the dimensions of price, output, production costs, selling cost, product design, and so forth, which enterprises arrive at in any market as the consequence of pursuing whatever lines of conduct they espouse."[3] Market performance is the end result whereas conduct refers to how the results were obtained.

There is a close relationship between structure, conduct and performance. However, in market structure research it is difficult to

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1. Ibid.

2. Ibid., p. 9.

3. Ibid., p. 10.

classify problems specifically as structure, conduct or performance. The power of Bain's classifications lies in the fact that economists may learn more about markets and industries which have been classified according to his concepts.

Methods in Market Structure Analysis

Richard G. Walsh and Bert M. Evans have made an extensive analysis of the baking industry with special emphasis on market structure, conduct and performance.[1] The methods followed measure the structural dimensions as outlined by Joe Bain. Data was gathered and arranged to show trends in the number of bakeries, firm size, market shares and locational concentration. Barriers to entry also were examined.

Once market structural variables had been determined they were related to market performance in terms of production efficiency. The cost structure of the industry was explained through budget development and economy of scale analysis was introduced to resolve optimum plant size for given areas in the wholesale and retail markets. Market conduct of the firms in the baking industry was examined after the structural variables and operating costs were explained. Behavior in

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1. Richard G. Walsh and Bert M. Evans, Economics of Change in Market Structure, Conduct, and Performance: The Baking Industry 1947-1958. (Lincoln: The University of Nebraska) 1963.

terms of price and non-price activities was handled in four parts; price leadership, differential pricing, predatory price practices and price cutting. Walsh and Evans, in measuring the bakery industry performance, used price, profit and product dimensions as well as efficiency measures of bread production to arrive at market performance.

Market structure of the grocery industry has been investigated by Willard Mueller and Leon Garoain.[1] The approach taken in determining market structure variables differs from methods used by Walsh and Evans in determining the structure of the bakery industry. The researchers began with a history of grocery retailing. Market concentration in terms of number of firms, both chains and independents, size of firm and location of firm was determined. Size concentration measured by the four largest, fifth to eighth largest and all other firms also was examined.

A section of the grocery study is devoted to the effects of mergers on market structure. This is followed by an analysis of vertical integration in grocery distribution among affiliated independent stores. The final section of the grocery study consists of relating changes in grocery market structure with industrial performance.

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1. Willard F. Mueller and Leon Garoian, Changes in the Market Structure of Grocery Retailing (Madison: The University of Wisconsin Press) 1961.

William Eickhoff examined the market structure of Ohio's milk industry.[1] Objectives were to analyze structural changes which had occurred, to evaluate market performance and to relate the effect of structural changes with competition and performance. Performance and conduct measurements were evaluated by comparing data over a twelve-year period, 1950 to 1962.

Eickhoff used the Markov process to predict size distribution of Ohio milk plants to 1972. The basic assumption used by Eickhoff was that established growth rate patterns would continue for an indefinite period. A principal feature of the model included observing changes in the size of firms over a period of time. Evaluation of the tendencies of plant growth was made concerning an equilibrium size distribution on the basis of the initial movements. From the initial movements of firms it is possible to compute probabilities of growth by dividing the number of plants moving to other size categories by the initial number of plants within a particular size category. By assuming that the rate of growth represents the adjustment of firms to a particular market environment which will continue to exist, the number of firms for the future can be evaluated. General findings by Eickhoff predicted a decrease in the

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1. William Dean Eickhoff, Market Structure and Performance Relationships in the Ohio Fluid Milk Industry (Columbus: Ohio State University) 1963.

number of distributing plants, together with increasing plant size in terms of volume of milk handled.

Eickhoff tested the hypothesis that market structure is a determinant of market performance. The model related market performance variables such as wholesale and retail marketing margins with structural variables of concentration, volume and firm numbers. Independent variables used were seller and buyer concentration ratios. Results from the use of a multiple regression model show that the volume of milk sold outside the relevant market are not important in explaining variation in market performance. Concentration ratios did not explain variation in price margins when structural variables of time and plant numbers were eliminated. Relationships between buyer concentration and market performance were statistically significant.

Work in market structure description and measurement has been accomplished at the University of California.[1] Fletcher and McCorkle's work is devoted to the growth and adjustment of the Los Angeles milkshed to southern California. They also developed an analysis of the producer and handler structural characteristics of the Los Angeles milkshed.

Major objectives of Fletcher and McCorkle's study included describing structural characteristics of the Los Angeles market,

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1. L. B. Fletcher and C. O. McCorkle, Jr., Growth and Adjustment of the Los Angeles Milkshed, California Agricultural Experiment Station Bulletin 287, June 1962.

identifying those variables which determine geographic patterns of production and utilization, and predicting market adjustments to future sources of supply. Information concerning milk procurement, utilization and payments were obtained.

The researchers determined the market structure of the Los Angeles milkshed by observing distributor numbers, type of ownership and organization, sales outlets and sale concentration. The examination of southern California's milkshed was made covering the years 1956 to 1962. The analysis included the discovery of market structure variables in the southern milkshed, Los Angeles, and the northern milkshed, San Joaquin Valley. Number and size of dairies, as well as the type of production organization, were resolved. Market structure trends and patterns were established so that firm adjustments to market conditions could be predicted. Cost and location adjustments for plants as well as adjustments in producer prices and procurement practices were observed and described.

A more recent study completed at California by Padberg and Clark continues to explain market structure changes in California's milk industry.[1] Objectives of their study were to explain how and to what extent structure and institutional framework had changed in the fluid

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1. Daniel I. Padberg and D. A. Clarke, Jr., Structural Changes in California Fluid Milk Industry, California Agricultural Experiment Station Bulletin 802, June 1964.

milk industry and to examine the influences of these changes on competition. Padberg and Clark reached their objectives by examining changes in numbers and size classifications of both buyers and sellers of processed fluid milk. They investigated changes in the degree of market power possessed by buyers and sellers. Concentration curves were used to show the size distribution of the four largest and ten largest firms. Concentration curves show graphically the relationships between number of firms and cumulative market shares of firms ranked from largest to the smallest. Size distribution of firms in the industry is indicated by the shape of the curve. The development of concentration ratios for the four largest and ten largest firms were developed for retail and wholesale fluid milk outlets in California.

Procedures used by Padberg and Clarke followed the concepts developed by Bain and used by Walsh, Evans, Eickhoff, Fletcher and McCorkle in their analyses.[1] The structure of the market was explained by measuring firm numbers, volumes handled, type of organization and concentration by size and location. Market conduct of wholesale and retail participants was analyzed in terms of price behavior. Finally, Padberg and Clarke show changes that have occurred in competition and performance in the wholesale and retail markets.

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1. Refer to previously cited references in this chapter.

Market structure analysis of the dairy industry has been completed in Florida, Michigan, Washington and Wyoming. Researchers at the University of Florida analyzed the Florida milk market from a producer standpoint.[1] They ascertained that dairy farm numbers were falling but that producers remaining in the market were becoming larger in terms of increasing milk cows and pounds of milk produced.

Growing population and falling production of manufacturing quality milk led Michigan state researchers to an examination of market structure in the manufacturing milk industry of Michigan.[2] They found that manufacturing milk plant numbers were decreasing as well as the number of farms producing manufacturing quality milk. Increased number of milk cows did not offset the decrease in dairy farms. Producers of manufacturing milk were going out of business or moving into the production of fluid milk. Those plants and producers remaining in business were growing larger in terms of pounds of milk handled.

Bobst and Waananen, currently engaged in measuring market structure changes in Washington's dairy industry have explained market

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1. W. K. McPherson and Robert Floyd Luckey, Jr., Some Trends and Characteristics of the Dairy Industry in Florida, Florida Agricultural Experiment Station Bulletin 539, 1954.

2. Glynn McBride and Willard H. Blanchard, Changes in Michigan's Manufacturing Milk Industry, Michigan Agricultural Experiment Station, Special Bulletin 427, 1959.

structure trends.[1] Basic objective of the study was to determine market structure changes that had occurred in the producing, processing, and distributing segments of Washington's dairy industry.

Work at the University of Wyoming involved mailing a questionnaire to distributing firms throughout Wyoming.[2] Processing plants decreased 54 percent and manufacturing plants decreased 29 percent from 1956 to 1960. An interesting characteristic was the increase in firms distributing milk. Schutz also found that the number of producer-distributors operating had declined since 1957. Advertising costs were investigated and it was found that outlays for advertising, as a percent of sales, had decreased from 1957 to 1960. Newspapers, signs, theaters and calendars were being used with greater frequency in recent years. It was found that outlays for radio and television advertising had decreased.

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1. B. W. Bobst and M. V. Waananen, "Recent Structural Changes in the Markets Affecting Washington's Dairy Industry," unpublished manuscript, Washington State University, Pullman, Washington, 1964.

2. W. D. Schutz, Dairy Plants in Wyoming: Trends and Practices, Wyoming Agricultural Experiment Station, Mimeo Circular No. 169, 1962.

Chapter 3

THE DEVELOPMENT OF THE DAIRY INDUSTRY IN ARIZONA

The purpose of this chapter is to describe briefly some of the growth patterns that have occurred in the dairy industry of Arizona. Historical incidents that influenced dairy industry development are reviewed in the first section. The second section describes legislation and regulation that has developed in the Arizona market.

Growth of the Dairy Industry

The dairy industry in Arizona grew as population centers were established and as the potential water resources of the state were developed. Many changes came about as the need for additional dairy products grew and as the demand for a wholesome product increased. Arizona milk cow numbers were estimated as early as 1870 (Table 1). Davis reported that Durham cattle as well as the Holstein and Jersey breeds made up the early dairy herds in Arizona.[1] There were some native cattle in Arizona as reported by Bartlett[2] and it is reasonable to assume that they were included in some early milk cow herds.

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1. Davis, pp. 3-4.

2. John Russell Bartlett, Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua (New York: D. Appleton and Company) 1854, pp. 256 and 294.

TABLE 1. ESTIMATED MILK COW NUMBERS IN ARIZONA, JANUARY 1, 1870 TO 1931[a]

Year	Estimated Number of Milk Cows	Year	Number of Milk Cows
1870	1,000	1901	18,000
1871	1,000	1902	18,000
1872	1,000	1903	18,000
1873	1,000	1904	19,000
1874	1,000	1905	19,000
1875	1,000	1906	21,000
1876	1,000	1907	22,000
1877	2,000	1908	23,000
1878	3,000	1909	24,000
1879	4,000	1910	26,000
1880	5,000	1911	27,000
1881	6,000	1912	29,000
1882	6,000	1913	31,000
1883	7,000	1914	34,000
1884	7,000	1915	35,000
1885	8,000	1916	36,000
1886	8,000	1917	37,000
1887	9,000	1918	37,000
1888	9,000	1919	36,000
1889	10,000	1920	35,000
1890	10,000	1921	30,000
1891	11,000	1922	35,000
1892	12,000	1923	36,000
1893	13,000	1924	36,000
1894	14,000	1925	37,000
1895	15,000	1926	32,000
1896	16,000	1927	34,000
1897	17,000	1928	35,000
1898	18,000	1929	38,000
1899	18,000	1930	38,000
1900	19,000	1931[b]	42,000

a. Livestock on Farms, January 1, 1867-1919, U. S. D. A., Bureau of Agricultural Economics, Washington, D. C., January 1938.

b. Estimated milk cow numbers in Arizona from 1932 to 1964 are found in Chapter 4, page , Table 2.

Availability of water was a key factor in the production of milk. An irrigation system meant that additional feed could be grown which would eventually facilitate the expansion of dairy herds. Most of the early agriculture in Arizona was centered in livestock. However, with the completion of the Roosevelt dam in 1912 larger amounts of water were made available and crop production grew rapidly. Cash crops were introduced into the irrigated valleys. The introduction of cotton represented a temporary setback for the livestock industry and especially the dairy industry. Farmers turned from relatively low income dairy enterprises to high income cotton crops.

There was a temporary decline in the pounds of milk shipped to creameries in 1916. The three creameries in Phoenix, Hassyampa, Maricopa and Farmers Co-op usually received around 18,000 pounds of milk fat daily.[1] However, some plants closed down after the introduction of cotton because agricultural resources were shifted from milk production to cash cotton production. The initial cotton boom ended in 1920 with declining cotton prices. At this time the dairy industry recovered. Milk cows were repurchased and milk production increased. The county agent at Yuma said, "We are going to work for more diversified farming, less cotton acreage, higher yields per acre and the introduction of livestock and dairying."[2]

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1. Davis, p. 5.
2. Ibid., p. 9.

The first milk plants in Arizona in most all cases produced cheese, butter and condensed milk. Family needs in terms of fluid milk were met by one or two individually-owned cows. However, over time it was seen that profits could be derived by delivering milk from house to house or selling milk to creameries. The Central Avenue Dairy of Phoenix transferred some milk to consumers' containers by dipping from cans as early as 1898. As demand increased wagons were equipped with 50-gallon tanks. Milk was drawn from a spigot into the customer's own container.[1]

The history of the industry is marked by the addition of increased production per cow, new technologies, changes in the number of milk handlers, expanding consumer demand and an increased need for regulation. Creameries recovering from deficit milk periods during the cotton boom were accepting milk and cream with little regard for quality. It was recognized that laws controlling milk quality were needed in order to maintain a high health standard in Arizona communities. Milk codes, legislation and licensing were established to insure the quality of dairy products.

Organizations were established to maintain the bargaining power between milk producers and handlers as well as to provide for the co-operative purchase of supplies. As the market expanded producers lost

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1. Ibid., p. 39.

their bargaining power with distributors. Low prices, inaccurate fat tests and lack of market statistics were reasons for instability in the market. Corrective measures were taken by producers and in 1955 the federal government was petitioned to stabilize the market.

Legislation and Regulations

The main purpose of milk codes and legislation was to guarantee the public a clean, sweet, and wholesome array of dairy products fit for consumption. The dairy commissioner's office was organized in 1918 to guarantee this type of product. Legislative processes enacted a bill as follows:

> To Create the Office of State Dairy Commissioner and to fix the Salary, and Define the Duties and Powers of Such Officers; to Provide for the Inspection of Creameries, Cheese Factories, Dairy Barns and Utensils used in the Handling an Manufacture of Dairy and Creamery Products; to Establish Regulations for the Dairy and Creamery Industries; to Regulate the Production Sale and Shipment of Milk, Cream, Butter and Cheese; to Provide Penalties for the Violation of this Act, to Make an Appropriation for the Carrying out of Its Provisions, and Declaring an Emergency.[1]

The dairy commissioner was appointed by the governor and was to receive a salary not to exceed $3,000.00 per annum. His main job was to carry out the provisional inspection sections of the act of 1918 establishing the milk code of the state.

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1. Session Laws of Arizona, First Special Session, 3rd Legislature, 1918, p. 18-27.

There has been an active dairy commission in Arizona ever since the initial appointment of W. A. Barr in 1918.[1] As the industry grew the commissioner's office developed a greater amount of responsibility in issuing of licenses, inspection of facilities, and testing of products for bacterial contamination.

J. F. Jennings, Dairy Commissioner in 1925, recognized that his office would not be able to carry out its full responsibility without additional help. He chose, at that time, J. Irvin Bush as his deputy commissioner.[2] There were times when additional help was needed and the commissioner was given additional authority to appoint inspectors and deputies as he saw fit.

A major means by which the commissioner kept track of the many dairy firms doing business in the state was through issuance of a license to operate a particular enterprise. Licenses issued in 1918 and 1919 were simple and were allocated only to manufacturing plants. However, Arizona statutes have been revised from time to time in order to keep track of firms operating in the state and raise additional revenue.[3]

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1. Refer to Appendix 2 for a list of the Arizona Dairy Commissioners, their salaries and term of office.

2. Refer to Appendix 3 for a list of deputy commissioners, their salaries and term of office.

3. Refer to Appendix 4 for information concerning licensing of dairy firms.

The first license issued was to plants set up for manufacturing butter, cheese, and condensed milk.[1] Manufacturers, distributors, producer-distributors and producer-manufacturers licenses were established in 1939. These businesses were defined in the Arizona statutes of 1939 and 1952.[2]

Metropolitan areas such as Phoenix and Tucson established early milk codes. Their codes were recognized prior to the establishment of the state commissioner's office and were developed to further the production of sweet, wholesome dairy products. The city of Phoenix in 1893 appointed a health officer who inspected various foods used for human consumption. The milk code that he was responsible for was rather simple relative to the codes of today. The code stated that all visible materials be strained from the fluid milk prior to processing. The code suggested that preservatives such as formaldehyde could be added to the fluid milk to reduce souring.[3]

Milk codes became more rigorous as the industry supply and consumer demand developed. Phoenix adopted a strict milk code in 1915 to insure sanitary dairy products to consumers through inspection. The

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1. Arizona Code Annotated 1939, Article 9 - Dairy and Dairy Products, Definition of lines. p. 150.

2. Refer to Appendix 5.

3. Davis, p. 53.

code was not in conflict with the commissioner's office, but was an additional attempt to insure a wholesome product. It specified the requirements for producing, handling, and shipping fluid milk. Bacteria units per milliliter of milk were defined for different seasons of the year.[1]

Regulation has also been imposed by various dairy organizations and associations. These organizations, the Arizona Dairy Producers, Arizona Purebred Breeders, Arizona Milk Producers, American Dairy Association and the Dairymen's League have been instrumental in promoting various aspects of the industry. The Dairymen's League, in 1955, petitioned the federal government to help stabilize market conditions.

The initial petition was initiated because of instability in the market represented by non-uniform pricing, poor testing methods, and general lack of record-keeping. Mr. Cooper, President of the Dairymen's League, stated in the Federal Hearing that conditions in the market were not stable. He suggested that the greatest service that the Dairymen's League could render to its members was to petition the Department of Agriculture to come to Phoenix and conduct a hearing in order to set up a federal marketing order.[2]

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1. Ibid., p. 56-58.

2. United States Department of Agriculture, Docket No. A-O271 Proposed Milk Order for Central Arizona Marketing Area, Phoenix, Arizona, April 19, 1955, Hearing is filed with Mr. Haverfield at the Market Administrator's office in Phoenix. Page 27.

Notice of the hearing was published in the Federal Register April 12, 1955, and the meeting began April 19 under the direction of Jack W. Bain, government appointed hearing director. Mr. Harold Bowles, executive secretary for the Dairymen's League, was a key witness for establishing the order. In his testimony he cited instances that indicated instability in the market. He said, "I found very slipshod supervision of producer weights and test, with practically no check testing. I have also traveled by plane and car over the state in the past year helping producers to combat price wars in their areas of the state."[1] Mr. Bowles also struck hard at the inability of producers and handlers to bargain together. He suggested that the producers association should be stronger, "to the point where the association could bargain effectively with the handlers [in order to] create a more stable condition in the market. We have never been able to get the handlers to bargain with us in the manner that would work for harmony and stability."[2]

Mr. Bowles stated further that, "There are handlers in the market area at the present time who are not following recommended procedures for the sampling and testing of milk for butterfat. There are also some handlers who do not have the proper equipment for insuring

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1. Ibid., p. 36.

2. Ibid., pp. 36-37.

accurate weights to the producer."[1] In regards to pricing Mr. Bowles cited an example of instability that occurred in a price war.

> When the milk price war started in Tucson, handlers whose plants were located in Phoenix and who sold milk in the Tucson market dropped the producer pay price a sufficient amount to cover this price war...and handlers with plants located in Phoenix but not selling milk in the Tucson area also dropped their producer paying price in accordance with those selling in the Tucson area.[2]

The Dairymen's League recognized other problems in the market, Bowles said, "One of the most serious marketing problems is the lack of accurate market statistics."[3] He also mentioned that the central Arizona market was a deficit producing market during certain seasons of the year.

The Dairymen's League was not alone in its fight for a stable market. Mr. Grover Steele of Safeway Stores backed the petition drawn up by the League. Mr. Grover said, "Safeway supports this move for a Federal Milk Marketing Order for central Arizona. To encourage and assure an adequate supply of milk, Safeway is in favor of the adoption of regulation which establishes minimum prices for the milk of producers either by proper state milk control or Federal Milk Marketing Orders."[4]

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1. Ibid., p. 39.
2. Ibid., pp. 40-41.
3. Ibid., p. 44.
4. Ibid., pp. 57-58.

There was, of course, opposition to the establishing of a Federal Milk Order in Arizona. Mr. Montague,[1] speaking for the handlers, said, "The handlers feel that there is no present justification for the imposition of a Federal milk order. We are unalterably opposed to the order because in our opinion it will not reduce the problems in this market which have taken place in recent months."[2] In other testimony, The Borden Company said:

> We sincerely question the need and advisability of an order in Arizona at this time, principally because of the fact that, at our present Class 1 price of $5.25 per cwt. on a 3.5% basis, we are paying more for milk than is our nearest shed, the Los Angeles area, by 30¢ per cwt. and very considerably more than is paid in Utah; in fact, Utah milk can be delivered on a continuing basis in Phoenix for less than our current Class 1 price of $5.25 per cwt.... There is no "emergency" in Arizona which demands the immediate imposition of a milk order at this time.[3]

When all the evidence had been presented for and against the federal order, a decision was made by the federal government as to need and feasibility. The end result was the establishment of a Federal Marketing Order in central Arizona which controlled fluid milk handled in

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1. Counsel for handlers at the initial hearing in Phoenix.

2. Ibid., p. 16.

3. United States Department of Agriculture, Docket A-0271, Proposed Milk Order for Central Arizona Marketing Area, Brief Submitted after hearing by Arden Farms Company, Associated Dairy Products and Carnation Company. Hearing is filed with Mr. Haverfield at the Market Administrator's office in Phoenix. Page 7.

a number of Arizona counties (Figure 1). Since the establishment of the initial regulation, amendments have been made concerning the area to be regulated, definitions, pricing formulas, and compensatory payments.[1]

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1. Current copies of the Federal Milk Marketing Order are on file at the Market Administrator's office, Phoenix, Arizona.

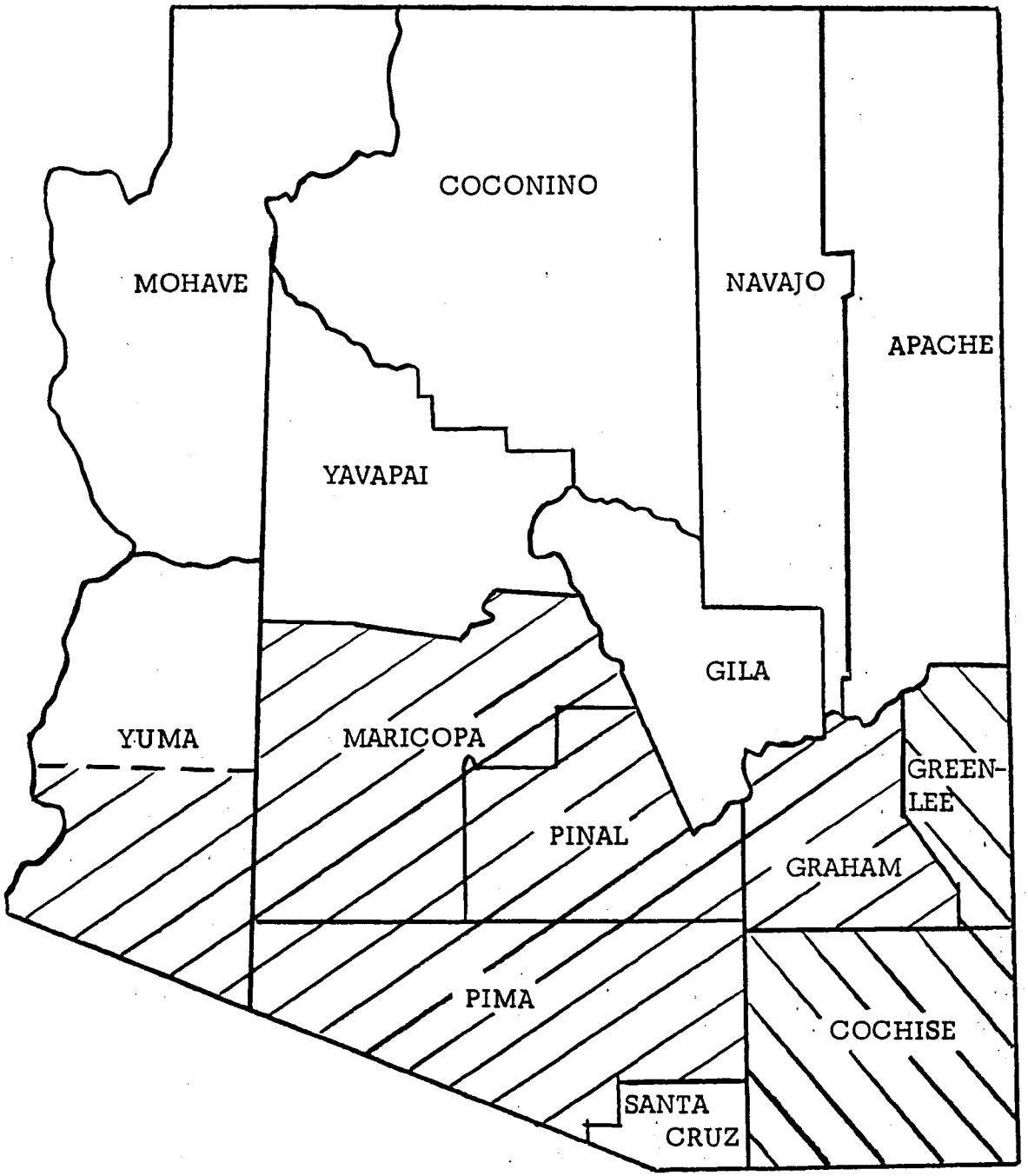

FIGURE 1. STATE OF ARIZONA SHOWING THE AREA CONTROLLED BY FEDERAL MILK ORDER 131.

LEGEND: ORIGINAL ORDER AREA
AREA ADDED IN 1962

Chapter 4

SUPPLY STRUCTURE OF THE ARIZONA MILK INDUSTRY

Supply structure of the dairy industry is associated with the number of dairy farms and milk cows as well as volume of milk production. Trends and patterns associated with these variables are compared at the following levels: the nation, the western states, and the counties of Arizona.

Arizona and the Nation

Arizona has not been considered a major dairy industry state compared to Wisconsin, Minnesota and New York. Traditional dairy belt areas are located in the North, Northeast and Northwest. However, the changes that have been occurring in Arizona's dairy industry have put Arizona among the national leaders in terms of performance records.

United States Department of Agriculture (USDA) reports show that milk cow numbers in Arizona have been increasing. It is reasonable to assume that greater demand for dairy products due to population increases has contributed to the increasing milk cow numbers. According to William Rasmusen, recent profits in the sale of fluid milk have

influenced producers to buy more cows.[1] Milk cow numbers have grown 34.2 percent since 1930 (Table 2).[2]

There has been a strong upward trend in milk production per cow. Average cows in Arizona in 1943 produced 5,250 pounds of milk annually. This placed Arizona fourteenth in the nation (Table 3). Milk production per cow climbed an additional 25.7 percent in 1953 to 6,600 pounds per cow. California and Arizona led the nation in 1963 with 10,410 pounds and 9,800 pounds per cow, respectively. Pounds of milk produced per cow in Arizona has increased 89.7 percent since 1943.

Production per cow expansion and absolute increases in cow numbers in Arizona have led to changes in the number of pounds of milk delivered to plants. Arizona, compared to the ten states leading in pounds of milk shipped to plants for 1943, 1953, and 1963, is illustrated in Table 4. Even though absolute changes have been reported for pounds of milk shipped to plants in Arizona, rankings by the USDA indicate that Arizona's position in the nation, thirty-fifth out of fifty states, has not changed since 1943.

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1. William Rasmusen is part owner of a producer-distributorship, Sarival Guernsey Farm, in Glendale, Arizona.

2. Table 1, Chapter 2, page 16, shows milk cow numbers prior to 1930.

TABLE 2. MILK COWS, MILK PRODUCTION PER COW AND TOTAL MILK PRODUCTION IN ARIZONA, 1930 TO 1963

Year	Milk Cows on Farms (thousands)	Milk Production per Cow (thousands)	Total Milk Production (millions)
1930	38,000	5,100	194
1940	43,000	5,400	232
1943	49,000	5,250	257
1944	48,000	5,300	254
1945	47,000	5,480	258
1946	44,000	5,540	244
1947	44,000	5,900	260
1948	45,000	5,600	252
1949	45,000	5,900	266
1950	46,000	5,900	271
1951	46,000	6,000	276
1952	47,000	6,200	291
1953	47,000	6,600	310
1954	47,000	7,400	348
1955	47,000	7,500	352
1956	48,000	7,700	370
1957	48,000	8,200	394
1958	49,000	8,600	421
1959[a]	50,000	9,220	461
1960	50,000	9,220	461
1961	50,000	9,360	468
1962	49,000	9,400	461
1963[b]	51,000	9,800	500

a. Milk Cows on Farms, Production Per Cow, and Total Production, U. S. D. A., Statistical Reporting Service, Crop Reporting Board, Statistical Bulletin No. 289, Washington, D. C., June 1961, p. 61.

b. Dairy Statistics through 1960, Supplement for 1962, U. S. D. A., Economic Research Service, Statistical Bulletin No. 303, Washington, D. C., p. 6.

TABLE 3. MILK PRODUCTION PER COW, TEN LEADING STATES AND ARIZONA 1943, 1953 AND 1963

1943[a]

State	Production per Cow (thousands)
California	6,900
New Jersey	6,560
Wisconsin	6,000
Washington	5,970
Massachusetts	5,820
New York	5,820
Utah	5,760
Nevada	5,650
Idaho	5,520
Oregon	5,470
Arizona (14)	5,250

1953

State	Production per Cow (thousands)
California	8,100
New Jersey	7,580
Washington	7,060
Wisconsin	7,050
New York	6,970
Utah	6,910
Massachusetts	6,700
Idaho	6,620
Arizona	6,600
Michigan	6,500

1963[b]

State	Production per Cow (thousands)
California	10,410
Arizona	9,800
New Jersey	9,690
Connecticut	9,380
Massachusetts	9,360
Rhode Island	9,170
Hawaii	9,090
Michigan	8,980
Washington	8,960
New York	8,820

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a. Milk Cows on Farms, Production per Cow, and Total Production, U. S. D. A., Statistical Reporting Service, Crop Reporting Board, Statistical Bulletin No. 289, Washington, D. C., 1961.

b. Milk Production and Dairy Products Annual Statistical Summary, 1963, U. S. D. A., Statistical Reporting Service, Crop Reporting Board, Washington D. C., 1964.

TABLE 4. POUNDS OF MILK DELIVERED TO PLANTS, TEN LEADING STATES AND ARIZONA, 1943, 1953, AND 1963

State	1943 Pounds[a] of Milk Delivered to Plants & Dealers (millions)	State	1953 Pounds of Milk Delivered to Plants & Dealers (millions)	State	1963 Pounds of Milk Delivered to Plants & Dealers[b] (millions)
Wisconsin	12,350	Wisconsin	14,700	Wisconsin	17,450
New York	6,550	New York	8,530	New York	10,235
California	4,140	California	5,855	Minnesota	9,250
Pennsylvania	3,650	Minnesota	5,180	California	7,409
Illinois	3,290	Pennsylvania	5,130	Pennsylvania	6,610
Michigan	3,140	Michigan	4,260	Texas	2,725
Missouri	1,640	Illinois	4,050	Washington	1,905
Texas	1,430	Missouri	2,700	Idaho	1,460
Vermont	1,290	Texas	2,020	Oklahoma	1,150
Washington	1,150	Vermont	1,952	New Jersey	1,080
Arizona (35)	159	Arizona (35)	250	Arizona (35)	435

a. Dairy Statistics, U. S. D. A., Agriculture Marketing Service, Statistical Bulletin No. 218, Washington, D. C., 1957.

b. Dairy Statistics: Supplement for 1962, U. S. D. A., Economic Research Service, Statistical Bulletin No. 303, Washington, D. C., 1963.

Arizona and the Western States

Many of the trends associated with the dairy industry in Arizona are closely related to current trends and patterns in the western states. Arizona's position relative to ten selected western states has been explained with respect to milk cow numbers, milk production per

cow and pounds of milk delivered to plants. Milk cows on farms in western states have decreased over the last twenty years. There were 2,514,000 milk cows on farms in the West in 1943 compared to 2,189,000 head on farms in 1953. This represented a 13 percent decrease. There was an additional 10.1 percent reduction to 1,967,000 milk cows on farms in 1963. However, all western states have not experienced decreasing milk cow numbers. Arizona's position, compared to the western states, has changed slightly over a twenty-year period in terms of milk cows on farms (Table 5).

Average production per milk cow in Arizona has increased. Milk production per cow increased 86.7 percent from 1943 to 1963 and 48.5 percent from 1953 to 1963. Production expansion was greater in Arizona than any western state between 1943 and 1963. New Mexico was a distant second for the same period of time (Table 6).

As milk cow numbers and milk production per cow have changed, pounds of whole milk delivered to plants by producers in eleven western states has changed. Arizona, Nevada, Utah and New Mexico increased the number of pounds of milk shipped to plants by more than 50 percent from 1943 to 1953. Arizona producers increased milk shipments to plants by 57.2 percent over the same period of time (Table 7).

TABLE 5. MILK COWS IN THE ELEVEN WESTERN STATES, 1943, 1953, and 1963[a]

State	1943 Number of Milk Cows[b]	Percent of Total	1953 Number of Milk Cows[c]	Percent of Total	1963 Number of Milk Cows[d]	Percent of Total
Arizona	53,000	2.1	51,000	2.3	54,000	2.8
California	810,000	32.2	874,000	39.9	881,000	44.8
Colorado	249,000	9.9	182,000	8.3	124,000	6.3
Idaho	266,000	10.6	231,000	10.6	217,000	11.0
Montana	173,000	6.9	110,000	5.0	76,000	3.8
Nevada	22,000	.9	16,000	.7	17,000	.9
New Mexico	83,000	3.3	53,000	2.4	42,000	2.1
Oregon	290,000	11.5	233,000	10.7	163,000	8.3
Utah	117,000	4.7	111,000	5.1	104,000	5.3
Washington	380,000	15.1	280,000	12.8	260,000	13.2
Wyoming	71,000	2.8	48,000	2.2	29,000	1.5
TOTALS	2,514,000	100%	2,189,000	100%	1,967,000	100%

a. Livestock and Poultry on Farms, U. S. D. A., Bureau of Agricultural Economics, Crop Reporting Service, January 1, currently referred to as Livestock and Poultry Inventory, Statistical Reporting Service, Crop Reporting Board, Washington, D. C.

b. 1943. Cows and 2-year-old heifers.

c. 1953. Cows 2 years plus.

d. 1963. Cows 2 years plus.

TABLE 6. AVERAGE PRODUCTION PER COW IN THE ELEVEN WESTERN STATES WITH PERCENTAGE CHANGES IN PRODUCTION 1943, 1953, AND 1963

State	1943[a] Average Production	1953 Average Production	1943-1953 Percentage Change	1963[b] Average Production	1953-1963 Percentage Change	1943-1963 Percentage Change
California	6,900	8,100	12.4	10,410	28.5	50.9
Washington	5,970	7,060	18.3	8,960	26.9	50.1
Utah	5,760	6,910	19.9	8,370	21.1	45.3
Nevada	5,650	6,200	9.7	8,130	31.1	43.9
Oregon	5,470	5,980	9.3	7,250	12.1	32.5
Idaho	5,520	6,620	19.9	8,360	26.2	51.5
Arizona	5,250	6,600	25.7	9,800	48.5	86.7
Colorado	4,800	5,570	16.0	7,590	36.3	58.1
Montana	4,780	5,140	7.5	6,040	17.5	26.4
Wyoming	4,570	5,130	12.3	6,690	30.4	46.4
New Mexico	4,060	4,450	9.6	6,850	53.9	68.7

a. Dairy Statistics, U. S. D. A., Agriculture Marketing Service, Statistical Bulletin No. 218, Washington, D. C., 1957.

b. Milk Production and Dairy Products Annual Statistical Summary, 1963, U. S. D. A., Statistical Reporting Service, Crop Reporting Board, Washington, D. C., 1964.

TABLE 7. POUNDS OF MILK DELIVERED TO PLANTS IN ELEVEN WESTERN STATES WITH PERCENTAGE CHANGES IN DELIVERIES, 1943,1953, AND 1963.

	1943[a]		1953			1963[b]			
	Pounds of Whole Milk Delivered to Plants	Percent of Total	Pounds of Whole Milk Delivered to Plants	Percent of Total	Percent Change since 1943	Pounds of Whole Milk Delivered to Plants	Percent of Total	Percent Change since 1953	Percent Change since 1943
	(In Millions of Pounds)								
Arizona	159	2.0	250	2.3	57.2	435	3.1	74.0	174.0
California	4,140	51.4	5,855	53.0	41.4	7,409	52.3	26.5	83.4
Colorado	365	4.5	510	4.6	39.7	650	4.6	27.5	78.1
Idaho	781	9.7	1,130	10.2	44.7	1,460	10.3	29.2	87.0
Montana	150	1.9	200	1.8	33.3	247	1.7	23.5	64.7
Nevada	36	.5	56	.5	55.6	106	.8	89.3	194.4
New Mexico	79	1.0	120	1.1	51.9	208	1.5	73.3	163.2
Oregon	720	8.9	860	7.8	19.4	920	6.5	7.0	27.8
Utah	386	4.8	590	5.3	52.9	690	4.8	16.9	78.8
Washington	1,150	14.2	1,380	12.5	20.0	1,905	13.5	38.0	65.7
Wyoming	91	1.1	102	.9	12.1	127	.9	24.5	39.5
Totals	8,057	100.0	11,053	100.0	37.2	14,157	100.0	28.1	75.7

a. Dairy Statistics Through 1960, U. S. D. A., Economic Research Service, Statistical Bulletin 303, Washington.

b. Dairy Statistics 1962 Supplement, U. S. D. A., Economic Research Service, Statistical Bulletin 303, Washington.

Structure of Fluid Milk Supply Within Arizona

Fluctuations have occurred in total farm numbers in Arizona since 1920. There were 9,975 farms in 1920 compared with 18,468 farms in 1940, an 85.1 percent increase. However, total farms had decreased 70 percent by 1963 to an estimated 5,500 farms. The number of total farms reporting milk cows also has declined since 1920. It has been estimated that 13.2 percent of all farms in Arizona had one or more milk cows in 1963 contrasted to 54.5 percent of all farms having one or more milk cows in 1920 (Table 8).

Farms reporting milk cows and dairy farms are not necessarily the same unit, according to the Census Bureau. Dairy farms are those firms deriving 50 percent or more of their revenue from the sale of dairy products while farms reporting milk cows need not report any earned revenue from the sale of milk or milk products.[1] Dairy farms have been decreasing since 1950. It has been estimated that there were 269 dairy farms in Arizona in 1963 compared to 848 in 1950, a 68.3 percent decrease.

Largest concentration of dairy farms has been in Maricopa County. There were 711 dairies in Maricopa County in 1950 representing 83.3 percent of all dairies in the state. Maricopa County contained 85.4 percent of all dairies in 1954, and by 1963 this percentage had decreased to 82.2 (Table 9).

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1. United States Census of Agriculture: 1959, U. S. Department of Commerce, Arizona Counties, XXIV.

TABLE 8. TOTAL FARMS AND NUMBER OF FARMS REPORTING MILK COWS IN ARIZONA, 1920 TO 1963

Year	Total Farms	Farms Reporting Milk Cows	Farms Reporting Milk Cows as a Percent of the Total Farms
1920	9,975	5,433	54.46
1925	10,802	5,267	48.76
1930	14,173	5,545	39.32
1935	18,824	NA	--
1940	18,468	6,649	36.00
1945	13,142	NA	--
1950	10,412	4,994	47.96
1954	9,321	3,720	39.90
1959[a]	7,233	2,124[b]	29.37
1963[c]	5,500	724	13.16

a. Dairy Statistics Through 1960, Supplement for 1962, U. S. D. A., Economic Research Service, Statistical Bulletin No. 303, Washington, D. C., p. 40.

b. New Mexico and Arizona Counties and State Economic Areas; 1954 Census of Agriculture, U. S. Department of Commerce, Bureau of the Census, Arizona Chapter A, Statistics for the State, Washington, D. C., Vol. 1, Part 30. Total farms, p. 150; farms reporting milk cows, p. 1974.

c. Estimated by William Ralph Van Sant, Extension Dairy Specialist, Co-operative Extension Service, University of Arizona.

Dairy farms state-wide have been concentrated in the county areas defined by the Federal Milk Marketing Order.[1] Federal milk

1. The area controlled by the market order includes Maricopa, Pinal, Pima, Graham, Greenlee, Cochise, and the southern half of Yuma Counties.

TABLE 9. DAIRY FARMS BY COUNTY IN ARIZONA, WITH PERCENTAGE CHANGES IN FARM NUMBERS 1950, 1954, 1959, AND 1963.[a]

County	No. Farms 1950	Percent of Total	No. Farms 1954	Percent of Total	Percent Change since 1950	No. Farms 1959	Percent of Total	Percent Change since 1954	No. Farms 1963	Percent of Total	Percent Change since 1959	Percent Change since 1950
Apache	4	.5	0	0	-100	0	0	0	0	0	0	-100.0
Cochise	35	4.1	2	.4	- 94.2	16	4.3	700.0	6	2.2	-62.5	- 82.9
Coconino	1	.1	6	1.1	+ 83.5	0	0	-100.0	0	0	0	-100.0
Gila	0	0	0	0	0	0	0	0	0	0	0	0
Graham	10	1.2	4	.7	- 60.0	27	7.3	+575.0	8	3.0	- 70.4	- 20.0
Greenlee	6	.7	5	.9	- 16.7	1	.3	- 80.0	2	.7	+ 50.0	- 66.7
Maricopa	711	83.8	482	85.4	- 32.2	298	80.3	- 38.2	221	82.2	- 25.8	- 68.9
Mohave	1	.1	7	1.2	600.0	0	0	-100.0	1	.4		0
Navajo	29	3.5	13	2.3	- 55.2	13	3.5	0	6	2.2	- 53.8	- 79.3
Pima	23	2.7	15	2.7	- 34.7	10	2.7	- 33.3	5	1.8	- 50.0	- 78.3
Pinal	22	2.6	8	1.4	- 63.6	3	.8	- 62.5	8	3.0	+166.7	- 63.6
Santa Cruz	0	0	0	0	0	0	0	0	1	.4		
Yavapai	6	.7	10	1.8	+ 66.7	2	.5	- 80.0	8	3.0	+300.0	+ 33.3
Yuma	0	0	12	2.1		1	.3	- 91.7	3	1.1	+200	
TOTAL	848	100.0	564	100.0	- 33.5	371	100.0	- 34.2	269	100.0	- 27.5	- 68.3

a. U. S. D. C., Bureau of the Census, 1950, 1954 and 1955, Census of Agriculture, Washington. 1963 figures estimated by W. R. Van Sant, Extension Dairy Specialist, Cooperative Extension Service, University of Arizona.

marketing statistics show that 260 producers delivered milk in the order area in June of 1963.[1] These producers delivered milk to plants located within the bounds of the order area and they represented 96.6 percent of all producers in the state. The Federal Administrator's office in Phoenix reports that there were 252 producers delivering milk to the handlers in the order area in August 1964.[2] This figure included some producers living in Yavapai and Santa Cruz Counties as well as Imperial County, California. These producers are not located in the market area but are subject to the regulation of the market order.

Estimating the number of milk cows is done by the USDA and the Census Bureau. The estimates are not always the same. Census Bureau figures are lower than the USDA figures by four to seven thousand head.[3] Estimates from the Bureau of Census have been used in order to arrive at a general breakdown of milk cows by county.

Concentration of milk cows has moved towards the highly populated areas. According to census data there were 42,134 head of milk cows in Arizona in 1950. Maricopa County contained 29,205 of these cattle or 69.3 percent. Maricopa County had 29,920 milk cows

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1. Federal Milk Market Administrator, United States Department of Agriculture. Statistical Summary, February, 1964.

2. Market Information Bulletin, Vol. IX, September 1964, No. 9, Phoenix, Arizona, p. 1.

3. General comparison.

in 1954, or 73.3 percent of the state herd. Growth was further represented in Maricopa County in 1959 when 33,797 milk cows were reported, 76.1 percent of the total milk cows in the state. Estimations for 1963 indicate that Maricopa County had 37,500 head of milk cows, 83.3 percent of the state total (Table 10).

Increasing absolute numbers of milk cows and decreasing number of dairy farms implies that dairy enterprises have become larger in terms of milk cows per dairy farm. Average herd size in 1950 for the state was 50 milk cows and rose to 72 milk cows per herd by 1954. Average size of dairy herds in 1959 was 120 head and 167 in 1963. Maricopa County milk cow herds have grown from 42 cows per herd in 1950 to 170 cows per herd in 1963. Pima County herds grew from 78 cows per herd in 1950 to 200 in 1963. Average size herds in Pinal County have increased from 86 to 150 milk cows over the same period of time.

Pounds of milk delivered to plants per county have been changing in all counties since 1956. Approximately 291,959,850 pounds of milk were delivered to plants in 1956 compared to 490,512,915 shipped in 1963, a 68 percent increase. Total deliveries made in 1963 were made by 50 percent fewer producers and milk shipments to plants by producers have been greatest in Maricopa County. Plants in Maricopa County received 87 percent of all the milk in the state in 1963 (Table 11).

TABLE 10. MILK COWS ON FARMS BY COUNTY IN ARIZONA WITH PERCENTAGE CHANGES IN COW NUMBERS 1950, 1954, 1959[a] and 1963[b]

County	Cow Numbers 1950	Percent of Total	Cow Numbers 1954	Percent of Total	Percent Change since 1950	Cow Numbers 1959	Percent of Total	Percent Change since 1954	Cow Numbers 1963	Percent of Total	Percent Change since 1959	Percent Change 1950-1963
Apache	631	1.5	369	.9	-41.5	224	.5	-39.3	190	.4	-15.2	-69.9
Cochise	1,894	4.5	1,575	3.9	-16.8	1,616	3.6	+ 2.6	1,000	2.2	-38.1	-47.2
Coconino	446	1.1	383	.9	-14.1	128	.3	-66.6	100	.2	-21.9	-77.6
Gila	405	1.0	290	.7	-28.4	145	.3	-50.0	110	.3	-24.1	-72.8
Graham	1,602	3.8	1,762	4.3	+10.0	1,998	4.5	+13.4	1,300	2.9	-34.9	-18.9
Greenlee	473	1.1	396	1.0	-16.3	518	1.2	+30.8	450	1.0	-13.1	- 4.9
Maricopa	29,205	69.3	29,920	73.3	+ 2.4	33,797	76.1	+13.0	37,500	83.3	+11.0	+28.4
Navajo	1,063	2.5	744	1.8	-30.0	608	1.4	-18.3	500	1.1	-17.8	-53.0
Pima	1,782	4.2	1,599	3.9	-10.3	969	2.2	-39.4	1,000	2.2	+ 3.2	-43.9
Pinal	1,884	4.5	1,263	3.1	-33.0	1,561	3.5	+23.6	1,200	2.7	-23.2	-36.3
Santa Cruz	293	.7	273	.7	- 6.8	203	.5	-25.6	150	.3	-26.1	-48.8
Yavapai	1,527	3.6	1,126	2.8	-26.3	1,725	3.9	+53.2	1,100	2.5	-36.2	-28.0
Yuma	581	1.4	785	1.9	+35.6	677	1.5	-13.8	300	.7	-55.7	-48.4
TOTAL	42,134	100.0	40,821	100.0	- 3.1	44,387	100.0	+ 8.7	45,000	100.0	+ 1.4	+ 6.8

a. U. S. D. C., Bureau of the Census, Agricultural Census for Arizona, 1950, 1954 and 1959 Washington.

b. 1963 figures estimated by W. R. Van Sant, Extension Dairy Specialist, Cooperative Extension Service, University of Arizona.

TABLE 11. POUNDS OF MILK DELIVERED TO PLANTS BY PRODUCERS BY COUNTY IN ARIZONA WITH PERCENTAGE CHANGES IN DELIVERIES 1956, 1959 AND 1963[a]

County	1956 June		1959 June			1963 June		
	Total Average Deliveries to Handlers	Percent of Total	Total Average Deliveries to Hnadlers	Percent of Total	Percent Change since 1956	Total Average Deliveries to Handlers	Percent of Total	Percent Change since 1959	Percent Change since 1956
Cochise	3,074,760	1.1	5,372,070	1.4	+ 74.7	1,739,955	.4	-66.7	- 43.4
Graham	7,938,385	2.7	10,386,805	2.7	+ 30.8	6,584,600	1.3	-36.6	- 17.1
Maricopa	254,253,160	87.1	324,449,595	84.0	+ 27.6	427,251,480	87.1	+31.7	+ 68.0
Pima	8,756,350	3.0	15,089,100	3.9	+ 72.3	17,593,000	3.6	+16.6	+100.9
Pinal	5,664,800	1.9	9,121,350	2.4	+ 61.0	9,869,965	2.0	+ 8.2	+ 74.2
Yavapai	2,157,880	.8	6,752,500	1.7	+212.9	6,526,200	1.3	- 3.4	+202.4
Yuma	2,978,400	1.0	6,141,125	1.6	+106.2	6,214,125	1.3	+ 1.2	+108.6
Greenlee) Navajo) Santa Cruz)	2,440,025	.8	3,137,175	.8	+ 28.6	3,549,990	.7	+13.2	+ 45.5
Imperial	4,696,090	1.6	5,842,920	1.5	+ 24.4	11,183,600	2.3	+91.4	+138.1
TOTAL	291,959,850		386,292,640	100.0	+ 32.3	490,512,915	100.0	+27.0	+ 68.0

a. Compilation of Statistical Material Pertaining to Proposed Amendments to Federal Order 131, as Amended Central Arizona Marketing Area, U. S. D. A., Federal Milk Market Administrator, Phoenix, Arizona, February, 1964. Total Average Deliveries calculated by producer number times average daily delivery times 365.

Milk shipments to plants in Arizona are handled by three organized groups of producers. These producer associations account for approximately 91 percent of all milk marketed in Arizona. There are a few non-member producers in Arizona and they account for approximately one percent of the milk supply. Producer-distributors account for eight percent of Arizona milk. The United Dairymen of Arizona (UDA) was organized in 1960 when the Dairymen's League and the Arizona Milk Producers joined forces. There were some producers formerly of the two organizations that decided not to join UDA, and some of these producers have since formed the Federated Milk Producers. It is estimated that UDA serves more than 200 producers and handles approximately 70 percent of the milk produced in the central Arizona area.

Federated Producers Association is made up of approximately 30 producers who deliver their milk to the Shamrock Corporation of Tucson and Phoenix. When Federated was organized in 1961, approximately 30 producers were members. There has been no large change in the number of producers associated with Federated. Co-op Dairy is made up of 22 producers and this number also has been constant over time. Therefore, if Federated and Co-op have remained constant in terms of producer numbers and the total number of producers has been decreasing in the state, UDA and/or independent producers must be smaller in numbers. There is little data available to point towards exact numbers.

There has been a decrease in producers and an increase in milk cows and production per cow. Therefore, the producers remaining in business have been increasing in size in terms of pounds of milk produced and pounds of milk shipped through their respective producer association. The number of pounds of milk handled by Co-op Dairy, for example, has increased 90 percent from 1953 to 1963. Shamrock Dairy of Tucson also indicated that the production per Federated producer has increased substantially.[1]

The purposes of the three producer associations are similar.

> The UDA seeks to achieve a stable market and equitable prices for dairy farmers through marketing programs developed within the UDA and through constant revision of the Federal Order.... The marketing program of the United Dairymen includes bargaining on sale of milk; federal marketing order research; representation in industry; legislature and at hearings; and milk hauling, storage and processing. Other activities of the cooperative include butterfat, quality and chemical residue testing; farm supply purchasing; field service; farm labor placement; and a credit union.[2]

The Federated Producer organization provides a bargaining cooperative for members, they conduct butterfat test, and perform quality testing programs such as pesticide control in milk. The general purpose of Federated Producers is to work towards a stabilized market with an adequate supply of milk. The goals of the Co-op Dairy are similar to those that have been stated.

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1. Interview with Majorie Hefty, Shamrock Dairy of Tucson, November 1964, revealed this information.

2. The Agricultural Council of Arizona, Member Directory 1964.

The preceding sections have explained and described the changes that have taken place in the Arizona dairy industry from the supply side. Some definite patterns have been observed and are listed as follows:

1. Milk cow numbers in Arizona have been increasing.
2. Milk production per cow is at an all-time high. Arizona is currently ranked second in the nation.
3. Milk production in Arizona has increased 90 percent since 1943.
4. Dairy farms in Arizona have grown larger in size in terms of milk cows per herd and milk production per cow.
5. Dairy farm numbers have decreased 68.3 percent since 1950.
6. Dairy farms and milk cows have been concentrated in Maricopa County.
7. Ninety-seven percent of all producers in the state have been located in the area governed by Federal Marketing Order 131.
8. There are three producer associations that account for 91 percent of all milk marketed in Arizona.
9. The size of producer associations has increased in terms of the volume of milk handled.

The changes in market structure that have been explained may be related to the conduct and performance of market participants. As producer

numbers decrease, for example, competition pressures may be exerted to the extent that producer associations will have to merge to maintain their bargaining power. It appears that more and more of the total milk supply is being marketed through these associations. Small organizations like Co-op Dairy and Federated Producers, with 22 and 25 producers respectively, may be forced to become part of UDA or some other organization in order to maintain their bargaining power.

Chapter 5

DEMAND STRUCTURE OF THE ARIZONA DAIRY INDUSTRY

Analysis of the demand structure of Arizona's dairy industry has been handled in three sections.[1] The first section is devoted to an analysis of the distributors or handlers of fluid milk. Section two describes changes in terms of producer-distributors. The third section is devoted to a brief analysis of the market structure in the central Arizona milk marketing area.

Market Structure Changes: Distributors

The current definition of a distributor or handler in Arizona is any plant processing and distributing milk and milk products other than products made from manufacturing milk. However, there is no manufacturing grade milk in Arizona. All milk is classified according to use rather than quality or, in other words, all milk used in Arizona for human consumption is of like quality. There are three use classifications, Class I, II, and III. These classes have been defined in detail in Central Arizona Milk Marketing Order 131.

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1. Demand structure refers to distributors and producer-distributors demanding milk from producers.

2. State Dairy Commission Laws, State of Arizona, July 14, 1956.

Class I Fluid Milk Definition: All skim milk (including reconstituted and concentrated nonfat milk solids and butter fat:

(1) Disposed of in the form of a fluid milk product; (2) not specifically accounted for as class II or class III.

Class II Fluid Milk Definition: All skim milk and butter fat.

(1) Contained in fluid milk products used to produce cottage cheese except for cottage cheese produced as livestock feed; (2) Disposed of in fluid products in bulk form (minimum 5 gallons) to any commercial food processing establishment for use in food products prepared for consumption off the premises.

Class III Fluid Milk Definition:[1] Shall be all skim and butter fat:

(1) Used to produce any product other than a fluid milk product or a class II product; (2) contained in inventories of fluid milk products on hand at the end of the month; (3) skim milk disposed of in the form of fluid milk products or cottage cheese for livestock feed....[2]

The number of distributors handling, receiving and/or distributing the three classes of fluid milk has been changing since 1943 (Figure 2). There were 122 handlers statewide in 1943 compared to 18 handlers in 1963, an 85.2 percent decrease. A portion of the decrease is due to alterations in the definition of a distributor. "Persons engaged in the business of buying or receiving dairy products . . . from the producer or manufacturer . . . for the purpose of handling, preparing, distributing or selling same" were considered to be distributors in 1943.[3] However, by

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1. Incomplete definition.

2. Order Amending the Order Regulating the Handling of Milk in the Central Arizona Marketing Area, U. S. D. A., No. 131, June 1962.

3. Arizona Code, Annotated 1939, Article 9, Dairy and Dairy Products, Phoenix, Arizona, p. 150.

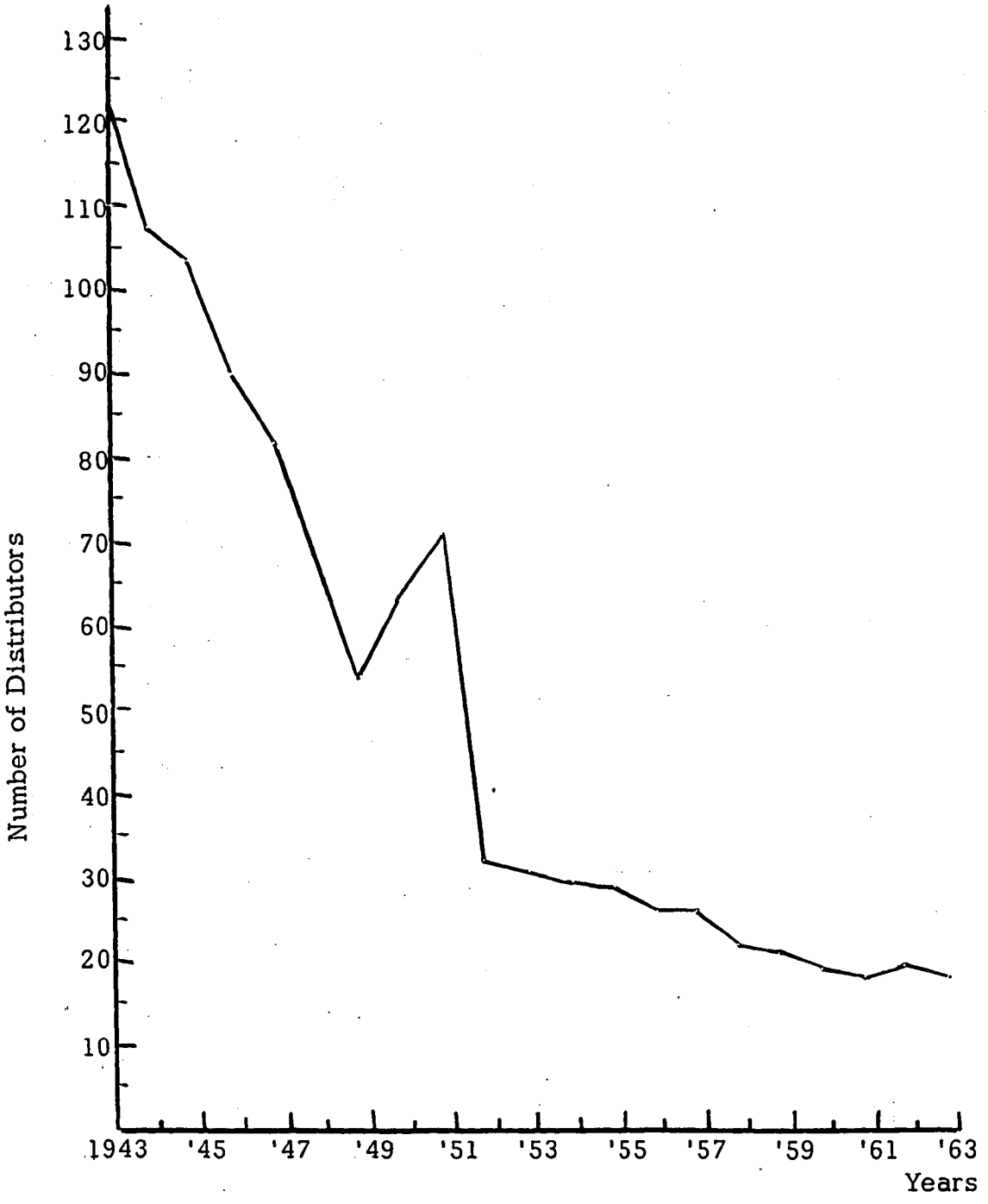

Figure 2.--Number of milk distributing firms in Arizona, 1943 to 1963.

1963 the definition had changed to plants processing and distributing milk and milk products other than products made from manufacturing milk.[1]

As handler numbers decreased,[2] firms remaining in the industry have become concentrated in Maricopa County. Thirty-five percent of all the firms in Arizona were in Maricopa County in 1953, but by 1963, 61.1 percent of all handlers were in Maricopa County. Total handlers statewide have decreased 41.9 percent since 1953. However, distributors in Maricopa County have remained unchanged in terms of absolute numbers even though there have been firms entering and exiting (Table 12). All counties reported one or more distributing plants in 1953 except Apache and Santa Cruz. Only 6 counties out of 14 reported milk distributing plants in 1963. These counties were Coconino, Gila, Graham, Maricopa, Pima, and Yavapai.

The number of handlers coming into and leaving the market has varied each year since 1953. The greatest decrease in handler numbers occurred in 1958 when a net of four firms left the industry. Actually, six firms left and two firms entered. There were 15 distributors in Arizona in 1963. Since 1953, 14 firms have entered the industry and 31 firms have departed, leaving a net of minus 17 (Table 13).

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1. Arizona Code Annotated 1939, Cumulation Supplement 1952, Phoenix, Arizona, pp. 92-94.

2. Milk distributing firms and milk handlers are the same type of firm. They also are considered to be milk processors.

TABLE 12. NUMBER OF MILK DISTRIBUTING FIRMS IN MARICOPA COUNTY AS A PERCENT OF ALL DISTRIBUTING FIRMS IN ARIZONA, 1953 TO 1963[a]

Year	Total Milk Distributors in Arizona	Total Milk Distributors in Maricopa County	Percent of the Total
1953	31	11	35.5
1954	29	11	37.9
1955	29	11	37.9
1956	25	9	36.0
1957	26	10	38.5
1958	22	11	50.0
1959	21	10	47.6
1960	19	10	52.6
1961	18	11	61.1
1962	19	11	52.6
1963	18	11	61.1

a. A. Warren Austin, Arizona Dairy Commissioner, Phoenix, Arizona, 1964.

There are a number of reasons why handlers left the Arizona market. Mr. Shouse, the Deputy Dairy Commissioner of Arizona, was able to give tentative reasons why 25 of the 31 plants left the market. Conditions of competition accounted for 22,6 percent of the exits. Firms sold to other handlers in the Arizona industry represented 19.4 percent of the total firms departing, and 12.9 percent of firms leaving the industry did so because their plants were aging and could not meet sanitation requirements (Table 14). A partial list of distributors and the firms to whom they were sold has been developed.[1]

1. Refer to Appendix 6.

TABLE 13. NUMBER OF MILK DISTRIBUTING FIRMS ENTERING AND LEAVING THE ARIZONA DAIRY INDUSTRY, 1953 TO 1963[a]

Year	Number of Firms Entering the Market	Number of Firms Leaving the Market	Net Difference	Total Number of Distributors
1953	5	6	-1	31
1954	1	2	-1	30
1955	1	2	-1	29
1956	0	3	-3	26
1957	1	1	0	26
1958	2	6	-4	22
1959	1	2	-1	21
1960	0	2	-2	19
1961	2	3	-1	18
1962	1	0	1	19
1963	0	1	-1	18
1964	0	3	-3	15
TOTALS	14	31	-17	

a. A. Warren Austin, Arizona Dairy Commissioner, Phoenix, Arizona, 1964.

TABLE 14. REASONS GIVEN FOR MILK DISTRIBUTORS LEAVING THE DAIRY INDUSTRY IN ARIZONA, 1953 TO 1963[a]

Reasons for Distributors Leaving the Market	Number of Distributors Leaving the Market	Percent of Total
Sanitation Deficiency	4	12.9
Competition	7	22.6
Sold to Other Handlers	6	19.4
Distance from Market	2	6.4
License Change	2	6.4
Accidents	4	12.9
Unknown	6	19.4
TOTALS	31	100.0

a. H. J. Shouse, Deputy Dairy Commissioner, June, 1964, Phoenix, Arizona

Milk production and pounds of milk delivered to plants has been increasing. As deliveries to plants increased and plant numbers decreased, the volume of milk per plant has moved upward. The trend, therefore, is towards fewer plants, but larger plants in terms of milk volume handled. The largest four firms handled between 38 and 52 percent of the total volume of milk produced in the state from 1953 to 1963. To be more exact, in 1953, the largest four firms handled 38.1 percent of all milk. Largest four firms in 1955 and 1957 handled 49.1 and 51.4 percent respectively, and in 1959 the largest four firms were handling 52.2 percent of all milk. Fifty percent of the total milk supply was handled by the four largest firms in 1963 (Table 15).

TABLE 15. MEASURES OF MILK DISTRIBUTOR CONCENTRATION IN ARIZONA 1953, 1955, 1957, 1959 AND 1963[a]

	1953	1955	1957	1959	1963
Concentration ratio, largest 4 firms	38.1	49.1	51.4	52.2	50.4
Concentration ratio, largest 10 firms	48.1	63.2	72.1	77.7	72.6

a. Concentration ratio is the sum of the shares of milk volume controlled by the given number of firms.

The trend appears to be towards less concentration in the market. The industry may be headed towards 10 large firms in terms of volume handled instead of towards 3 or 4 dominant handlers. More dramatic structural changes were observed in firms not represented in the ten

largest handlers. These smaller distributors have decreased from 21 to 6 firms over the ten year period 1953 to 1963. Indications are that some of these smaller businesses are being purchased by larger firms. This conclusion is based on the fact that nearly 40 percent of the firms leaving the market left because of competitive factors and outright sells to handlers remaining in business.

Concentration of the four largest firms has been relatively stable over the period 1955 to 1963. However, growth appears to be taking place in the intermediate size firms. The largest ten firms accounted for 10 percent more of the market in 1963 than they did in 1955 whereas the largest four firms accounted for approximately one percent more of the market. The number of smaller firms is decreasing, intermediate sized firms are increasing in numbers and size, and large firms are remaining relatively constant in number and size.

The foregoing description of the market participants has been explained by concentration curves (Figure 3). Concentration curves show graphically the relationship between number of firms and cumulative market shares of firms ranked from largest to smallest. The shape of the curve represents the size distribution of firms within the industry.

Another way to look at the unequal size of firms in the market is through a Lorenz diagram. The Lorenz curve measures the percentage of firms and the percentage of volume handled by these firms. Separate

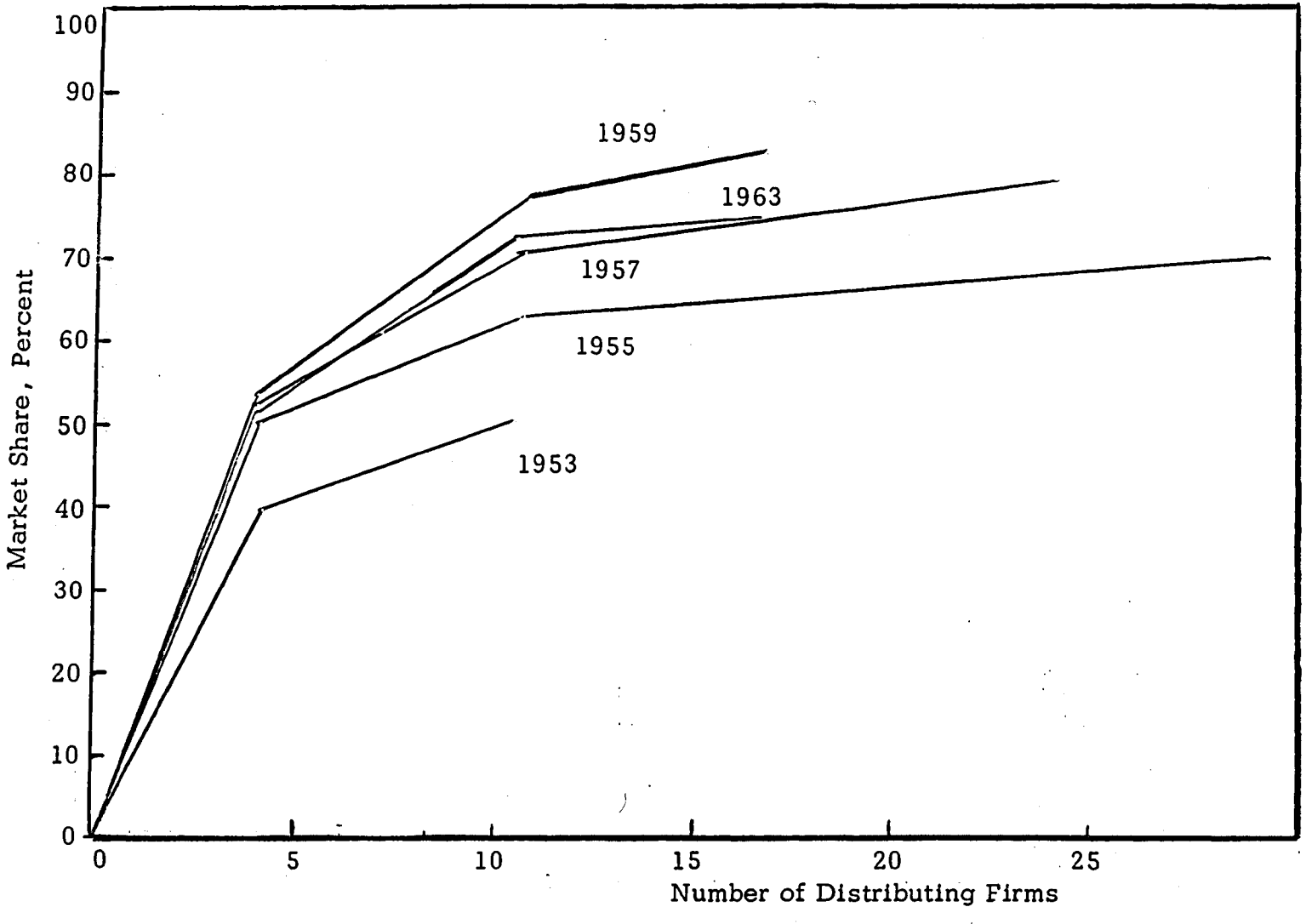

Figure 3.--Observed and generated size distribution of distributing firms in Arizona, 1953, 1955, 1957, 1959 and 1963.

Lorenz curves for handlers in the Arizona dairy industry over a 10-year period have been developed (Figure 4). A straight line drawn from origin to origin would indicate that firms in the industry are of equal size, measured by the volume of milk handled. In other words, 50 percent of the firms would be handling 50 percent of the volume of milk. All cases represented by the Lorenz analysis must show that 100 percent of the reporting firms handle 100 percent of the milk supply attributed to those firms. Unequal size can be seen among Arizona handlers in terms of volume of milk handled. However, there is a weakness in the analysis when comparing data from two different periods of time. Any time that the measured periods do not include 100 percent of the firms, there is a bias that tends to make the industry at a given time more equal in size than it really is. This was the case in comparing incomplete data gathered in 1953 to data collected in 1955, 1957, 1959, and 1963. Little regard will be given to 1953 data in the Lorenz analysis because of this bias.

Nine percent of the distributors handled 50 percent of all milk shipped to distributors in 1955. This means that there were a few very large firms handling one-half of the milk shipped to distributors. It was found that 13 percent of the handlers accounted for 50 percent of milk delivered to handlers in 1957. Nineteen and 17 percent of the firms respectively handled 50 percent of handler milk in 1959 and 1963.

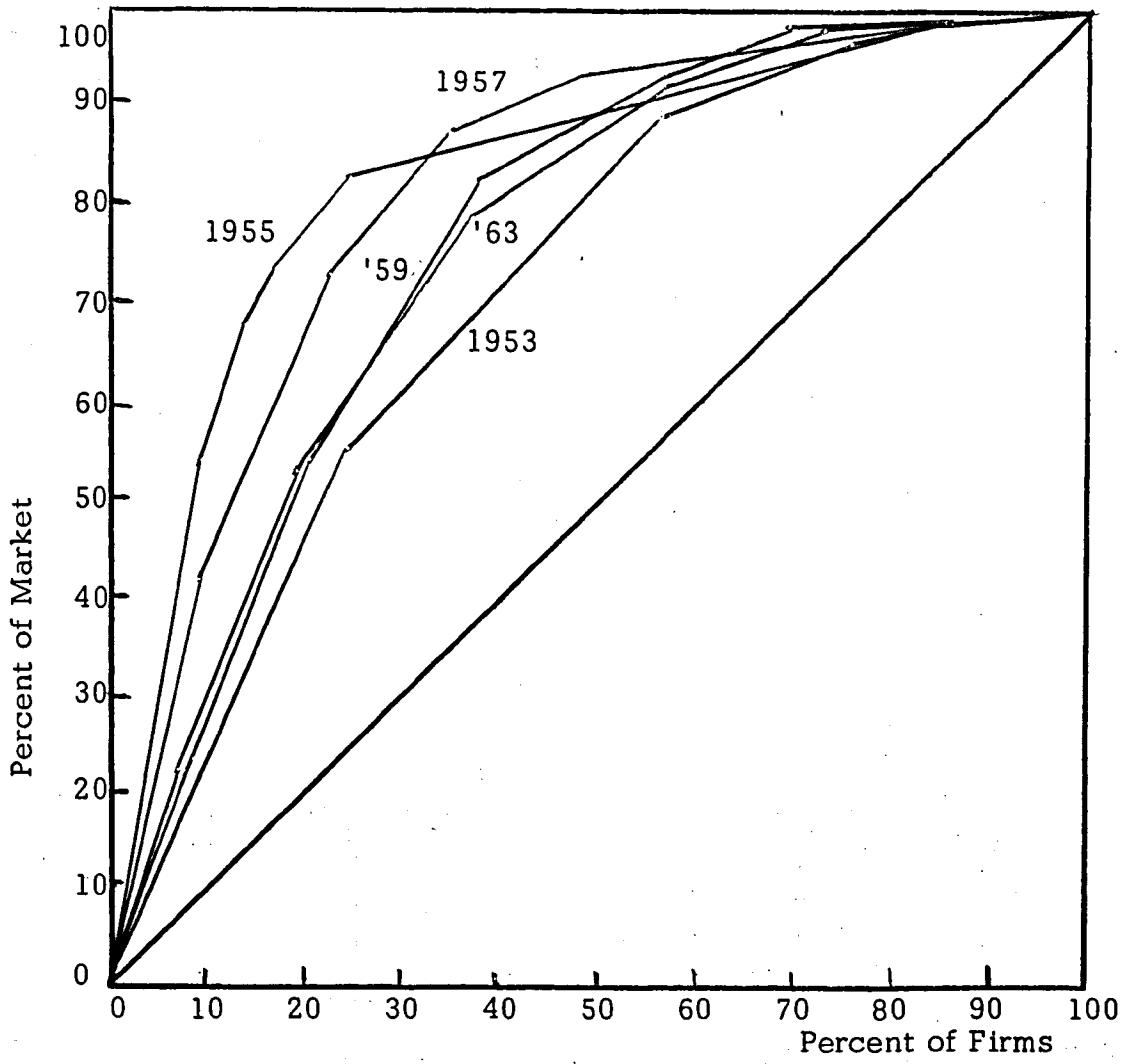

Figure 4.--Lorenz Curves for milk distributoring firms in Arizona, 1953, 1955, 1957, 1959 and 1963.

Firm size measured by volume of milk handled in absolute pounds has been changing since 1953. There were no plants handling more than 40 million pounds of milk annually in 1953. A number of firms handled in excess of 40 million pounds of milk annually in 1963. The number of firms in a particular volume classification are listed (Table 16). Volume numbers have been coded A to O, A being the smallest volume, and O the largest. There is a tendency towards larger firms in terms of absolute volume of milk handled.

There are other ways to measure the size of the industry and the changes that have taken place in the industry. One such method is measurement of employee concentration in the four largest and ten largest firms. Concentration curves have been developed to show relationships of employee numbers in firms for 1953 and 1963 (Figure 5). Concentration of employees in the largest four firms in 1953 and 1963 were nearly the same. Approximately 64 percent of all employees in the Arizona dairy industry were working in the four largest firms for both years. The largest ten firms accounted for 95 percent of all milk plant employees over the same period of time. However, not all firms reported employee numbers in 1953, and it is assumed that the 1953 concentration ratios calculated may be lower than they would have been if all firms had reported.

The majority of handlers in 1953 were organized as corporations. Fifty-one percent of all distributing plants reporting in 1953 were

TABLE 16. SIZE DISTRIBUTION OF MILK DISTRIBUTING FIRMS BY VOLUME IN ARIZONA 1953, 1955, 1957, 1959 AND 1963.

Size	Number of Distributors 1953	1955	1957	1959	1963
A	3	22	14	4	6
B	2	0	2	2	0
C	2	2	1	2	4
D	1	1	1	2	1
E	1	0	1	0	0
F	1	0	0	1	0
G	1	1	0	0	0
H	1	0	2	2	1
I	0	2	0	0	0
J	0	0	0	0	2
K	0	0	1	0	0
L	0	1	0	0	0
M	0	0	0	1	0
N	0	0	0	1	0
O	0	0	1	1	1
Firms Unaccounted For	19	0	3	5	2
TOTAL	31	29	26	21	18

corporations followed by partnerships totaling 21.4 percent of all reporting firms. Sixty-nine percent of all distributors were corporations while 12.5 percent were partnerships in 1963. Other forms of legal organization have been individual proprietorships and cooperatives. Fourteen percent of the reporting distributors in 1953 were privately owned (Table 17).

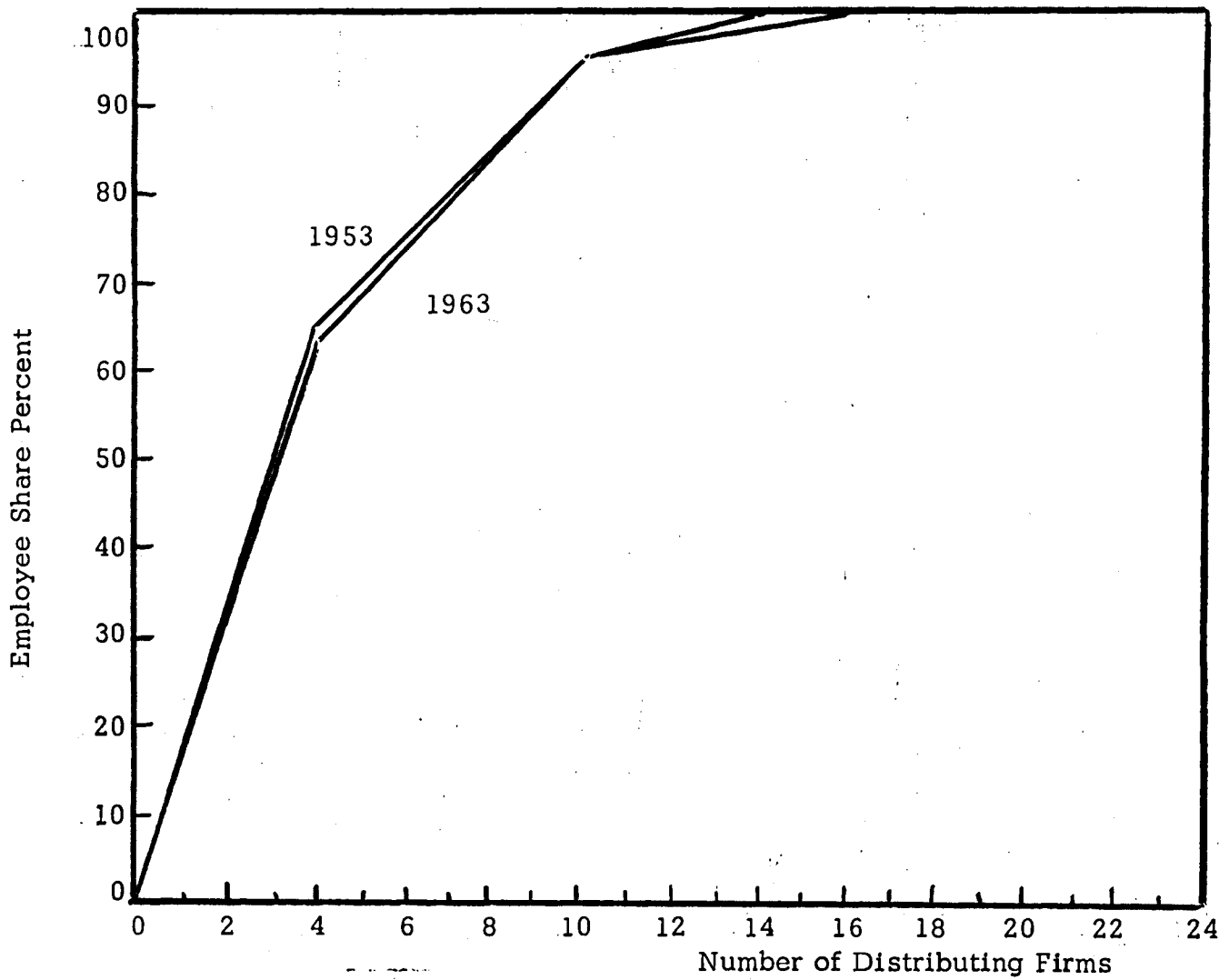

Figure 5.--Observed and generated size distribution of milk distributor firms by employees in Arizona, 1953 and 1963.

TABLE 17. LEGAL ORGANIZATION OF MILK DISTRIBUTORS, FIRMS IN ARIZONA, 1953 and 1963

Legal Organization	1953 Number of Distributors	1953 Percent of Total	1963 Number of Distributors	1963 Percent of Total
Corporation	8	57.1	11	68.7
Partnership	3	21.4	2	12.5
Individual Proprietorship	2	14.3	3	18.8
Cooperative	1	7.2	0	
Other	0		0	
TOTAL	14	100.0	16	100.0

Market Structure Changes: Producer-Distributors

A producer-distributor has been differentiated from distributors in terms of the source of fluid milk handled. Currently, a producer-distributor is a person producing and distributing his own milk. However, the definition has changed from time to time. A producer-distributor in 1939, for example, was defined to include producer-manufacturers. However, the two enterprises were separated by issuing a license to each in 1952.

The number of firms representing producer-distributors has decreased 88.5 percent from 1943 to 1963. There were 113 producer-distributors in 1943 and 13 producer-distributors in 1963 (Figure 6). The number of producer-distributors coming into and leaving the market

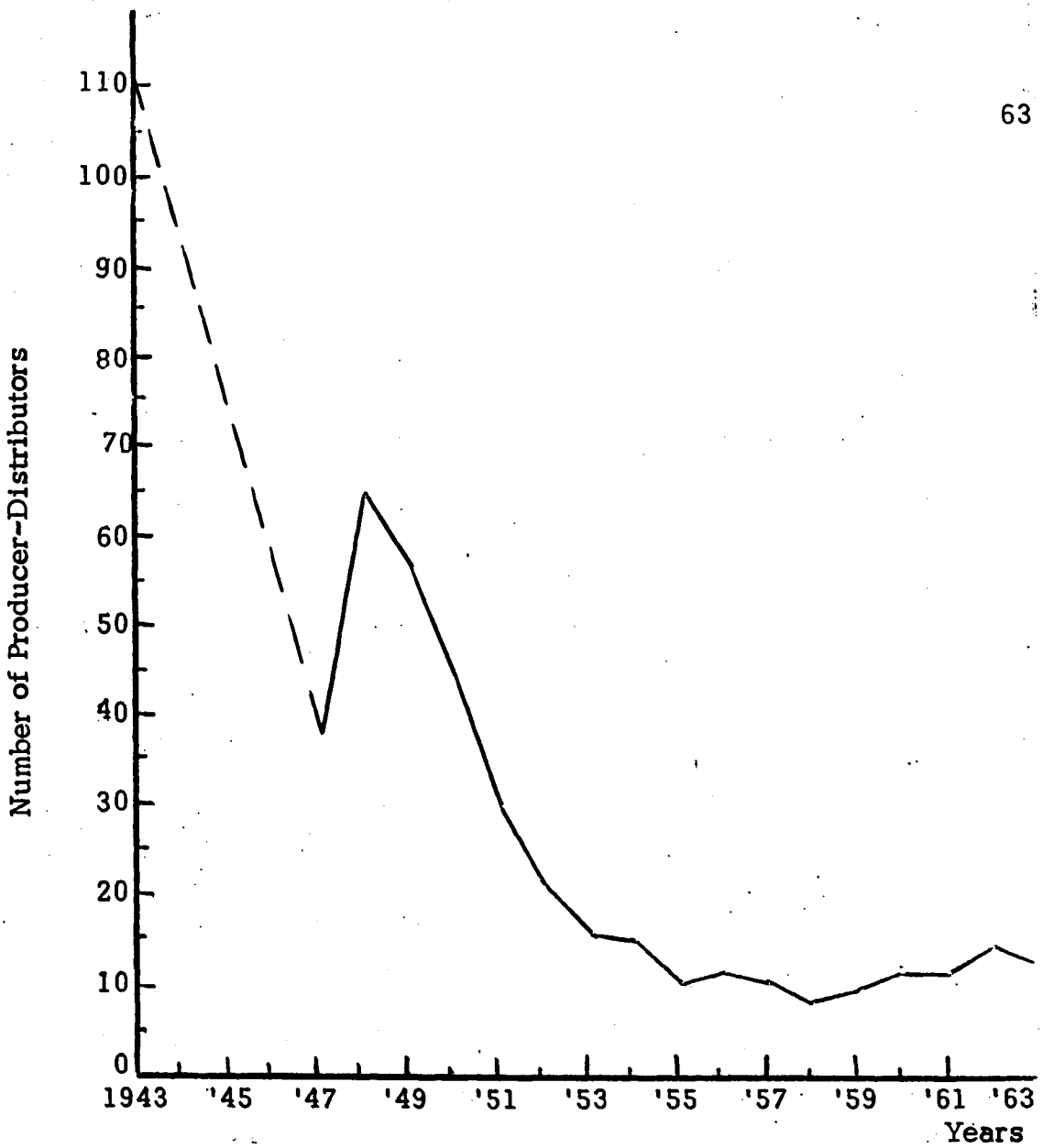

Figure 6.--Number of producer-distributor firms in Arizona, 1943 to 1963.

has varied since 1953. Greatest number of plants left the market in 1955 (Table 18).

TABLE 18. NUMBER OF PRODUCER-DISTRIBUTOR FIRMS ENTERING AND LEAVING THE ARIZONA DAIRY INDUSTRY, 1953 TO 1963[a]

Year	Number of Firms Entering the Market Jan. 1-Dec. 31	Number of Firms Leaving the Market	Net Difference	Total Number of Producer-Distributors
1953	2	-7	-5	17
1954	3	-4	-1	16
1955	0	5	-5	11
1956	2	1	1	12
1957	1	2	-1	11
1958	2	4	-2	9
1959	1	0	1	10
1960	2	0	2	12
1961	1	-1	0	12
1962	4	1	3	15
1963	0	2	-2	13
TOTAL	18	27	-9	

a. A. Warren Austin, Arizona Dairy Commissioner, Phoenix, Arizona, 1964.

Concentration of producer-distributors has been in Maricopa County. An average of 40.4 percent of all producer-distributors has been found in Maricopa County from 1953 to 1963. Fifty percent of all producer-distributors were in Maricopa County in 1959 and 1961. The second largest concentration of producer-distributors has been in Navajo County. Producer-distributors in Navajo County have averaged 21.3 percent of the total producer-distributors in the state (Table 19).

TABLE 19. PRODUCER-DISTRIBUTOR FIRMS IN MARICOPA AND NAVAJO COUNTIES AS A PERCENT OF ALL PRODUCER-DISTRIBUTOR FIRMS IN ARIZONA, 1953 TO 1963[a]

Year	Total Producer-Distributors in Arizona	Total Producer-Distributors in Maricopa County	Percent of the Total	Total Producer-Distributors in Navajo County	Percent of the Total
1953	17	5	29.4	3	17.6
1954	16	7	43.7	3	18.8
1955	11	4	36.4	3	27.3
1956	12	5	41.6	3	25.0
1957	11	4	36.4	3	27.3
1958	9	4	44.4	2	22.2
1959	10	5	50.0	2	20.0
1960	12	5	41.7	2	16.6
1961	12	6	50.0	2	16.6
1962	15	6	40.0	3	20.0
1963	13	4	30.8	3	23.0
Average	12.5	5	40.4	2.6	21.4

a. A. Warren Austin, Arizona Dairy Commissioner, Phoenix, Arizona, 1964.

Concentration curves were used to show unequal size in producer-distributor firms in terms of volume of milk handled (Figure 7). It was found that the three largest firms handled 6.1 percent of all milk produced in Arizona. The largest five firms handled 6.8 percent of all milk produced.

The Lorenz measurement of percentage volume handled by a certain percentage of the firms has been developed for producer-distributors. The market is made up of a few large firms measured in terms of volume handled. Ninety-one percent of the firms handling 25 percent

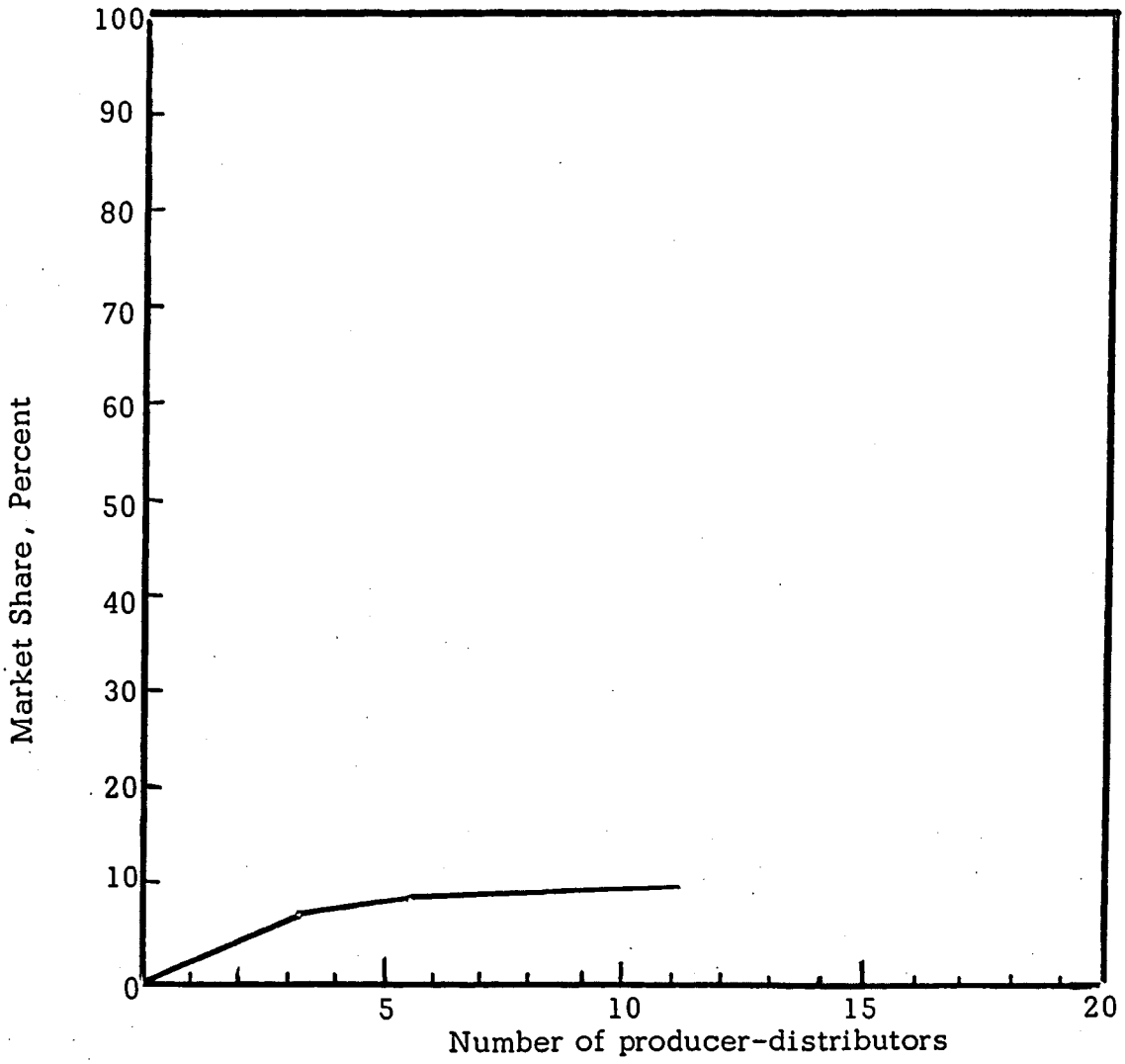

Figure 7.--Observed and generated size distribution of producer-distributor firms in Arizona, 1963.

of producer-distributor milk in 1963. Or, in other words, 9 percent of the firms handled 75 percent of all producer-distributor milk (Figure 8).

The average producer-distributor in Arizona handled 2,950,547 pounds of milk in 1963. This average has been biased by one very large firm. Eliminating the large firm from the total, the average

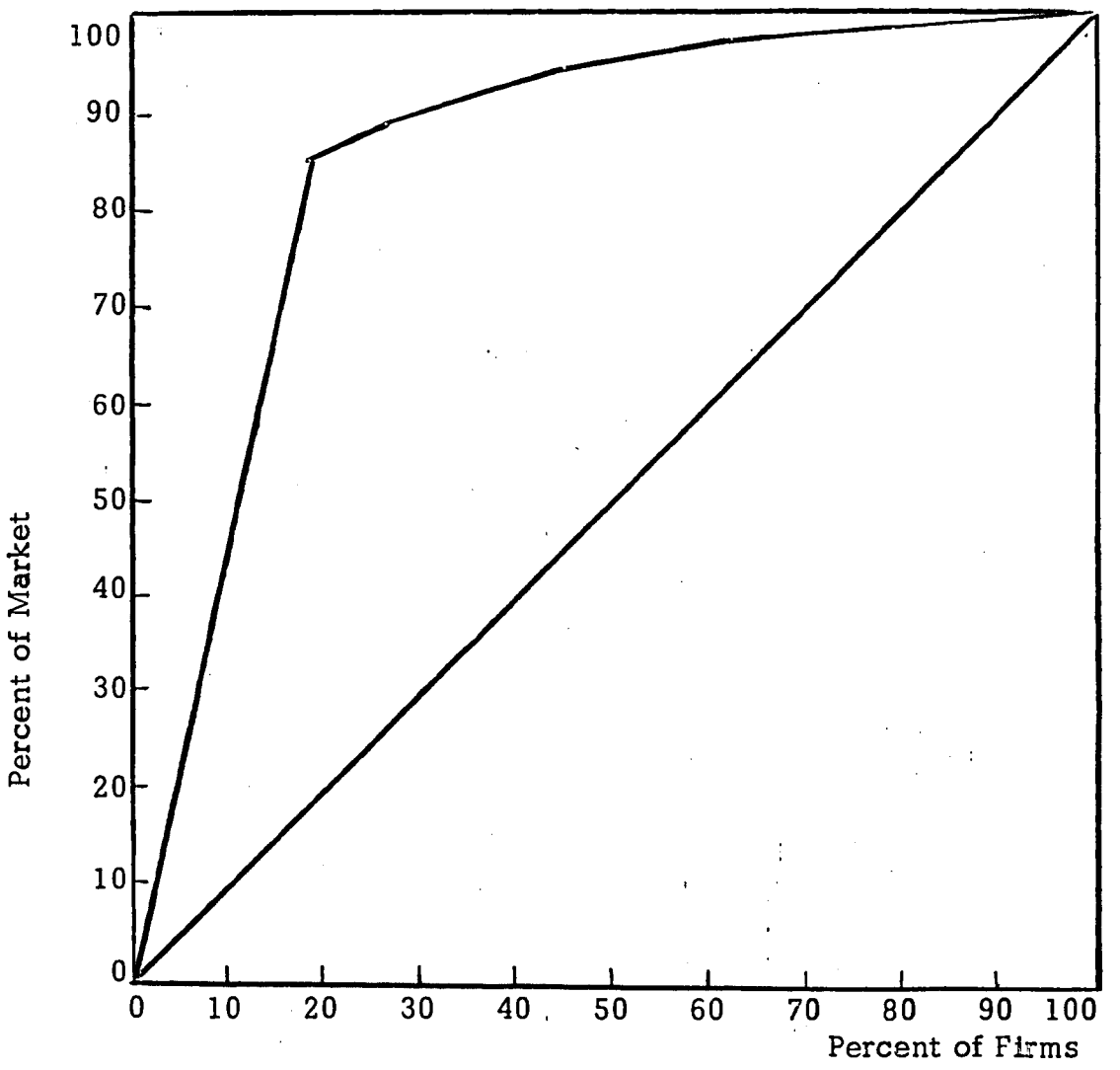

Figure 8.--Lorenz Curve for producer-distributor firms in Arizona, 1963.

producer-distributor firm in Arizona handled 821,645 pounds of milk annually. This average is more representative of the typical producer-distributor in the market. An indication of relative plant size is illustrated (Table 20). The volumes have been coded from the smallest to the largest, A to E.

TABLE 20. SIZE DISTRIBUTION OF PRODUCER-DISTRIBUTOR FIRMS BY VOLUME IN ARIZONA, 1963

Size	Number of Producer-Distributors
A	2
B	3
C	3
D	2
E	1
Firms Unaccounted For	2
TOTAL	13

The legal organization of producer-distributors in Arizona for 1963 was found to be 42 percent partnerships and 33 percent individual proprietorships. Corporations, cooperatives and others represented 24 percent of the total (Table 21). All firms in the state reported their legal structure in 1963.

TABLE 21. LEGAL ORGANIZATION OF PRODUCER-DISTRIBUTOR FIRMS IN ARIZONA, 1963

Legal Organization	Number of Producer-Distributors	Percent of Total
Corporation	1	8.3
Cooperative	1	8.3
Partnership	5	41.7
Individual Proprietorship	4	33.4
Other	1	8.3
TOTAL	12	100.0

Market Structure of the Central Arizona Marketing Area

Central Arizona Milk Marketing Order 131 controls the marketing of milk in Maricopa, Pima, Pinal, Graham, Cochise, Greenlee, and Yuma Counties. Any milk coming into the area from outside sources automatically becomes federally regulated with respect to prices paid to producers. Handlers in the central Arizona area have been specifically defined in the federal regulation.[1] Firms licensed by the state as producer-distributors are not controlled by Federal Milk Marketing Order 131 unless they are organized as cooperatives. United Dairymen of Arizona, Federated Milk Producers, and the Co-op Dairy are considered to be under

1. Refer to Appendix 7 for definitions.

federal regulation. The analysis that follows considers the market structure of those handlers operating in the central Arizona milk marketing area.

The handlers of the order area have represented from 47 to 74 percent of all milk handlers in the state. When Central Arizona Milk Marketing Order 131 was established in 1955, there were 47.5 percent of the firms in the state located in the order area, but by 1959, 74.7 percent of all firms were in the central Arizona marketing area. Currently 67.2 percent of all firms are in the order area (Table 22).

Fifteen milk distributing firms in the marketing area in 1963 handled approximately 74 percent of all milk produced in the state. These firms handled approximately 99.5 percent of all Class I milk in the order area. The firms were not all equal in size, in fact, the largest four firms handled 62 percent of the Class I order milk. Ninety-four percent of the Class I order milk was handled by the largest ten firms. There appear to be few very large firms in terms of volume handled in the central Arizona marketing area.

TABLE 22. MILK HANDLING FIRMS IN THE CENTRAL ARIZONA MILK MARKETING AREA AS A PERCENT OF THE TOTAL MILK HANDLING FIRMS IN ARIZONA, 1955 TO 1963.

Year	Total Milk Handling Firms in the State	Total Milk Handling Firms in Order Area	Milk Handling Firms in the Order Area as a Percent of the State
1955	40	19	47.5
1956	37	23	62.2
1957	37	24	64.9
1958	31	22	71.0
1959	31	23	74.2
1960	31	22	71.0
1961	30	20	66.7
1962	34	25	73.5
1963	31	23	74.2
Average	34	22	67.2

The preceding sections have explained and described the changes that have taken place in the Arizona dairy industry from the handler, producer-distributor side of the market. Some definite patterns have been observed and are listed as follows:

1. Milk distributor numbers have been decreasing.
2. Concentration of milk distributing firms has been in Maricopa County. Currently 61 percent of all handlers

in the state are located in Maricopa County.

3. Since 1953, 14 milk distributing firms entered the market and 31 left.
4. Competition and outright purchases by other milk distributors accounted for 40 percent of the firms leaving the market.
5. The largest four distributors have handled an average of 48 percent of all milk produced in the state from 1953 to 1963.
6. Milk distributing firms are increasing in size in terms of pounds of milk handled.
7. Sixty-nine percent of the distributors in Arizona were corporations and 19 percent were individual proprietorships in 1963.
8. Producer-distributors have decreased in numbers, but there are currently more producer-distributors than the 1958 low.
9. Since 1953, 18 producer-distributors entered the market and 27 left.
10. An average of 40 percent of all producer-distributors have been located in Maricopa County. Navajo County has maintained 20 percent of all producer-distributors since 1953.
11. The largest three producer-distributors handled six percent of all milk produced in Arizona in 1963.

12. Producer-distributors are relatively small in terms of milk handled per firm.

13. Partnerships and individual proprietorships accounted for 75 percent of all producer-distributor businesses.

14. Distributors and producer-distributors in the central Arizona market represented 67 percent of all milk handling firms in the state, 1963.

15. Fifteen handlers in the central Arizona market accounted for 74 percent of all milk produced in the state for 1963.

Chapter 6

MARKET CONDUCT IN THE CENTRAL ARIZONA MILK MARKET

Market conduct has been defined as the patterns of behavior which enterprises follow in adapting or adjusting to a market.[1] The characteristics and dimensions of market conduct involve price determination, product policy, sales policy and predatory or exclusionary tactics. Market conduct therefore refers to how firms perform in a market. The conduct of the central Arizona milk market will be examined with respect to price policy for producers and distributors. Predatory or exclusionary tactics and price wars will be examined for distributors and retail outlets.

Market Conduct: Producers

The producers shipping milk to handlers in the Central Arizona Marketing Area are protected by Federal Milk Marketing Order 131. The initial action to establish the order was the work of the Arizona Dairymen's League. It was recognized that instability existed in the market in terms of low fluctuating producer prices, inaccurate butter fat tests, poor record-keeping and little producer bargaining power. To solve these

1. Bain, p. 9.

problems the Dairymen's League petitioned the federal government for help in stabilizing the market.

The Agricultural Marketing Agreement Act of 1937 is the basis of authority for establishing federal market regulation. After the initial petition by the Dairymen's League the government held a pre-hearing to determine a course of action and a public hearing consisting of testimony for and against the proposed marketing order. Recommendations were made by the hearing committee and presented to the Agricultural Stabilization Service which rendered a final marketing order decision based on the evidence received. A two-thirds majority of the producers in central Arizona voted to accept the recommended order. Amendments have been added to the order from time to time through the hearing process.

The final marketing order provides for a stable market from a producer standpoint. Each part of the market has been defined and provisions have been made to insure accurate records. A complete pricing system was established to insure producers a minimum price per hundredweight for each class of milk. The following illustrates how producer milk prices are determined. The basic formula price is the average price per hundredweight for manufacturing grade milk f. o. b. plants in Wisconsin and Minnesota, plus a butter fat differential. The price is adjusted to a 3.5 percent butter fat basis by a butter fat differential rounded to the nearest one-tenth cent computed at .12 times the

Chicago butter price.[1] The minimum price per hundredweight to be paid by handlers for milk received at plants by class shall be as follows:

Class 1 Milk
Basic formula price for the preceding month plus $2.30 to be adjusted by a supply and demand factor not to increase or decrease the price by more than 50¢.[2]

Class 2 Milk
This price shall be the Class 3 price plus 15¢ per hundredweight.

Class 3 Milk
The price for Class 3 milk shall be computed by adding together the plus values of the following:

1. From the Chicago butter price, subtract 3 cents, add 20 percent thereof, and multiply by 3.5.
2. From the simple average as computed by the market administrator of the weighted averages of the carlot prices per pound for nonfat dry milk, spray and roller process, respectively, for human consumption, f. o. b. manufacturing plants in the Chicago area, as published for the period from the 26th day of the immediately preceding month through the 25th day of the current month by the Department, deduct 5.5 cents, multiply by 8.5, and then multiply by 0.965.[2]

there are also adjustments made in the price depending on butter-fat tests and locational differentials.

Payments to producers are handled by the three producer associations, United Dairymen of Arizona (UDA), Federated Producers and Co-op Dairy. A typical payment to a producer may be made as follows.

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1. Order Amending the Order Regulating the Handling of Milk in the Central Arizona Marketing Area, p. 9.

2. Refer to Appendix 8.

3. Order Amending the Order Regulating the Handling of Milk, p. 10.

Producer A ships a certain percent of his base milk to UDA. This percentage is predetermined by UDA. Butter-fat test and locational differentials are determined. Producer A's milk then is distributed to handler B. Handler B pays UDA for the milk based on the market administrator's calculated pricing system. UDA in turn deducts association expenses and other expenses depending on the amount of milk in surplus or deficit relative to the producer percentage base. This example has been simplified, but nevertheless it gives an idea of the payment process, handlers to producers.

Independent producers that are not affiliated with a producer organization are paid directly by the handler they supply. They receive the same hundredweight price as UDA and Federated producers but the independent pays a certain percentage of his payment to the market administrator's office for services performed.[1] Actually, the administrator's office becomes an "association" headquarters for independent producers shipping milk into the Central Arizona Marketing Area. Producers with UDA and Federated collect similar dues from their members for services performed. The advantage in belonging to an association lies in the bargaining services and cooperative buying of supplies. Cooperatives strive to provide an outlet for all milk produced at the order prices.

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1. Marjory Hefty.

Market Conduct: Distributors and Retail Outlets

The distributors in central Arizona compete in a retail and wholesale market. There is no minimum wholesale price or pricing system handed down by the market administrator's office. Price is established through the forces of the market. Price and non-price competition has been rigorously practiced by firms in the industry. Competition has been in the form of reduced services, suggested below-cost bidding, rebates, new dispensors, name-brand packaging and substitute products.

It has been suggested that competitive bidding below costs has occurred in the market. Near the first of May, 1964, Co-op Dairy brought suit against many handlers and chain stores for improper practices in the marketing of milk. One such practice was believed to be bidding below costs by handlers for wholesale shares of the market. The Co-op Dairy lost the Bayless Store account in February of 1963 to the Borden Company. Co-op believed that the Borden Company bid was below cost.[1] The Put and Take Market milk account also was lost by the Co-op Dairy. The feeling was that a general conspiracy in the market to push Co-op Dairy out of the wholesale business existed.[2] The loss of these

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1. Deposition of Rollin W. Maher. The Co-op Dairy, Incorporated vs. Webster's Meadow Gold Dairy Products, et. al., No.161595 Vol. 1, Phoenix, Arizona, June 24, 1964, p. 67.

2. Ibid., p. 69.

two accounts plus other incidents that have occurred motivated Co-op Dairy to bring suit against handlers and stores in Maricopa County.[1]

The managers of Co-op Dairy stated in the complaint:

> That since the month of July, 1963, the defendant Dairies... have become parties to a pool, trust, agreement, combination, confederation or other understanding for the purpose and intent of selling milk and milk products under the costs of producing the same to various retail stores.
>
> That the intent and purpose of these acts are to drive the plaintiff (Co-op)...out of business...thus destroying competition or eliminating competitors....
>
> ...that these defendant Food Markets, have been using their retail outlets for the purpose of selling the milk and milk products under the production costs; that the defendant dairies have been selling the milk and milk products to the defendant Food Markets at an unreasonably low price and have also given rebates to the defendant Food Markets in the form of cash, advertising allowances and discounts and other forms of discounts.
>
> That all of the defendants named...are members and parties to a conspiracy to drive the plaintiff and others similarly situated out of business for the purpose of creating a monopoly and thus control the price of milk and milk products in the state of Arizona....[2]

Objections to the complaint were made by all defendants. Webster's Meadow Gold objected to all ten interrogatories propounded by the plaintiff.

> Objection is made to all ten of the interrogatories propounded by the plaintiff upon the ground and for the reason that they are unduly burdensome and harassing and it is

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1. Refer to Appendix 9 for a list of the defendants in the case.

2. Summons, In the Superior Court of the State of Arizona In and For the County of Maricopa. Co-op Dairy vs. Webster's Meadow Gold et. al., May 1964.

> wholly unreasonable to require that this defendant go to the great expense involved in assembling the information required to answer these interrogatories when it is readily apparent that this suit is spurious, frivolous and unsupported by any competent evidence.[1]

The complaint was introduced into the Superior Court of Arizona in and for the County of Maricopa. Each defendant firm answered the complaint and a hearing was held to determine the extent, if any, of evidence supporting the contentions made by Co-op Dairy in the complaint. Depositions of the preliminary hearing were taken. Mr. Maher and Mr. Austerman of the Co-op Dairy gave testimony.[2]

Co-op Dairy said that they did not have any information available at the time of the hearing but would endeavor to obtain such information or evidence by the discovery procedures as directed by the Arizona Rules of Civil Procedure. Mr. Perkins, counsel for Associated Dairy Products, asked a question of Mr. Maher. "Now can I take it, Mr. Maher, from your answer to this interrogatory you, and nobody else to your knowledge associated with the plaintiff, has any present knowledge or information to support the allegations that a pool or trust, combination, conspiracy was entered into by the defendant dairies in July, 1963?"[3]

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1. No. 161595, Objections to Plaintiff's Interrogatories, Superior Court of Arizona, Maricopa County, Co-op Dairy vs. Webster's Meadow Gold, et. al.

2. Depositions are available at Mr. Eldon N. Towner's office, Wilson and Towner, Attorneys at Law, Buckeye, Arizona.

3. Deposition of Rollen W. Maher, Vol. 1, p. 8.

Mr. Maher answered, "Well, not any more definite than we gave you in the answer to the interrogatory there."[1] Mr. Perkins then asked, "Which is to say you have no information?"[2] Mr. Maher answered, "That is right."[3] When the deposition had been completed each defendant motioned for a summary judgment. The judge dismissed the case in September of 1964 on grounds that sufficient evidence had not been presented to support the allegations. This case represented an attempt to reveal the presence or absence and extent of predatory or exclusionary tactics of established rivals in the central Arizona market. The case brought out that there was instability in the retail and wholesale market with respect to pricing.

Competitive conduct in terms of giving rebates and discounts also has been practiced in the Arizona market. A rebate is an amount returned out of the sum already paid, or the equivalent in the form of discount or extra goods. For example, handler A offers retail store B milk in half-gallon cartons at 43 cents when all other wholesalers are offering half-gallons at 40 cents. Retailers would obviously take the lower price. However, handler A informs the retailer that he will give him so much ice cream or extra milk to make up the 3 cents difference. Handler A's

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1. Ibid., pp. 8-9.

2. Ibid.

3. Ibid.

motive is to bid up wholesale prices. Rebates may also be given in order to move a greater quantity of product. For example, the wholesaler informs the retailer that if he will take so much volume of fluid milk he also will receive a quantity of ice cream or cottage cheese.

An actual account of possible competition with regards to rebates was discussed in the suit, Co-op Dairy vs. Meadow Gold, et. al. Mr. Maher of Co-op Dairy told Mr. Sherk, defense counsel for Bayless Stores that "...large dairies, competitors of Co-op, [could] afford to sell their milk below costs because they [were] subsidized by national organizations."[1] Mr. Maher also felt that stores like Bayless were in turn being subsidized by the large dairies in the form of rebates and discounts to drive out competition. However, the end result was lack of evidence to prove that this type of conduct actually existed.[2]

Instability with respect to handlers and retail outlets in the central Arizona marketing area has been observed in a number of incidents. Non-collusive price cutting in the form of price wars by a few firms in order to gain a greater share of the market has occurred. The beginning of these wars in terms of who started them is often difficult to determine. Initiation of a price war may come from the wholesale or

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1. Deposition of Rollin W. Maher, Vol. 2, p. 118.

2. Ibid., p. 119.

retail levels. There were milk wars in the central Arizona marketing area in 1963 and 1964. It is supposed that the 1964 price war was a continuation of the 1963 instability.

There are a number of reasons why these milk wars may start. It is not the purpose here to single out any one cause, but to explain circumstances that existed that may have contributed to an unstable market. Concensus of opinion leads to seven factors that have contributed to instability in the cnetral Arizona market. Milk depots, producer-distributors, changes in delivery procedures, out-of-state milk, convenience markets, new containers and private-brand development have been factors that may have contributed to instability in the market.

The establishment of drive-in milk depots by various handlers and independents may initiate milk price wars. The Roosevelt Dairy of Mesa operates a number of milk depots as small stores, usually selling milk and other dairy products. There are different types of containers used for fluid milk, but when glass is used there is generally a bottle deposit. To become established in the market or to gain a greater share of the market, depots may sell milk a few cents lower than grocery stores. Competing stores will in turn lower prices to maintain their share of the market. The result of continued price drops by the respective parties is a price war.

Decreasing retail price reduces the profit margin and thereby forces retail outlets to seek alternative wholesale prices from handlers.

Producer-distributors in the market or entering the market are in a prime position to offer low wholesale prices. Producer-distributors seeking a market may sell their milk a few cents cheaper than other handlers. Competing firms may retaliate with wholesale price decreases. Wholesale price competition, and therefore lower wholesale prices to retail outlets, may in turn increase the incentive for lower retail prices. Retail markets could lower retail prices to gain a greater share of the market.

There are other ways that wholesale prices can be lowered. When a wholesaler delivers milk to the retailer he may just leave the milk on the dock of the retail store rather than put the milk in coolers within the store. Decreased services by wholesalers merit decreased wholesale prices and increased profit margins for retailers. However, there also may be an incentive to lower retail prices because of lower wholesale prices. This price decrease at the retail level may induce customers away from other stores. Retail price uncertainty in the market may result.

Retail outlets may be able to take advantage of fluid milk sources that are foreign to the market.[1] Some independent markets purchased milk from a wholesaler in Rochester, Minnesota in late 1962 or early 1963. The milk was pre-processed and arrived in Arizona in half-gallon cartons. Wholesale price for the Minnesota milk was 37 cents a half-gallon

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1. Deposition of Rollin W. Maher, Vol. 1, pp. 44-45.

compared to a 40 cent minimum per half gallon from local handlers. Low wholesale price enabled the retailer to drop prices to gain new customoers. Competing firms would try and maintain their market shares by following suit.

Over the last four years there has been an obvious increase in the number of convenience markets. Convenience markets compete vigorously with house-to-house retail milk routes. To gain a share of the market an everyday food item such as milk is priced lower than other stores or retail route milk. Retaliation by competing firms may initiate continued price fluctuations. Generally, firms becoming involved in milk price wars are the smaller stores such as convenience markets. However, larger chain stores may have to follow low price patterns if a sufficient number of customers are led away from their stores.

Handlers have been able to combat the convenience markets with the introduction of conveniences of their own. Ten-quart containers are such a convenience. They fit nicely into a refrigerator and milk is drawn through a spigot. The container is made of cardboard with a plastic bag for the milk. Ten-quart dispensers are convenient because there is a long-time supply of milk relative to individual half-gallon containers. The price for ten quarts in one container is slightly less than ten individual containers. Some of these dispensers are being handled by retail stores and consumers may need to be offered a lower price per

half-gallon container in order to induce them away from a store or retail route carrying ten-quart convenience packs.

The introduction of gallon jugs also competed with half-gallon and quart containers. There has been indication of price and non-price competition with the introduction of gallon jugs. Non-price competition took the form of convenience in terms of fewer trips to the store and price competition included a lower price for a one-gallon jug than two half-gallon cartons of fluid milk.[1]

Handlers on the Arizona market do some custom packaging for retail outlets. Co-op Dairy, for example, packaged some milk under the Sweet milk brand.[2] Co-op and other handlers packaged milk for Bayless Stores under the name Nancy Jane.[3] There has been considerable competition in bidding for these custom contracts. When a handler loses a contract to package milk for a large chain store, a considerable share of his market is lost. To gain back the lost share, lower wholesale prices may be offered, thereby drawing new business. Retaliation by other wholesale firms may occur and price instability may set in.

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1. Ibid., pp. 42-43.

2. Ibid., p. 31.

3. Ibid.

There is nothing wrong with losing a contract through competitive bidding. However, the claim was made by Co-op Dairy, in the case previously cited, that a number of handlers and stores got together to make sure that Co-op Dairy lost the contract for Nancy Jane milk packaging. Suggestion of this type of conduct was brought out on many occasions during the hearing and deposition-taking. The final judgment indicated that there was insufficient evidence to prove that collusive activity existed.

Chapter 7

MARKET PERFORMANCE AND WORKABLE COMPETITION

There are two objectives of this chapter. The first is to suggest optimum performance criteria which can be compared to the existing performance in the Arizona dairy industry. The second objective is to suggest research in areas where actual performance differs from optimum performance and to relate these areas to market structure.

"Market performance refers to the composite of end results in the dimensions of price, output, production costs, selling costs, product design, and so forth, which enterprises arrive at in any market as the consequence of pursuing whatever lines of conduct they espouse."[1] How well markets perform depends upon how closely they meet optimum criteria. Performance norms summarize the relevant economic and political values included in acceptable social goals.[2]

The choice of optimum performance criteria for research is difficult because there are many objectives, and they may conflict. Problems arise because measurements of the divergence between optimum

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1. Bain, p. 11.

2. Stephen H. Sosnick, "A Critique of Concepts of Workable Competition," The Quarterly Journal of Economics, Vol. 72, August, 1958 p. 381.

and actual performance may not exist, actual and optimum performance may not be quantifiable, or they may be quantifiable in different terms.

Padberg and Clarke suggest:

> Economic analysis aimed at improving market performance is motivated by the basic goals of economic efficiency and its resultant optimization of resource allocation and income determination. This implies a measure of the extent to which the allocation of resources, the physical operations of production and marketing, and the value determination aspects of marketing are oriented towards consumer welfare as represented by the preference patterns of individuals.[1]

Society may choose other goals that do not necessarily relate to maximization of profits. The protection and existence of small businesses and/or, in the case of the Arizona milk market, the protection of producers, as outlined by Federal Milk Marketing Order 131, may be the goals of society. The end that society seeks may be regulation to insure a wholesome product and may preclude any thought of profit, plant size or price. Society may desire to have market information, or perhaps wish to suppress the political and economic power that may exist in the hands of a few small groups. Performance goals attributable to public preference patterns must not be considered to stand alone as the necessary criteria for desirable market conditions.

According to Sosnick, performance can only be resolved by examination of performance data and not inferred from structure and

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1. Padberg and Clarke, p. 43.

conduct.[1] Good or bad performance alone is difficult to detect unless extreme conditions exist. Therefore, performance conditions that are classified between norms of monopoly and pure competition are difficult to handle because there are a number of theoretical constructs which may apply and they may be indeterminate. Therefore, the difference between actual and optimum performance may have little meaning without first examining market structure.

Optimum criteria as goals are really never reached, but they may offer incentives for direction towards desirable growth and change.[2] Pure competition has been suggested to be an optimum goal with which existing market conditions could be compared. Sosnick suggested that pure competition was not a reliable basis for performance appraisal, because pure competition is unattainable, close approximations may entail worse performance, and "the closest possible approximation would entail actual... performance of dubious desirability."[3] Researchers are forced into a dilemma. Some economists say that even though a goal is unattainable, it provides incentive towards desirable change; whereas others proclaim that direction towards the goal may, in fact, entail worse performance.

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1. Sosnick, pp. 397-398.

2. Richard H. Leftwich, The Price System and Resource Allocation, (New York: Holt, Rinehart and Winston) 1961, p. 185.

3. Sosnick, p. 384.

The answer to this problem may lie in a workable competition criterion which may use the pure and monopoly models as extreme guidelines. Sosnick states that investigators of workable competition, "must have in mind generally accepted focal aims, whose meaning is sufficiently clear,..."[1] and in order to have such aims, guidelines must be selected even though they may be extreme. Some performance cannot be compared with optimum criterion because none really exists. The use of inter-market comparisons may act as possible guidelines. Value judgments made by researchers are based on desirable or undesirable conditions that appear in other markets or within the existing market.

The conditions of pure competition involve an infinite number of buyers and sellers dealing with a homogeneous product of which no one buyer or seller can affect the price. There is free mobility of resources and easy entry into a market that is free from public controls, so that each market participant can seek the most advantageous position. It is obvious that the Arizona dairy industry does not approach these conditions. In the author's opinion the industry approaches oligopolistic competition. Few firms, relatively high concentration, differentiated products, immobility of labor and unequal possession of market knowledge are characteristics in the Arizona milk market. These characteristics provide researchers an opportunity to examine the structure of the market in terms of performance and social goals.

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1. Ibid., p. 412.

The pursuing of further research to explain structure-performance relationships in the Arizona milk market should be directed by a definite plan of action precluded by (1) the idea that workable competition is desirable and (2) social welfare is more important than personal interests.[1] Sosnick suggested criteria which are essential to the discovery of a workable competion. Among them:

> 1. [Researchers] must have in mind a generally acceptable set of focal aims, whose meaning is sufficiently clear that it is possible to formulate performance desiderata...and to decide which sacrifices in individual performance dimensions are worth making....
> 2. [Researchers] must decide what market characteristics or effects bear so directly on aims for a good economy that they should be regarded as dimensions of performance.
> 3. [Researchers] must decide which of the effects that individual structure or conduct attributes produce on performance are desirable and which undesirable....[2]

The following list outlines potential areas for further research in the Arizona dairy industry. These areas were selected because they appeared relatively fruitful in light of the dimensions of market structure investigated and the literature reviewed. The suggested areas of study are:

1. Economies of scale analysis with respect to optimum efficiency.

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1. Ibid., p. 412

2. Ibid., pp. 412-413.

> The physical volume of sales should be the quantities that customers demand at prices which generate no continuing excess demand or inventory accumulation...which bear a relation to average total costs that generates appropriate profits.[1]
>
> Opportunities to reduce costs...should not be neglected, obstructed, or suppressed without good reason; obsolete or undesirable market conditions should be corrected with reasonable speed, directness, and equity.[2]

2. Determination and extent of the barriers to entry in the Arizona market.

> Entry should be easier or harder than it is if more or less actual and potential entry would tend in the net to improve performance.[3]

> Concentrated economic and financial power should have positive justification, and protections should exist against its abuse-e. g., discrimination-.... The opportunity to establish a new concern should not needlessly be obstructed, and companies' survival should correspond to their comparative public service.[4]

3. Internal and external effects in the market associated with labor unions.

> Labor-management relations should not be characterized by ill-will, frequent shutdowns, featherbedding, exploitation, or wage increases to the neglect of price reductions. Workers should have protection against indignity, insecurity, arbitrariness... and undemocratic unions.[5]

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1. Ibid., p. 416.

2. Ibid.

3. Ibid., p. 421.

4. Ibid., p. 418.

5. Ibid., p. 417.

> Management should have adequate power, sufficient incentive, and a motivation to strive for the most profitable long-term return on equity, except where such would obviously conflict with social welfare....[1]

4. Relationship between firm numbers, size of plants and size of product market with desirable market performance.

> Bigness, numbers of plants, markets, varieties, and products, patterns of balanced or disproportionate integration, and the number of points of contact among and between buyers and sellers should be altered if they represent, not a search for growth, economies, or assurances that are conducive to favorable performance, but a needless basis for financial power, predatory undercutting, suppression or inter-industry competition where entry is blocked, squeezing, profit shifting, or mutual forbearance from aggressive action.[2]

5. The effects of government intervention in the Arizona milk industry.

> Information, research, and other services by government, together with legal controls on prices, discrimination, production, entry, imports, quality, standardization, promotion, taxation, finance, intracorporate affairs, etc., should be altered if such would fairly and feasibly tend to improve performance.[3]

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1. Ibid., pp. 417-418.

2. Ibid., p. 420.

3. Ibid., p. 421.

The areas of study are suggested tentatively.[1] Perhaps the deviation between current performance and goals of society is tolerable. The point is, at this stage researchers do not really know. Research on performance which deals with the structural variables may lead to the discovery of patterns of competition in the milk industry of Arizona which are more compatible with public preferences.

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1. Refer to the following publications for other areas of potential study: The Philosophy Methodology Basic Tools of Marketing Research, Proceedings, Marketing Research Committee, Report No. 4, Western Agricultural Economics Research Council, Berkeley, California, November, 1960. Pricing as a Problem for Marketing Research, Proceedings, Marketing Research Committee, Report No. 5, Western Agricultural Economic Research Council, Berkeley, California, June, 1963. Journal of Farm Economics, A Report on Market Structure Research in Agricultural Economics, Volume 43, No. 3, August, 1961. J. S. Hillman et. al., Barriers to the Interstate Movement of Milk and Dairy Products in the Eleven Western States, Arizona Agricultural Experiment Station Bulletin No. 255, Tucson, Arizona, 1954. Agricultural Marketing Research in the West, Conference Proceedings, Committee on Agricultural Marketing Research, Report No. 1, Western Agricultural Economics Research Council, Reno, Nevada, 1957. Agricultural Industries Forum, Dairy Marketing Session, Illinois Agriculture Experiment Station, Urbana, Illinois, 1960.

LIST OF REFERENCES

Agricultural Census, U. S. D. C., Bureau of the Census, 1950, 1954 and 1959. Washington, D. C.

Agricultural Council of Arizona, Member Directory 1964.

Agricultural Industries Forum, Dairy Marketing Session, Illinois Agricultural Experiment Station, Urbana, Illinois, 1960.

Agricultural Marketing Research, Proceedings, Committee on Agricultural Marketing Research, Western Agricultural Economics Research Council, Reno, Nevada. 1957.

Arizona Code Annotated 1939, Article 9, Dairy and Dairy Products, Phoenix, Arizona

Arizona Code Annotated 1939, Cumulation Supplement 1952, Phoenix, Arizona.

Bain, Joe S. Industrial Organizations (New York, John Wiley and Sons, Inc.) 1959.

Bartlett, John Russell, Personal Narrative of Explorations and Incidents in Texas, New Mexico, California, Sonora, and Chihuahua (New York, D. Appleton and Company) 1854.

Bobst, B. S. and M. V. Waananen, "Recent Structural Changes in the Markets Affecting Washington's Dairy Industry," Unpublished Manuscript, Washington State University, Pullman, Washington, 1964.

Clodius, Robert L. and Willard F. Mueller, "Market Structure Analysis as an Orientation for Research in Agricultural Economics," Journal of Farm Economics, August, 1961, pp. 515-553.

Compilation of Statistical Materials Pertaining to Proposed Amendments to Federal Order 131 as Amended, Central Arizona Marketing Area, U. S. D. A., Phoenix, Arizona, 1964

Dairy Statistics, U. S. D. A., Agricultural Marketing Service, Statistical Bulletin No. 218, Washington, 1957.

Dairy Statistics Through 1960, Supplement for 1962, U. S. D. A., Economic Research Service, Statistical Bulletin No. 303, Washington, D. C.

Davis, R. N., History of Dairying in Arizona. Tucson (Arizona Agricultural Experiment Station) 1959.

Deposition of Rollin W. Maher, The Co-op Dairy Incorporated vs. Webster's Meadow Gold Dairy Products, et. al., Volume 1 and 2, Arizona, June 24, 1964.

Eickhoff, William Dean, Market Structure and Performance Relationships in the Ohio Fluid Milk Industry (Columbus, Ohio State University) 1963.

Fletcher, L. B., and C. O. McCorkle, Jr., Growth and Adjustment of the Los Angeles Milkshed, California Agricultural Experiment Station, Bulletin 287, June 1962.

Hillman, J. S. et. al., Barriers to the Interstate Movement of Milk and Dairy Products in the Eleven Western States, Arizona Agricultural Experiment Station, Bulletin 255, 1954.

Leftwich, Richard H., The Price System and Resource Allocation (New York, Holt, Rinehart and Winston) 1961.

Livestock On Farms January 1, 1867 to 1919, U. S. D. A., Bureau of Agricultural Economics, Washington, D. C., 1938.

Market Information Bulletin, U. S. D. A., Volume IX, No. 9, Phoenix, Arizona, September 1964.

McBride, Glynn and Willard H. Blanchard, Changes in Michigan's Manufacturing Milk Industry, Michigan Agricultural Experiment Station, Special Bulletin 427, 1959.

McPherson, W. K. and Robert Floyd Luckey, Jr., Some Trends and Characteristics of the Dairy Industry in Florida, Florida Agricultural Experiment Station, Bulletin 539, 1954.

Milk Cows on Farms, Production Per Cow, and Total Production, U. S. D. A., Statistical Reporting Service, Crop Reporting Board, Statistical Bulletin No. 289, Washington, D. C., June 1961.

Milk Production and Dairy Products Annual Statistical Summary, U. S. D. A., Statistical Reporting Service, Crop Reporting Board, Washington, D. C., 1957.

Mueller, Willard F. and Leon Garoian, Changes in the Market Structure of Grocery Retailing (Madison: The University of Wisconsin Press) 1961.

Objections to Plaintiff's Interrogatories, Co-op Dairy vs. Webster's Meadow Gold, et. al., Superior Court of Arizona, No. 161595, Maricopa County, 1964.

Order Amending the Order Regulating the Handling of Milk in the Central Arizona Marketing Area, U. S. D. A., Agricultural Stabilization and Conservation Service, No. 131, Phoenix, Arizona, June 1962.

Padberg, Daniel I. and D. A. Clarke, Jr., Structural Changes in the California Fluid Milk Industry, California Agricultural Experiment Station, Bulletin 802, June 1964.

Philosophy Methodology Basic Tools of Marketing Research, Proceedings, Marketing Research Committee, Western Agricultural Economics Research Council, Report No. 1, Berkeley, California, November, 1960.

Pricing As a Problem For Marketing Research, Proceedings, Marketing Research Committee, Western Agricultural Economics Research Council, Report No. 5, Berkeley, California, June 1963.

Proposed Milk Order for Central Arizona Marketing Area, U. S. D. A., Docket No. A O 271, Phoenix, Arizona, April 19, 1955.

Proposed Milk Order for Central Arizona Marketing Area, Brief Submitted after Hearing by Arden Farms Company, Associated Dairy Products, and The Carnation Company, Phoenix, Arizona, 1955.

Schutz, W. D., Dairy Plants in Wyoming: Trends and Practices, Wyoming Agricultural Experiment Station, Mimeo Circular No. 169, 1962.

Session Laws of Arizona, First Special Session, 3rd Legislature, Phoenix, Arizona, 1918.

Sosnick, Stephen H., "A Critique of Concepts of Workable Competition," The Quarterly Journal of Economics, Vol. 72, August, 1958.

Summons, In the Superior Court of the State of Arizona in and for the County of Mricopa. Co-op Dairy vs. Webster's Meadow Gold et. al., May, 1964.

Walsh, Richard G. and Bert M. Evans, Economics of Change in Market Structure, Conduct, and Performance; The Baking Industry 1947-1958 (Lincoln, The University of Nebraska) 1963.

APPENDICES

APPENDIX 1

QUESTIONNAIRES USED TO OBTAIN INFORMATION
FOR THE RESEARCH STUDY

DEPARTMENTS OF DAIRY SCIENCE AND
AGRICULTURAL ECONOMICS
THE UNIVERSITY OF ARIZONA
TUCSON, ARIZONA

CONFIDENTIAL

Questionnaire on Scope of Operations of Milk Distributing firms in Arizona

(All information in this report will be considered confidential and no names will be mentioned in any use made of the questionnaire.)

Firm Name_____Address_____
Type of business organization:
Corporation_____, Partnership_____, Individual Proprietor_____,
Cooperative_____, Other_____.

Number of people employed on January 1, 1963 in:		Annual Payroll (Last fiscal year)
Processing*	_____	_____
Distribution	_____	_____
Sales-Advertising	_____	_____
Administration	_____	_____
Total	_____	_____

* This should include milk haulers, fieldmen, quality control personnel as well as those actually charged with phases of plant operation. If an employee has duties in more than one area of responsibility, include him under the category in which he spends the major part of his time.

Cash value of products sold (Last fiscal year)_____

Amount of dairy products purchased (Last fiscal year):

Class I _____pounds; Farm value $_____
Class II _____pounds; Farm value $_____
Class III_____pounds; Farm value $_____
Cream
Fluid_____pounds, Plastic_____pounds, Other_____pounds
Concentrated dairy products
Evaporated milk_____pounds.
Sweetened condensed milk_____pounds.
Condensed skim_____pounds.
Other

(For those business manufacturing and selling ice cream and other frozen dessert products.)

Amount of products sold in last fiscal year:

Ice Cream_____gallons
Sherbert _____gallons
Water ice_____gallons
Iced Milk
Hardened_____gallons, Soft_____gallons
Ice cream mix_____gallons
Ice milk mix _____gallons
Other products (e. g. milk shake base)

Remarks: (Other economic or technical industry problems you think should be studied.)

_____

_____

( ) Please check here if you would like a summary of this study.

CONFIDENTIAL

Questionnaire on Scope of Operations of the Dairy Industry; Producer-Distributor Analysis

(All information in this report will be considered confidential and no name will be mentioned in any use made of the questionnaire.)

Firm Name_____Address_____

Type of Business Organization:
Corporation_____, Partnership_____, Individual Proprietor_____ ,
Cooperative_____, Other_____.

Number of people employed on January 1, 1963 in:	Annual Payroll for 1963
Management _____	_____
Processing _____	_____
Distribution _____	_____
Other _____	_____

Some firms may have one or two people handling all the work. In those cases, , please list employees under management. If an employee is assigned a particular job, please list the job. We are only interested in milk production and processing, not irrigation, or other farming jobs. List those that do the milking, bottling, etc.

Cash value of all dairy products sold in 1963_____

Amount of fluid milk sold in gallons_____Average price per gallon in 1963_____

Other dairy products sold_____

_____

_____

_____

_____

(List each commodity, volume sold in 1963 and average price per unit)

Remarks: (Other economic or technical industry problems you think should be studied.)

_____

_____

_____

( ) Please check here if you would like a summary of this study.

APPENDIX 2

ARIZONA DAIRY COMMISSIONERS, TERM OF OFFICE, METHOD OF APPOINTMENT AND MAXIMUM SALARY

Commissioner	Term of Office[a]	Method of Appointment[b]	Maximum Salary[b]
W. A. Barr	1918-20	Governor	$3,000
Clarence Dana	1920-23	Governor	$3,000
J. R. Jennings	1923-29	Governor	$3,000
T. P. Morgan	1929-31	Governor	$3,000
Dave W. Fountain	1931-33	Governor	$3,000
J. L. Black	1933-37	Governor	$3,000
J. R. Bradshaw	1937-39	Governor	$3,000
W. H. Millett	1939-41	Governor	$3,000
L. A. Johnson	1941-49	Governor	$3,000
Phil Isley	1949-51	Governor	$3,000
A. W. Austin	1951-55	Governor with consent and advice of Senate	$4,800
W. W. Cole	1955-57	Governor with consent and advice of Senate	$6,000
A. W. Austin	1957 to date	Governor with consent and advice of Senate	$6,000, changed to $7,200

a. H. J. Shouse, Deputy Dairy Commissioner, Phoenix, Arizona, 1964.

b. Session Laws of Arizona, First Special Session, 3rd Legislature 1918, Arizona Code Annotated 1939, Article 9, Phoenix, Arizona

APPENDIX 3

ARIZONA DEPUTY DAIRY COMMISSIONERS, TERM OF OFFICE AND SALARY

Deputy Commissioner[a]	Term of Office[a]	Maximum Salary[b]
J. Irvin Burk	1925-1929	NA
Elvan S. Lines: Effie Berry	1929-1931	NA
Guy Acuff	1931-1933	NA
J. D. Cage	1933-1937	NA
Raymond L. Summers	1937-1939	NA
Lawrence J. Murphy	1937-1938	NA
Percy E. Mauzey	1937-1938	NA
L. J. Murphy	1937-1938	NA
O. W. Fowler	1937-1939	NA
O. W. Fowler	1939-1941	$2,400
H. J. Shouse	1941-1951	$2,400
H. J. Shouse	1952-1962	$4,200
H. J. Shouse	1963-present	$6,000

a. H. J. Shouse, Deputy Dairy Commissioner, Phoenix, Arizona, 1964.

b. Arizona Code Annotated 1939, Article 9, Phoenix, Arizona

APPENDIX 4

TYPES OF LICENSES ISSUED TO DAIRY INDUSTRY FIRMS IN ARIZONA BY YEAR OF INITIATION, INCLUDING THE COST OF THE LICENSE[a]

Year	Type of License	Cost
1918	License to Manufacture Cheese, Butter and Condensed or Evaporated Milk	$25.00
1919	Manufacture Cheese, Butter and Condensed Milk	$25.00
	Wholesale or Retail Manufacture of Ice Cream	$15.00
	Manufacture of Ice Cream Only	$10.00
1928	Receiving or Porcessing Plant License	$10.00
1931	Manufacture License	$25.00
	Distributor License	$10.00
	Producer-Distributor License	$10.00
	Producer-Manufacturer License	$10.00
1939	Producer Permit	NA
	Distributor License	$10.00
	Manufacturer License	$25.00
	Producer-Distributor	$10.00
	Producer-Manufacturer	$10.00
1943	Manufacturer-Distributor	$35.00
1951	Distributor License	$35.00
1952	Distributor License	$50.00
	Manufacturing Milk Processing Plant	$50.00
	Manufacture of Ice Cream for Retail Only	$10.00
	Producer-Distributor	$25.00
	Producer-Manufacturer	$25.00
1963	Business of Selling of Wholesale Milk or Dairy Products or both	$25.00

a. Session Laws of Arizona, First Special Session, 3rd Legislature, 1918; Arizona Code Annotated 1939, Article 9, Phoenix, Arizona.

APPENDIX 5

DEFINITIONS OF THE VARIOUS ENTERPRISES IN THE DAIRY INDUSTRY OF ARIZONA AS DEFINED BY THE ARIZONA STATE LEGISLATURE

Distributor definition: A dairy products distributor is a person engaged in the business of buying or receiving dairy products from the producer or manufacturer for the purpose of handling, preparing, distributing or selling the same.

Manufacturer definition: Milk producer manufacturer is a person engaged in the business of buying or receiving milk or milk products from the producer or manufacturer for the purpose of converting such milk or milk products into other such products by a manufacturing process.

Producer-Distributor definition: A producer-distributor or producer-manufacturer is a producer of market milk who shall handle his own products exclusively and distribute the same as market milk or manufacturers milk products which are his own.[a]

Manufacturer definition: Manufacturing milk processing plant means a plant manufacturing and processing, manufacturing milk, and manufacturing ice cream or ice cream mix.

Distributor definition: A milk distributing plant is a plant processing and distributing milk and milk products other than products made from manufacturing milk.

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a. Arizona Code Annotated 1939, Article 9, Dairy and Dairy Products, Definitions of lines, Phoenix, Arizona, p. 150.

Producer-Distributor definition: Producer-Distributor is a producer and distributor of his own milk and milk products exclusively.

Producer-Manufacturer definition: A producer-manufacturer means a producer of milk, manufacturing the same into various dairy products. The milk used must be produced by him exclusively.[a]

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a. Arizona Code Annotated 1939. 1952 Cumulation Supplement, Phoenix, Arizona, 1952.

APPENDIX 6

GENEALOGY OF SOME DISTRIBUTING FIRMS IN THE ARIZONA DAIRY INDUSTRY[a]

Initial Firm		Firm in 1964
Central Avenue Dairy (1898)	Sold to Carnation Co.	Carnation Company
Hassayampa Creamery	Sold to Arizona Dairy Supply. Failed.	
Maricopa Creamery Company	Sold to The Borden Co. 1929	Borden Company
Pacific Creamery Co. (1906)	Sold to Armour Co. 1918 Sold to Borden Co. 1927 Sold to Arden Co. 1954 Sold to Carnation Co. 1964	Carnation Company
Armour and Co. (1916)	Closed in 1918 Sold to Webster 1930 Associated Dairy Producers, organized in 1933	Webster's Meadow Gold Associated Dairy Products
Farmers Creamery	Sold to Gold Seal Dairy 1928. Sold to Norton Dairy. Mission Dairy formed. Sold to Borden	Borden Company
Purity Ice Cream Co.	Sold to Westward Ho Sold to Foremost 1962	Foremost Dairy
Cloverleaf Dairy	Sold to Shamrock Dairy	Shamrock Dairy
Sunland Dairy	Sold to Shamrock Dairy	Shamrock Dairy
Prescott Dairy Farms	Sold to Shamrock Dairy	Shamrock Dairy

a. H. J. Shouse, R. N. Davis, History of Dairying in Arizona, Agricultural Experiment Station, University of Arizona.

Home Dairy (1906)	Quit business in 1964	
L and A Dairy (1938)	Sold to Consumers Co-op (1940)	Co-op Dairy
A. B. Davis Phoenix Producer-Distributor	Sold to Borden 1938	Borden Company

APPENDIX 7

DEFINITION OF THE VARIOUS ENTERPRISES IN THE DAIRY INDUSTRY OF ARIZONA AS DEFINED BY FEDERAL MILK MARKETING ORDER 131[a]

1131.10 Handler.

"Handler" means:

(a) Any person in his capacity as the operator of a pool plant or of a nonpool plant from which Class I milk is disposed of on a route(s) in the marketing area;

(b) A cooperative association with respect to milk of any producer which such cooperative association causes to be diverted from a pool plant to a nonpool plant for the account of such association; or

(c) A cooperative association with respect to the milk of its member producers which is received from the farm for delivery to the pool plant of another handler in a tank truck owned and operated by, or under contract to, such cooperative association, if the cooperative association notifies the market administrator and the handler to whom the milk is delivered in writing prior to the first day of the month in which the milk is delivered, that it elects to be the handler for such milk.

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a. Order Amending the Order Regulating the Handling of Milk in the Central Arizona Marketing Area, U. S. D. A., Agricultural Stabilization and Conservation Service, Washington, June 1, 1962.

1131.11 Producer-handler.

(a) "Producer-handler" means any person who is both a dairy farmer and the operator of a plant from which fluid milk products are disposed of on routes in the marketing area, but who receives no milk from other dairy farmers or from any source other than a pool plant and who does not receive from pool plants an amount representing more than 5 percent of his total Class I utilization for the month: Provided, That such person provides proof satisfactory to the market administrator that (1) the maintenance, care and management of all the dairy animals and other resources necessary to produce the entire amount of milk handled (other than that received from pool plants) is the personal enterprise of and at the personal risk of such person in his capacity as a producer, and (2) the operation of such plant is the personal enterprise of and at the personal risk of such person in his capacity as a handler.

(b) A governmental agency which operates a milk plant shall be considered a producer-handler: Provided, That the plant operated by such agency shall be a pool plant if bulk milk is delivered during the month by such governmental agency to another plant which is a pool plant and a written request is filed by the agency with the market administrator asking that its plant be considered a pool plant. If such a plant is made a pool plant at the request of the governmental agency for one month and thereafter resumes the status of a nonpool plant it shall

not be eligible for pool plant status again until it has been a non-pool plant for 12 consecutive months.

1131.8 Pool Plant.

"Pool Plant" means any milk plant, except the plant of a producer-handler....;

(a) Approved by a duly constituted state or municipal health authority for the receipt or processing of Grade A milk or which supplies processed milk to an agency of the United States Government located within the marketing area, from which during the month:

(1) There are disposed of on routes fluid milk products equal to at least 50 percent of the total receipts at the plant (i) of milk qualified by inspection to become producer...(a), and (ii) from other milk plants and a cooperative association acting in the capacity of a handler... in the form of fluid milk products qualified for fluid consumption; and

(2) There are disposed of on routes in the marketing area fluid milk products in a volume not less than 25 percent of such receipts and also greater than an average of 600 pounds per day.

(b) Any plant which ships fluid milk products approved by any health authority having jurisdiction in the marketing area as eligible for distribution under a Grade A label in a volume not less than 50 percent of its receipts of milk (from dairy farmers who would be producers if this plant qualifies as a pool plant) in the current month during the period of

July through October or 20 percent in the current month during the period of November through June to a plant specified in paragraph (a) of this section: Provided, That if a plant qualifies in each of the months of July through October in the manner prescribed in this section such plant shall upon written application to the market administrator on or before October 31 following such compliance be designated as a pool plant until the end of the following June.

(c) A milk plant located within the marketing area at which milk may be received from the farms of dairy farmers holding permits or authorization issued by health authorities having jurisdiction in the marketing area and which is operated by a cooperative association qualified under... this part which has 75 percent or more of its member producers' milk received at the pool plants of other handlers.

1131.9 Nonpool plant.

"Nonpool plant" means any milk manufacturing, processing, or bottling plant other than a pool plant.

APPENDIX 8

METHODS USED IN DETERMINING THE SUPPLY AND DEMAND PRICE ADJUSTMENT FOR CLASS I FLUID MILK IN THE ARIZONA DAIRY INDUSTRY[a]

The price for Class I milk shall be the basic formula price for the preceding month plus $2.30 and shall be increased or decreased by a supply-demand adjustment of not more than 50 cents computed as follows:

(1) Divide the total receipts of producer milk in the second and third months preceding by the total gross volume of Class I milk (excluding interhandler transfers that would result in the same milk being accounted for a second time as Class I milk) for the same months, multiply the result by 100, and round to the nearest whole number. The result shall be known as the Class I utilization percentage;

(2) Compute a net deviation percentage as follows:

(a) If the Class I utilization percentage is neither less than the minimum standard utilization percentage specified below nor in excess of the maximum standard utilization percentage specified below, the net deviation percentage is zero,

(b) Any amount by which the Class I utilization percentage is less than the minimum standard utilization percentage specified below

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a. Order Amending the Order Regulating the Handling of Milk in the Central Arizona Marketing Area, U. S. D. A., Agricultural Stabilization and Conservation Service, Washington, June 1, 1962.

is a minus net deviation percentage, and

(c) Any amount by which the Class I utilization percentage exceeds the maximum standard utilization percentage is the plus net deviation percentage.

(3) For a minus net deviation the Class I price shall be increased and for a plus net deviation the Class I price shall be decreased as follows:

(a) One-half cent for each such percentage point of net deviation, plus

(b) One-half cent for the lessor of:

(i) Each such percentage point of net deviation, or

(ii) Each percentage point of net deviation of like direction (plus or minus, with any net deviation of opposite direction considered to be zero for purposes of computation of this subparagraph) computed pursuant to subparagraph 2 of this paragraph for the month immediately preceding; plus

(iii) One-half cent for the least of:

(iv) Less one-half cent, if necessary, to round down to a whole cent.

Month for Which Price Applies	Months Used In Computation	Standard Utilization Percentages	
		Min.	Max.
January	October-November	113	120
February	November-December	115	122
March	December-January	116	123
April	January-February	116	123
May	February-March	117	124
June	March-April	117	124
July	April-May	118	125
August	May-June	118	125
September	June-July	116	123
October	July-August	114	121
November	August-September	113	120
December	September-October	113	120

APPENDIX 9

LIST OF DEFENDANTS IN THE CASE CO-OP DAIRY VS. WEBSTER'S MEADOW GOLD, ET. AL.

Firm	Legal Organization
Webster's Meadow Gold Dairy Products	Arizona corporation
The Sweet Milk Company	Arizona corporation
Cow Palace Milk Farms	Arizona corporation
Foremost Dairies, Inc.	Arizona Corporation
Shamrock Dairy of Phoenix, Inc.	Arizona corporation
Arden Farms Company	Arizona corporation
The Borden Company	New Jersey corporation
Circle-K Food Stores, Inc.	Texas corporation
Put and Take Food Stores Inc.	Arizona corporation
Govway Department Stores	Arizona corporation
Smitty's Inc.	Arizona corporation
Fry's Food Store, Inc.	Arizona corporation
Food City, Inc.	Arizona corporation
El Rancho Markets	Arizona corporation
A. J. Bayless, Inc.	Arizona corporation
7-11 Food Stores, Inc.	Arizona corporation
Bashas Markets	Arizona corporation
William Rasmussen and Charles Daines Sarival Gurnsey Farms	Partnership
Paul West, Paul West Market	
Mayfair Markets	Arizona corporation
Gene's Modern Markets	
Abrahams	
Lucky Markets	
Neb's Markets	
Jeff Food Fair	
Casa Blanca Market	
Tang's Market	
Yoakum's Food Center	

a. Summons, In the Superior Court of the State of Arizona In and For the County of Maricopa, No. 161595, May 1, 1964, Co-op Dairy vs. Webster's Meadow Gold, et. al.