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Economics of Change in Market Structure, Conduct, and Performance The Baking Industry 1947-1958

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Preface

Agricultural product markets are receiving much attention from economists. The industrialization of food processing in the past 50 years has aroused mixed emotions in the minds of many thoughtful citizens. On the one hand, it has been welcomed as a source of employment and economic growth, and of labor saving in the home. On the other hand, the dwindling number and expanded size of firms that process and market most food products has been viewed as a potential threat to the public interest in competitive, efficient food markets.

Private and public research agencies, including the U.S. Department of Agriculture and universities, are examining this situation. The Marketing Economics Division of the United States Department of Agriculture is conducting a study of the economic consequences of consolidation, integration, and merger among agricultural product marketing firms. Studies are being conducted in Washington and in universities on a cooperatively sponsored basis. This book presents the findings of a recently completed inquiry into the baking industry—the structure, conduct, and performance of bread markets. Funds for this research were authorized by the Agricultural Marketing Act of 1946, under a contract initiated in July, 1957, between the Department of Agricultural Economics, University of Nebraska, and the Economics Research Service of the U.S.D.A.

The authors are grateful for the assistance of many individuals and groups in the development of this study. Dr. Paul E. Nelson, Jr., Head, Market Structure and Practices, U.S.D.A., was particularly helpful in planning and initiating the research. Drs. Winn Finner and Allen B. Paul contributed as U.S.D.A. representatives. Dr. Charles C. Slater, Economist, Arthur D. Little, Inc., formerly with the baking industry, acted as a continuing consultant to the study. Much of the work would have been impossible without the generous cooperation of many individuals and firms in the baking industry. We are also indebted to Eleanor M. Birch and to Drs. J. B. Hassler, H. W. Ottoson, and C. J. Miller, Department of Agricultural Economics, University of Nebraska, for their valuable advice and critical comments. These and many others have contributed to the original design of the study, to the collection of data,

and to the analysis and findings presented here. The authors express their appreciation to all and willingly share with them whatever credit the study may earn. We reserve for ourselves, however, any debits that may be charged against it owing to possible errors of fact or inference.

R. G. WALSH
B. M. EVANS

Contents

1. Introduction 1

2. Structural Characteristics of the Industry 8

3. Technology and Costs of Bread Production 44

4. Costs of Bread Distribution 68

5. Price and Nonprice Conduct of Firms in Bread Markets 82

6. Industrial Performance 115

Appendix 155

Index 165

List of Tables

1. Number of Establishments, Total Value of Shipments, Value of Shipments per Establishment, Perishable Bakery Products Industry, United States, 1947, 1954, and 1958.... 9
2. Distribution of Bakery Plants by Number of Employees and Average Value Shipments per Plant, Bread Products Industry, United States, 1947, 1954, and 1958..... 11
3. Changes in Concentration Among the Eight Largest Bakeries and Comparisons of the Sales of the Eight Largest Bakeries With Total Sales of the Perishable Bakery Products Industry, United States, 1947, 1954, and 1958..... 13
4. Distribution of Bread Plants by Capacity per Hour and Ownership, United States, 1958..... 15
5. Market Shares of the Seven Largest Wholesale Baking Companies and Major Grocery Chains Integrated into the Baking Industry, 27 Selected Metropolitan Market Areas, 1957 17
6. Value of Shipments of the Four Largest Baking Companies as a Proportion of Total Value of Shipments, by States, Bread Products Industry and Total Bakery Products, 1954.. 19
7. Number of Stores and Average Share of Grocery Store Sales by Corporate Chains, Cooperative and Voluntary Chains, and Unaffiliated Independents in 15 Metropolitan Areas of the United States, 1948, 1954, and 1958..... 21
8. Number of Multi-Plant Bakery Firms With Number and Size of Acquisitions Arrayed by the Size of Acquiring Companies, United States, 1953–58..... 27
9. Annual per Capita Sales of Perishable Bakery Products, United States, 1947, 1954, and 1958..... 41
10. Estimated Average Production Costs of Wholesale White Bread, United States, 1947–1958..... 45
11. Investment in Selected Bakery Machinery, United States, 1954 and 1958..... 48
12. Estimated Percentage of Bread Plants Having Adopted Selected Equipment by 1947, 1954, and 1958, United States 49

13. Comparison of Selected Automatic Bakery Equipment Cost With Labor Cost Saving and Years to Pay Out Investment in Plants of 4,000 Loaves per Hour Capacity, 1954 51
14. Comparison of per Pound Production Costs of Small and Large Model Bread Plants Under a Range of Hours per Week Operation and Without Daily Variation in Output, United States, 1959 57
15. Comparison of per Pound Production Costs of Small and Large Model Bread Plants Using Standard and Automatic Equipment Under a Range of Hours per Week Operation and Typical Daily Variation in Output, United States, 1959 57
16. Estimated Daily Variation in Bread Production Capabilities of Wholesale Bakery Plants, United States, Second Quarter, 1958 61
17. Estimated Average Distribution and Selling Costs of the Wholesale and Retail Functions, Bread, 1947 and 1958 72
18. Average Distribution Costs per Pound of Bread Products Sold, by Channel of Distribution, United States, 1959 80
19. Comparison of the Average Transfer Price per Pound of White Pan Bread Among Segments of the Bakery Industry, United States, 1947, 1954, and 1958 119
20. Average Transfer Price per Pound, Various Bakery Products, Total Industrial Production, United States, 1947, 1954, and 1958 121
21. Profits (After Taxes) as a Percentage of Stockholders' Equity, Selected Baking Firms, Food Firms, and Manufacturing Firms, United States, 1940 and 1947–58 123
22. Bakery Sales, Investment, and Profits, A & P Bakery Division, 1924–39 125
23. Estimated Average Wholesale Bakery and Integrated Grocery Chain Bread Costs, Prices, and Profit Margins, by Region and Average, United States, 1958 127
24. Estimated Production Cost Reductions That Would Result From Possible Alternative Industry Organization, Bread and Bread Type Rolls, by Size of Plant, United States, 1958 132
25. Estimated Distribution Cost Reductions That Would Result From Possible Alternative Industry Organization, Bread and Bread Type Rolls Distributed Wholesale Through Grocery Stores, United States, 1958 141

26. Average Distribution Costs of Wholesale Baking Companies, United States, 1940, 1947, and 1958 146
27. Utilization of Wheat for Food in the United States, by Industry Groups, Total Pounds, and per Capita, 1947, 1954, and 1958 156
28. Food Wheat Utilization Industries, Value of Shipments, Number of Companies, and Market Share of the 4, 8, and 20 Largest Companies, With Percent Change, United States, 1947–58 157
29. Average Factor Costs of Production and Distribution, Selected Bakery Groups, White Bread, United States, 1958 .. 158
30. Selected Production Costs of Four Model Bread Plants With Standard Equipment, United States, 1959 159
31. Selected Production Costs of Four Model Bread Plants With Automatic Equipment, United States, 1959 160
32. Average Fixed and Variable Unit Costs for Model Bread Plants With Standard Equipment Operated Under Conditions of Average Daily Variation in Demand and 1959 Prices, United States 161
33. Average Fixed and Variable Unit Costs for Model Bread Plants With Standard Equipment Operated Under Conditions of Uniform Daily Demand and 1959 Prices, United States 162
34. Average Fixed and Variable Unit Costs for Model Bread Plants With Automatic Equipment Operated Under Conditions of Average Daily Variation in Demand and 1959 Prices, United States 163
35. Average Fixed and Variable Unit Costs for Model Bread Plants With Automatic Equipment Operated Under Conditions of Uniform Daily Demand and 1959 Prices, United States 164

List of Figures

1. Comparison of Average Total Cost Curves for Model Bread Plants With Standard and With Automatic Equipment, and No Daily Variation in Demand, 1959 55
2. Comparison of Average Total Cost Curves for Model Bread Plants With Standard and With Automatic Equipment, Operated Under Conditions of Average Variation in Demand, 1959 56
3. The Effect of Volume on per Unit Cost of Truck and Driver-Salesman, Wholesale Bread Routes, 1959 75
4. Differential Pricing of Bread in Outlying Areas of the Sioux City, Iowa, Market 89
5. Differential Pricing of Bread in Outlying Areas of the Wheeling, West Virginia, Market 90
6. Differential Pricing of Bread in Outlying Areas of the Cleveland, Ohio, Market 91
7. Differential Pricing of Bread in Outlying Areas of the Buffalo, New York, Market 92
8. Differential Pricing of Bread in Outlying Areas of the Pittsburgh, Pennsylvania, Market 93
9. Estimated Average Retail and Wholesale Prices, Gross Margins of Retailer, Baker, and Miller, Value of Farm Ingredients, Pound Loaf of White Pan Bread, United States, 1947 and 1958 118
10. Average Total Unit Costs Before and After Introduction of New Production Technology Into a Bread Market 137
11. Average Total Unit Costs and Market Price Before and After Introduction of a New Selling Cost Into a Bread Market 145

1 / Introduction

Baking is one of the largest industries in the United States. Its sales, which exceed $4 billion annually, rank it third among the food processing industries, and thirteenth among all manufacturing industries. Bakery products account for nearly $1 out of every $10 spent by American consumers for food. Almost half of the domestic consumption of wheat flour is in the form of bread, rolls, cake, pie, doughnuts, sweet goods, and other perishable bakery products. While this study encompasses the perishable bakery products industry as defined by the U.S. Census Bureau, it focuses primarily on wholesale markets for white bread.[1]

Since World War II, important changes have occurred in the bread baking industry. A decline in the per capita demand for bread products coupled with changes in technology and costs has affected the relationships between baking companies, their market behavior, and the resulting level of efficiency and price performance. In an industrial economy, the farming, milling, baking, retailing, and consuming functions are integrally related. Changes in the organization and practices in one may induce changes in others. The baking industry occupies a strategic position[2] in this process,

1. As shown in Table 1, the U.S. Census Bureau defines the industry to include plants producing bread and related perishable bakery products, primarily for sale off the premises. Plants producing crackers and related semi-perishable products are not included. Nor are retail bake shops with baking on the premises. Bakery product markets segment into sub-groups along distributive channels such as direct home service, multi-unit retail, wholesale, and integrated grocery chain. Distribution wholesale to grocery stores is by far the most important. Table 9 shows that white bread accounts for more than half of the total bakery product. Individual bread markets are primarily in large cities with a 100–150 mile rural fringe, where the cross elasticity of demand among sellers' products is economically significant. Willard Cochrane, "The Market as a Unit of Inquiry in Agricultural Economic Reseach," *Journal of Farm Economics* (February, 1957), p. 23.

2. In 1958, the function of wholesale baking received 58 percent of the 19.3 cent average retail price per pound of white bread, as compared with 16 percent paid the retail grocer, 3 percent paid the miller, 15.5 percent paid the farmer, and slightly over 7 percent paid for other functions in the process of wheat marketing. *Marketing Margins in White Bread,* Miscellaneous Bulletin 712, Agricultural Marketing Service, U.S. Department of Agriculture (Washington, D.C., 1959).

and as a result, consumers, farmers, millers, and retailers, as well as bakers themselves, have a vital interest in the way the baking industry performs.

Changes in market structure and firm behavior in the baking industry have been the subject of study and concern by several interested individuals and groups. The U.S. Department of Agriculture has followed with increased concern the widening of the market margin and the declining farmer share of consumer bread prices.[3] The Senate Agricultural Committee has completed a study of average cost and returns of bakery operations.[4] The Federal Trade Commission has followed the pricing practices of many baking companies with frequent cease and desist orders.[5] The Justice Department, through periodic prosecutions, has kept baking firms aware of the limitation imposed by the antitrust laws.[6] The Senate Subcommittee on Antitrust and Monopoly has studied the impact of "discriminatory pricing" by large baking companies on small independent bakers.[7] The industry has encouraged economic study of the historic development of baking and changes in market organization and practices.[8] Most recently, the F.T.C. studied buyer concentration and the integration of retail grocery organizations into baking and other food processing industries.[9]

This study describes and analyzes: (1) the changes in the market structure and organization of the bread industry, primarily since 1946; (2) the principal technological-cost factors associated with combination-integration; (3) the related changes in price and non-

3. *Ibid.*

4. *Cost and Margin Trends in the Baking Industry,* 85th Congress, 1st Session (Washington, D.C.: Government Printing Office, 1957).

5. For example: *In the matter of Ward Baking Co.,* Docket No. 6833, U.S. Federal Trade Commission, December 30, 1958.

6. *U.S. vs. Continental Baking Co., American Baking Co., Colonial Baking Co. (a subsidiary of Campbell-Taggart Associated Bakeries), Hart's Bakery,* et al., Dec. 18, 1958, *Trade Regulation Report* (New York: Commerce Clearing House, 1959), pars. 66, 345.

7. *Administered Prices Bread Hearings,* Subcommittee on Antitrust and Monopoly, 86th Congress, 1st Session (Washington, D.C.: Government Printing Office, 1959), hereafter referred to as *Hearings; Administered Prices Bread Report,* Subcommittee on Antitrust and Monopoly, 86th Congress, 2nd Session (Washington, D.C.: Government Printing Office, 1960), hereafter referred to as *Report.*

8. William G. Panschar, *Baking in America,* Vol. 1, *Economic Development* (Evanston: Northwestern University Press, 1956); Charles C. Slater, *Baking in America,* Vol. 2, *Market Organization and Competition* (Evanston: Northwestern University Press, 1956); Charles C. Slater, *Economic Changes in the Baking Industry,* (Chicago: American Bakers Association, 1958).

9. Federal Trade Commission, *Economic Inquiry into Food Marketing,* Part 1, *Concentration and Integration in Retailing* (Washington, D.C., 1960).

price behavior patterns of firms, and; (4) the impact of these changes on industrial performance, particularly production, distribution, and selling costs.

Theoretical Bases for the Analysis

Market *structure*[10] refers to characteristics of market organization considered important in determining firm conduct and industrial performance. Market structural variables measured in this study include the number and size of buyers and sellers operating within the relevant markets, the extent to which firms sell identical or differentiated products, the height of barriers to entry of firms, and the role of mergers in structural change.

Market *conduct* refers to patterns of behavior that enterprises follow in relation to their markets. Market conduct variables measured in this study include the methods employed by groups of firms in determining price and output, sales promotion policy, product variation policy, and various predatory and exclusionary tactics.

Market *performance* refers to the important economic results of market structure and conduct patterns relative to the public interest. Market performance variables measured in this study include the relative efficiency of production and distribution as influenced by technological advances, the size of operations and the extent of excess capacity, the amount and type of sales promotion costs, the improvement in quality of product, the price level in large city and in outlying market areas relative to costs, and the level of profits.

Market structure analysis is less concerned with the private interest in the maximization of individual bakery firm profit levels than with the public interest in greater per capita production, more optimum distribution of resources, freedom of opportunity, and the like. Other industry studies are currently under way to analyze the impact of various economic changes on the individual bakery firm profits.[11]

The need for further and continued research is evident from

10. Stephen H. Sosnich, "A Critique of Concepts of Workable Competition," *Quarterly Journal of Economics* (August, 1958), pp. 380–423. Joe S. Bain, *Industrial Organization* (New York: John Wiley & Sons, 1959), p. 9. More recently, Robert L. Clodius and Willard F. Mueller, "Market Structure Analysis As An Orientation for Research In Agricultural Economics," *Journal of Farm Economics* (August, 1961), pp. 513–553.

11. See, for example, *Distribution: The Challenge of the Sixties,* Report to the American Bakers Association, (Arthur D. Little, Inc.: Cambridge, December, 1960).

the findings of this study. One such area is the study of implications for antitrust policy, and for other possible remedies which may help achieve either adequate or optimum performance of the baking industry. This study analyzes the costs to society of some strategic deficiencies in the performance of bread markets, but it does not "suggest for what purpose antitrust and other legislation might be enacted, how it might be interpreted, where cases might be selected for administrative and judicial action, what remedies might be applied, and how the success of public policy might be judged."[12] Specific policy recommendations would require extended investigation and analysis. There are no complete or final answers to all the relevant economic and noneconomic questions, nor any solution in the sense of a guaranteed long-run optimum performance of the baking industry. This study should be viewed as a partial and first approximation to be verified or rejected by further study.

The market structure framework outlined above permits inclusion and use of the rich literature and theory recently developed which relates to the explanation of *changes* in market structure and behavior. Measurement of change in bread market conditions is based on comparisons between variables at the beginning and at the end of the time period under study. Explanation of the dynamic factors underlying changes in bread markets relies, in large part, on the many questions raised by oligopoly theory.

Oligopoly refers to an industry characterized by fewness of sellers, and to the interdependent market behavior among them. An oligopolistic market structure characterizes most bread markets. Markets are served by a few large bread producers, with a fringe of many small sellers some of which produce a specialty product or provide a special service function. Entry into bread baking on a significant scale is largely foreclosed except to certain established retail grocery firms. With modifications appropriate to the baking industry as subsequently outlined, oligopoly theory identifies important factors that may be associated empirically with changes in bakery markets.

Fellner suggests that oligopolistic markets may develop and change because of changes in cost factors and because of changes in the market power of participant firms.[13] These two possible bases for changes in market conditions are examined in this report:

First, that a dynamic variable tending to bring about economic

12. Sosnick, *op. cit.*, p. 414.

13. William Fellner, *Competition Among the Few* (New York: Alfred Knopf, 1949), pp. 44–47.

change in bakery markets is technical advance in bakery equipment, in the transport and handling of bakery products, and in food merchandising in general. The technological force is transferred largely through its cumulative effect on cost economies in the production and distribution of bakery products.

Second, the market power relationship between firms in bakery markets as manifest in the interdependent practices of enterprises with respect to pricing policies, nonprice practices and plant utilization. Changes in market power between firms and segments of the industry may have an important impact on several performance dimensions, as for example, the maintenance of price stability and profit goals; or the increase in price sufficient to cover the increased costs of excess capacity and nonprice competition (advertising, product variation, and services).

A further advantage of the market structure approach is that it opens the door to some of the new special theory applicable to imperfect markets. Modifications of the general theory of oligopoly will be discussed: (1) Most oligopoly theory has dealt largely with the relation between oligopolists as a concentrated group of large firms. Vatter has explored the possibility of extending oligopoly theory to deal with group inter-relations between the dominant few and the small firm periphery.[14] This study considers both, and explores the possible impact of oligopolistic behavior by the dominant few on the number and size of the small firm fringe in bakery markets. (2) The small-firm fringe may affect the stability goal of the oligopoly core through their lack of knowledge and/or rational economic behavior. Also, knowledge within the oligipoly core may differ significantly, thereby giving rise to independent behavior in place of the interdependent type posited by general oligopoly theory. (3) Oligopoly theory assumes enterprises have identical cost curves and, therefore, is modified in this study to deal with changes in market positions arising from secular changes (both shifts and shapes) in the cost curves of interdependent firms as reflected in policies of capital equipment adoption. (4) Aggregate demand for bread products is exceptionally stable. Thus it is the extreme case in oligopoly theory with respect to elasticity of demand, i.e., market price adjustment may have practically no effect upon total quantity purchased. (5) Market behavior of a bakery oligopoly may be modified from without through its vertical relation with a group of large grocery chains.

14. Harold G. Vatter, *Small Enterprise and Oligopoly,* Studies in Economics No. 4, Oregon State College (Corvallis, 1955), p. 4.

The relationship may take the form of bilateral oligopoly or vertical integration. In the case of bilateral oligopoly, grocery chains have a position of strength by virtue of their control and allocation of retail shelf space. Thus, the behavior of an oligopolistic baking group may be influenced more by the behavior of an oligopsonistic retail grocery group than by the behavior of consumers. For consumer preference is modified by its reflection through a retail grocery group. Ordinarily, an oligopolist participating in a market would be a processor, wholesaler, retailer or otherwise in a specific category. In this case, however, many corporate and voluntary grocery chains integrate vertically into bread baking, and thus compete directly with the wholesale baker. The largest corporate and voluntary chains in retail food markets may substitute a private label bread for that of wholesaler brands while at the same time representing a bilateral force of concentrated buyers from without. This combined relationship may have important implications for economic stability and change in bakery markets.

Sources and Method

Much of the work on this project has been assembling and developing data bearing on changes in market structure and behavior in the baking industry and interpreting these data within the general theoretical framework outlined above. The sources fall into three main categories: (1) published material including investment manuals, trade journals, annual reports of firms, studies by federal agencies, congressional investigations, and industry studies by individuals; (2) direct interviews and questionnaires from a selected sample of firms; and (3) engineering studies of optimum plant operations and labor time estimates on delivery routes.

Published material is largely from two sources. The U.S. Census of Manufactures for 1947, 1954, and 1958 provides bench marks from which to measure the changes in number and size of firms, the type of products produced, and the marketing channels utilized. The transcript of Hearings in 1959 and subsequent Report in 1960 by the U.S. Senate Subcommittee on Antitrust and Monopoly provides much previously unpublished information on market structure and behavior in the baking industry. Both sources provide reliable economic data. The Census provides aggregative industrial and sub-industrial data, and the congressional committee, not bound by the disclosure rule and armed with the power of subpoena, provides historic information on the market behavior of individual firms. Both micro and macro data are available for the

baking industry of a quality and quantity not often available to the research economist.

Data available from published sources were insufficient for the entire analysis. To estimate some of the effects of structural and behavior change in the baking industry, it was necessary to develop primary data bearing on cost-volume relationships in bread production and distribution. No adequate empirical data for the analysis of economies of scale or levels of plant utilization were available in published material. One of the first steps was a lengthy survey of wholesale bakery plant operations to provide the authors with a general orientation into its characteristics. This 20-plant sample provided an empirical basis for estimating under-capacity plant utilization at three relevant levels—station (machine), cyclical (within the week), and secular (average annual).

Independently, additional observations were taken on 23 wholesale and five house-to-house routes to illustrate the effect of volume on per unit costs of driver-salesman distribution. When allowance is made for changing volumes and factor costs these route observations do not differ substantially from average cost data previously published. Neither set of survey data, however, fully reflects optimum operation at minimum cost levels. This is a limitation of the survey technique in industrial studies in general.

The engineering economic approach is an alternative method for establishing cost-volume relationships reflecting minimum cost levels to analyze the effects of structural and behavioral change in food processing industries.[15] It provides an empirical basis for economies of scale in bread production. Engineering measures of machine performance, labor time, and physical input capabilities were prepared by bakery equipment manufacturers. These were combined with accounting costs from published sources to synthesize cost budgets for model bread plants of small, medium, and large size, with automated-batch and with continuous-mix equipment.

15. See, for example, L. L. Sammet, "Structural Trends and Economies of of Scale in Agricultural Marketing and Processing," *Proceedings of the Western Farm Economics Association* (August 13–15, 1958), pp. 187–201.

2 / Structural Characteristics of the Industry

This chapter deals with changes in the market structure or market environment in which the production and distribution of bread products occurs. Because the baking industry traditionally has been considered one of America's least concentrated industries, it is important to consider recent changes in market structure variables: the degree of seller and buyer concentration, of product differentiation, and barriers to entry.[1] The transformation of an industry from low to relatively high concentration, product differentiation, and/or net barriers to entry may affect market conduct and performance more than any other factors in individual capitalistic markets. Measurement of market structure variables in this chapter provides a partial basis for subsequent explanation of market conduct in Chapter 5 and market performance in Chapter 6.

Concentration in the Bakery Industry 1947-58

Measurement of market concentration requires that a definition of the relevant market be specified. In the baking industry, firms buy flour and other inputs in regional or national markets but sell bread products in essentially local market areas. Thus no single measure of market concentration serves all purposes. Selection of the various measures used here is based on the assumption that baking companies buy in national markets and sell in a number of local markets defined by the states and large cities in which plants are located. Moreover, bakery markets are segmented into several distinct channels of distribution. The primary market for bread products is via wholesale distribution through grocery stores, and some is distributed wholesale to restaurants, hotels, and institutions (Table 1). Also, grocery chains have integrated vertically into

1. Bain, *op. cit.*, p. 211.

the baking industry, and compete directly with baking companies distributing wholesale to grocery stores. Some baking companies have integrated vertically forward into retail marketing through chains of retail bake shops and through home delivery service. Measurement of market concentration here is at the aggregate industrial, wholesale segment, and bread plant levels.

TABLE 1

NUMBER OF ESTABLISHMENTS, TOTAL VALUE OF SHIPMENTS, VALUE OF SHIPMENTS PER ESTABLISHMENT, PERISHABLE BAKERY PRODUCTS INDUSTRY, UNITED STATES, 1947, 1954, AND 1958

Bakery Segment	Number of Establishments	Total Value of Shipments ($1,000s)	Average Value of Shipments per Establishment ($1,000s)
Wholesale			
1947	5,019	$1,764,968	$ 351.7
1954	5,426	2,385,721	439.6
1958	5,199	2,807,650	540.0
Vertically integrated grocery chain			
1947	90	$ 150,174	$1,668.6
1954	142	265,851	1,872.2
1958	178	371,941	2,089.6
Home service			
1947	624	$ 281,937	$ 451.8
1954	217	297,551	1,371.2
1958	361	363,937	1,008.1
Retail multi-unit			
1947	1,064	$ 219,812	$ 206.6
1954	318	117,892	370.7
1958	247	155,945	631.4
Total bread product industry			
1947	6,796	$2,404,000	$ 353.7
1954	6,103	3,067,000	502.5
1958	5,985	3,699,473	618.1

SOURCE: 1947, 1954, and 1958 *Census of Manufactures, Bakery Products,* Bureau of the Census, Department of Commerce (Washington, D. C.).

NOTE: Excludes products purchased and resold without further processing. Also, excludes 11,901 retail bakeries in 1958 and 12,611 in 1954 which were covered in the *Census of Business, Retail Trade.* In current dollars, they had annual sales of $649.4 million in 1958 and $581.9 million in 1954. While output may have increased slightly, the number of retail bakeries declined by 710, or about 6 percent in this recent four year period. Also excluded from the above tabulations are bakery product stores with no paid employees. In 1958 there were 4,752 such stores with sales of $79.3 million compared to 3,932 stores in 1954 with sales of $59.7 million, both in current dollars. Combined, these small retail bakeries account for about 16.5 percent of the estimated total bakery product sales of $4,428.1 million in 1958, a decrease from 17.3 percent of the total of $3,708.6 million in 1954, and about 19 percent of the total of $2,966.4 million in 1947.

Decreasing Number of Bakeries

The overall trend in the agricultural processing industries is one of declining numbers of rival firms. The most dramatic change in recent years has been a decline in the number of bakeries. Between 1947 and 1954, the number of bakeries going out of business was at a rate two-and-one-half times the rate for all food proces-

sors. More than half of the postwar decline in total number of processors in the 30 major food industries occurred in the bread product industry.[2] The number of food processing plants as a whole has decreased at an average annual rate of about 0.5 percent a year, while the number of bakeries has decreased at an average annual rate of about 1.25 percent. For the nation as a whole, the number of bakeries decreased from 6,796 in 1947 to 6,103 in 1954—slightly over 100 bakeries per year. This trend is continuing although at a less rapid rate. The number of bakeries declined to 5,985 in 1958—approximately 30 fewer bakeries per year in the most recent period for which data are available.

There have been important shifts within the bakery industry. Some segments contained more bakeries in 1958 than in 1947. Table 1 shows that vertically integrated bakeries owned by chain stores doubled in number from 90 in 1947 to 178 in 1958. The number of wholesale bakeries increased from 5,019 in 1947 to 5,426 in 1954, or by about 50 bakeries per year, but in more recent years decreased at about the same rate to 5,199 in 1958. But the number of house-to-house bakeries fell sharply from 624 in 1947 to 217 in 1954, though they increased to 361 by 1958. Multi-unit retail bakeries also declined in number from 1,064 in 1947 to 318 in 1954 and to 247 in 1958. In addition to firms going out of business, these divergent trends reflect shifts in distribution patterns that result in reclassification by segment. According to Census procedure, a bakery is classified in a particular segment if its distribution by the primary channels of that segment exceeds in value its distribution by the channels of any other segment. Many small bakeries that formerly delivered primarily via high-cost house-to-house routes shifted to restaurant and grocery store delivery and are now classified as wholesale bakeries. Also, a change in Census definition of retail multi-unit bakeries may account for part of the decline in numbers of these bakeries between 1947 and 1954. Multi-unit bakeries producing baked goods at each location for sale through a retail outlet at the same location were included in the 1947 Census but excluded in 1954 and 1958. Thus, a trend toward operation of multi-unit bakeries, producing baked goods at each location, in supermarkets of grocery chains, not counted in the bakery industry in 1954 and 1958, would seem to account for some of the decrease in number of multi-unit bakeries noted. For by 1959, some 38 percent

2. Forest E. Scott, "The Food Marketing Industries—Recent Changes and Prospects," *The Marketing and Transportation Situation*, U.S. Department of Agriculture (Washington, D.C., November, 1957), p. 21.

of all supermarkets ($1 million sales and over) had in-store bakeries, and nearly half were operated by concessionaires.[3]

Increased Size of Those Remaining

Accompanying the decrease in numbers of bakeries is an increase in the average size of those remaining. Table 1 illustrates this trend for each of the four types of baking plants and for the industry as a whole, as measured by current value of sales. When the 38 percent increase in the transfer price of bakery products from 1947–58 is removed, the real increase in average bakery plant sales is $130,000 or an increase of 37 percent.

Industrial segments that experience the highest attrition rates also have the largest average increase in size of plants remaining. This relationship shows that bakeries going out of business are usually the smaller producers. When all baking plants are classified by size of employment and the number of plants within each size group noted for each of the Census years, this tendency is readily apparent. Table 2 shows that plants with 1–19 employees and average sales of $75,650 in 1958 declined in number by 656, or 15 percent, from 1947–58. Likewise, the number of plants with 20–99 employees and average sales of $686,070 in 1958 decreased by 207 plants, or 13 percent. On the other hand, plants with 100–249 employees and average sales of $2,757,050 in 1958 increased by 97 plants, or 23 percent. Large baking plants with over 250 employees and average sales of $7,447,770 in 1958, increased by 46 percent in the postwar years, to 184 plants in 1958. Census year comparisons

TABLE 2

DISTRIBUTION OF BAKERY PLANTS BY NUMBER OF EMPLOYEES AND AVERAGE VALUE OF SHIPMENTS PER PLANT, BREAD PRODUCTS INDUSTRY, UNITED STATES, 1947, 1954, AND 1958

Year	Number of Employees			
	1 - 19	26 - 99	100 - 249	250 or more
	(number of plants)			
1947	4,492	1,648	426	126
1954	4,079	1,371	474	179
1958	3,836	1,441	523	185
	(average value of shipments per plant)			
1958	$75,650	$686,070	$2,757,050	$7,447,770

SOURCE: *Census of Manufactures, Bakery Products, op. cit.*, p. 10.

NOTE: The 1958 Census shows that 708 plants, or 12 percent of all bakeries, had 100 or more employees with average sales of about $4 million, and accounted for $2.8 billion or about 70 percent of total bakery sales of $4.1 billion (includes resales and miscellaneous receipts of $0.5 billion).

3. *Annual Report, 1959, Super Market Institute* (Chicago, 1959), p. 9.

(not shown) reveal that all of the increase in number of large plants is in two segments of the industry, the wholesale and vertically integrated grocery chain plants, while some 80-90 percent of the decrease in number of small plants is in the home service and multi-outlet retail segments—and the remaining decrease in small plants is in the wholesale segment.

Share of Sales by Largest Companies

While the bakery industry as a whole has experienced a high casualty rate, the largest companies have captured an increasingly larger share of the industry's sales. Table 3 shows that between 1947 and 1958 the share of all bakery business done by the four largest companies increased regularly—from 16 percent in 1947 and 1950 to 20 percent in 1954, and to approximately 23 percent in 1958. The four largest companies do a 50 percent greater share of the business today than they did in 1947. Moreover, while the industry grew at an annual rate of about 1 percent per year, the four largest wholesale baking companies grew at an annual rate of about 5 percent per year. As a result the total growth of the four largest companies during the 11 year period accounted for all the industry's growth. These comparisons are made after correcting for the 38 percent increase in transfer price of bakery products from 1947 to 1958.

While the Bureau of Labor Statistics reports that white bread prices at retail increased 54 percent during this period, the 38 percent figure is more appropriate for this industrial comparison; it was obtained by dividing total pounds produced into total value of sales of all bakery products, as reported by the Census of Manufactures for these years.

The baking industry, as a buyer of flour and other ingredients in regional and national markets, exhibits a medium to high degree of concentration. Kaysen and Turner classify an industry as concentrated (Type II Oligopoly) if the eight largest firms account for 33 percent or more of total industrial shipments and the 20 largest firms account for 75 percent or more.[4] The eight largest baking companies purchase about 32 percent of the total flour and other ingredients utilized by the industry (Table 3), and it can be shown that the 20 largest buyer groups purchase about 60 percent. Added to the eight largest wholesale baking companies are the eight largest integrated grocery chain baking divisions buying 8-9 percent of

4. Carl Kaysen and Donald F. Turner, *Antitrust Policy: An Economic and Legal Analysis* (Cambridge: Harvard University Press, 1959), p. 30.

TABLE 3

CHANGES IN CONCENTRATION AMONG THE EIGHT LARGEST BAKERIES AND COMPARISONS OF THE SALES OF THE EIGHT LARGEST BAKERIES WITH TOTAL SALES OF THE PERISHABLE BAKERY PRODUCTS INDUSTRY, UNITED STATES, 1947, 1954, AND 1958

Bakery Group	1947			1954			1958		
	Total Bakery Sales[a] (million dollars)	Percent of 8 Bakeries (percent)	Percent of All Bakery Sales (percent)	Total Bakery Sales[a] (million dollars)	Percent of 8 Bakeries (percent)	Percent of All Bakery Sales (percent)	Total Bakery Sales[a] (million dollars)	Percent of 8 Bakeries (percent)	Percent of All Bakery Sales (percent)
Sales of top two bakeries[b]	253.7	40.6	10.6	346.6	36.5	11.3	506.2[e]	44.5	14.1
Sales of top four bakeries[c]	384.6	61.6	16.0	613.4	64.5	20.0	820.7	72.2	22.9
Sales of next four bakeries	240.4	38.4	10.0	337.3	35.5	11.0	315.9	27.8	8.8
Sales of eight largest bakeries[d]	624.9	100.0	26.0	950.7	100.0	31.0	1,136.6	100.0	31.7
Total industrial sales	2,403.6		100.0	3,067.0		100.0	3,579.0		100.0

SOURCE: *Concentration in American Industry,* Report of Subcommittee on Antitrust and Monopoly, 85th Congress, 1st Session (1957); *Census of Manufactures, op. cit.,* p. 4; *Moody's Industrials.*

[a] Industry value shipments, bread and related products; does not include products sold but not produced. Excludes non-bakery sales.

[b] Continental Baking Co. and General Baking Co. in 1947; Continental Baking Co. and American Baking Co. in 1954 and 1958. *Moody's Industrials.*

[c] Add to [b] above, Campbell Taggert and American Baking Companies in 1947; Campbell Taggert Baking Co. and General Baking Co. in 1954 and 1958. *Moody's Industrials.*

[d] Includes in addition to the foregoing, Ward, Interstate, Langendorf, and Purity Bakeries in 1947; Ward, Interstate, Langendorf, and Omar in 1954; Interstate, Ward, Langendorf, and Southern in 1958. *Moody's Industrials.*

[e] Includes estimated sales of firms acquired by Continental in 1958. Excludes non-bakery sales.

total bakery supplies, and the 258 independent baking companies buying about 16 percent of total bakery supplies through three purchasing cooperatives. This leaves unaccounted for only one of the largest 20 organizations buying bakery supplies.

Another relevant consideration is the level of concentration in wholesale baking, the largest and most important segment of the industry, as Table 1 shows. While the eight largest baking companies account for about 32 percent of all bakery industry sales, they share about 42 percent of all wholesale bakery business. It is true that smaller independent bakeries still do more than half (58 percent) of the wholesale bakery business, but many of these have become affiliated with management cooperative groups to achieve some of the advantages of buying (as noted above) and merchandising available to the largest companies.[5] Although such organizations date from 1922, they have become increasingly important in recent years, until in 1958 around $570 million or more than 36 percent of the sales of the smaller wholesale baking companies are made by the 258 members of three cooperative groups. These organizations rival in size the largest wholesale baking companies. For example, the 120 members of Quality Bakers of America, the largest of the bakery cooperatives, have combined sales of over $280 million. If the annual sales of the eight largest wholesale baking companies are added to the sales of the 258 bakeries affiliated with the three management cooperatives, these 11 large organizations combined account for approximately half of all sales by the baking industry and for two-thirds of total wholesale bakery sales.

Significant changes have also taken place in the multi-market organization of wholesale baking. In the postwar years, there were seven wholesale baking campanies that owned 20 or more plants each. Generally speaking, each of the seven companies operated in 20 or more markets. In 1947, they operated a total of 203 bakeries. By 1954, they had increased this to 260 bakeries, and they expanded further to approximately 300 bakeries in 1958.[6] Comparing these findings with Census data reveals that the smaller companies owning

5. *Hearings, op. cit.*, p. 6035 ff. Affiliations of independent bakers provide small business members with advice and guidance comparable to that available to the largest baking companies in the following areas: accounting and cost service, advertising, dealer relations, insurance analysis, laboratory, engineering, management, personnel, production, sales promotion, sanitation, supplies purchasing, transportation, and brand franchise. Average sales of affiliated bakeries are $2.2 million as compared with average sales of $3.2 million by the 351 plants of the largest eight baking companies, and average sales of $0.6 million for all bakeries.

6. *Moody's Industrials.*

two or more bakeries declined sharply from 141 in 1947 to 98 in 1954, to 78 in 1958, and the number of plants they owned declined from 753 in 1947, to 479 in 1954, to 380 in 1958. Not only is the number of multi-plant companies declining, but also the largest wholesale baking companies have expanded their operations horizontally into more and more markets. This increased horizontal integration brings under unified control bakeries operating very similar production and marketing functions in an increasing number of bakery markets.

TABLE 4

DISTRIBUTION OF BREAD PLANTS BY CAPACITY PER HOUR AND OWNERSHIP, UNITED STATES, 1958

Plant Capacity	4 Largest Wholesale Companies	Next 4 Largest Wholesale Companies	8 Grocery Chain Companies	All Other	Total U. S.
2,000 pounds per hour (from 1,000 to 2,999)					
Number	16	12	14	814	856
Percent	8	17	17	82	63
4,000 pounds per hour (from 3,000 to 4,999)					
Number	125	37	49	113	324
Percent	62	51	59	11	24
6,000 pounds per hour (from 5,000 to 6,999)					
Number	45	19	13	54	131
Percent	22	26	16	6	10
8,000 pounds per hour (7,000 and above)					
Number	17	4	7	14	42
Percent	8	6	8	1	3
Total bread plants					
Number	203	72	83	995	1,353[a]
Percent	100	100	100	100	100
Median plant capacity (pounds)	4,800	4,800	4,000	2,500	
Annual capacity[b]					
Million pounds	7,016	2,788	2,390	17,910	30,104
Percent	23	9	8	60	100

SOURCE: Calculated from data presented in *Report, op. cit.*, p. 105; and 1958 *Census of Manufactures, op. cit.*, pp. 10 and 18.

[a] Baking plants with 90 percent or more specialization in bread and bread type rolls. Practically all of these plants (1,234) are wholesale bakeries. These 1,353 plants had sales of $1.5 billion in 1958. An additional 1,114 baking plants had 51–89 percent specialization in bread and bread type rolls, and sales of $1.5 billion in 1958. Estimated total sales of bread and bread type rolls in 1958 were $3.3 billion, slightly more than half of which was produced in plants with less than 90 percent specialization in bread and bread type rolls, and not shown in this table.

[b] Takes into account allowance for breakdowns, holidays, etc., which decreases the number of three-shift operating days to 300 annually. Bakeries of approximately 2,000 pounds per hour capacity had total annual capacity of 12,500 million pounds or 41 percent of total U.S. bread plant capacity. Bakeries of approximately 4,000 pounds per hour capacity had total annual capacity of 9,300 million pounds or 31 percent of total U.S. bread plant capacity. Bakeries of approximately 6,000 pounds per hour capacity had total annual capacity of 5,700 million pounds or 19 percent of total U. S. bread plant capacity. Bakeries of approximately 8,000 pounds per hour capacity had total annual capacity of 2,600 million pounds or 9 percent of total U. S. bread plant capacity.

Another consideration relevant to this study is measurement of the bread plant capacity owned by the largest baking companies, and the distribution of that capacity by size or scale of plant. The 1958 Census shows that 1,353 baking plants specialized 90 percent or more in the production of bread and bread type rolls with an estimated annual capacity of 30 billion pounds. The tabulation of bread plant capacities in Table 4 shows that the largest eight wholesale baking companies own about 32 percent of the estimated annual capacity of bread plants. This is very close to their share of total bakery sales. But the largest four and largest eight wholesale companies operate a disproportionately greater share of the larger capacity plants, as do the eight largest bakery divisions of integrated grocery chains. It is true that many smaller companies operate medium and large bread plants, but fully 82 percent of the 995 bread plants owned by the smaller companies have productive capacities of less than 3,000 pounds per hour, while this is the case for only about 12 percent of the large wholesale and grocery chain companies. These findings as to size of bread plants have important implications for production costs of large baking companies as compared with their smaller competitors, to be discussed in Chapters 3 and 5.

Seller Concentration in Bakery Markets

The industry may be further classified according to the geographic extent of market areas in which bread products are sold. Despite a freight absorption system of pricing, high transportation costs combined with perishability and bulk of the product necessitate 80 to 100 separate and semi-independent bakery markets.[7] The radius of market areas has widened from an estimated 50–100 miles in 1946 to about 150–300 miles in 1958. This development has not altered the fact that bread markets consist, typically, of a metropolitan area and a rural-urban fringe.

It is true that a small percentage of variety breads, cakes, sweet goods, and other bakery products of higher value to bulk ratios are frozen and transported longer distances than white bread. But only within rather strict limits may market cross-over be accomplished even with these higher value products. Roughly, transportation costs are increased one-half cent per pound for every 50 mile extension of the market area.

Most bread is distributed within 50 miles of its production point, in keeping with the concentration of population in metropolitan

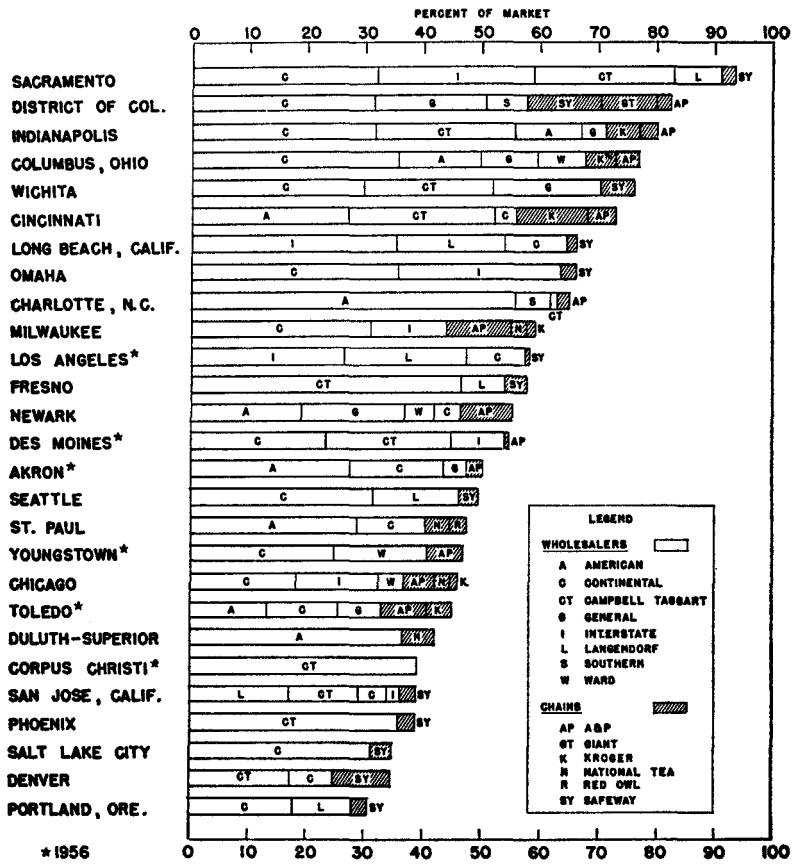
7. Arthur D. Little, Inc., *op cit.*, p. 73.

centers. It is not unreasonable to accept the individual market as the logically and empirically relevant unit for consideration of economic organization, conduct, and performance in the bakery industry. Each market constitutes a group of rival sellers supplying close-substitute outputs to common buyers, where there is little or no inter-penetration of markets.

Consequently, even though the industry is composed of more than 5,000 firms, its anatomy does not conform to the structural assumption of the usual competitive model, but has many oligopo-

TABLE 5

MARKET SHARES OF THE SEVEN LARGEST WHOLESALE BAKING COMPANIES AND MAJOR GROCERY CHAINS INTEGRATED INTO THE BAKING INDUSTRY, 27 SELECTED METROPOLITAN MARKET AREAS



SOURCE: Compiled by E. T. Sperry from newspaper surveys of consumer bread purchases, as summarized in *Hearings, op. cit.*, p. 6146.

listic characteristics. Although individual companies are of insignificant size in terms of the nation's total bakery business, they may be very important in the markets in which they operate. For example, whereas Continental, the country's largest baking company, does only 9.3 percent of the industry's total bakery business, it does more than one-third of the bread business in many of the markets in which it operates (Table 4). Typically, the largest bakery in a bread market does more than 30 percent of the business, the two largest bakeries about 50 percent, and the four largest over 65 percent (ranges from 46 to 92 percent).

These general estimates are based on tabulations by the authors of newspaper surveys of consumer bread purchases in 27 large city markets located throughout the country. Cities selected are shown in Table 5. Reliability of these estimates is considered good; sample size ranges from 1,200 to 6,000 households per city, and samples were drawn on a probability basis.

Another measure that reflects more closely than national figures the level of concentration in the industry's market areas is a special tabulation of concentration on a state basis. It can be demonstrated by the use of Census data that concentration in states is considerably higher than for the nation as a whole (Table 6). In 1954, in three states the four largest companies did over 80 percent of the total bakery business; in nine states the four largest companies did more than 70 percent of the bakery business; in 16 states the four largest companies did over 60 percent; and in 23 states, the four largest companies did over 50 percent. In only three states did the four largest companies account for less than 30 percent of the bakery business. This tabulation, however, generally understates the concentration in bread markets since the geographic extent of bread markets does not typically correspond to state lines and the area of the state is nearly always greater than the actual market areas within the state.

The identity of the four largest baking companies in each state can be deduced from industrial directories and consumer preference studies.[8] They reveal that large firms tend to dominate bakery markets in most sections of the country. Sellers in practically all markets are composed of a concentrated core of a few dominant companies and a fringe consisting of a large number of small firms. The dominant core usually includes one to three of the largest multi-plant wholesale companies plus one or two locally owned

8. *Baking Industry Bluebook* (Chicago: Baking Industry Magazine, 1958); see also footnote to Table 5.

TABLE 6

VALUE OF SHIPMENTS BY THE FOUR LARGEST BAKING COMPANIES AS A PROPORTION OF TOTAL VALUE OF SHIPMENTS, BY STATES, BREAD PRODUCTS INDUSTRY, AND TOTAL BAKERY PRODUCTS, 1954[a]

Region and State	4 Largest Baking Companies (2051) (thousand dollars)	All Manufacturing Bakeries (2051) (thousand dollars)	Percent of Value of Shipments of Manufacturing Bakeries Accounted for by 4 Largest Companies	All Bakeries Including Retail Bakeries (2051 and 5462) (thousand dollars)	Percent of Value of Shipments of All Bakeries Accounted for by 4 Largest Baking Companies
United States	613,403	3,067,017	20.0	3,711,299	16.5
New England:					
Maine	16,687	27,136	61.5	(b)	(b)
New Hampshire	5,170	7,592	68.1	(b)	(b)
Vermont	3,989	5,205	76.6	(b)	(b)
Massachusetts	39,726	119,410	33.3	147,714	26.9
Rhode Island	14,182	24,902	57.0	29,499	48.1
Connecticut	21,706	45,119	48.1	59,261	36.6
Middle Atlantic:					
New York	81,040	370,808	21.9	510,718	15.9
New Jersey	41,840	106,986	39.1	150,872	27.7
Pennsylvania	82,119	270,286	30.4	317,271	25.9
East north central:					
Ohio	61,022	208,433	29.3	252,653	24.2
Indiana	23,468	74,862	31.3	86,814	27.0
Illinois	55,410	194,745	28.5	253,498	21.9
Michigan	49,499	151,579	32.7	176,258	28.1
Wisconsin	20,312	58,441	34.8	80,119	25.4
West north central:					
Minnesota	19,052	48,365	39.4	65,162	29.2
Iowa	18,306	46,230	39.6	53,436	34.3
Missouri	44,724	103,090	43.4	114,626	39.0
North Dakota	5,275	6,813	77.4	(b)	(b)
South Dakota	5,788	8,144	71.1	(b)	(b)
Nebraska	17,583	26,773	65.7	31,295	56.2
Kansas	12,072	26,165	46.1	29,184	41.4
South Atlantic:					
Delaware	4,855	5,167	94.0	(b)	(b)
Maryland	23,371	55,849	41.8	66,431	35.2
District of Columbia	20,190	27,329	73.8	(b)	(b)
Virginia	20,345	47,785	42.6	54,132	37.6
West Virginia	11,418	33,550	34.0	35,059	32.6
North Carolina	27,217	59,386	45.8	63,165	43.1
South Carolina	16,724	20,503	81.6	22,237	75.2
Georgia	27,521	52,751	52.2	56,642	48.6
Florida	24,530	54,504	45.0	65,688	37.3

SOURCE: 1954 *Census of Manufactures;* (Unpublished data, December 1958) U.S. Department of Commerce, Bureau of the Census, as summarized in, *Hearings, op. cit.*, p. 6144.

[a] The largest companies in each state were determined from the value of shipments of the manufacturing establishments (S.I.C. 2051) operated by the companies. The sales of retail bakeries with baking at each location (S.I.C. 5462) were reviewed and found not large enough to include any of those companies among the four largest in any state. A few of the "four largest" companies also operated some retail shops with baking on premises, but the value of sales at such locations was relatively small in all cases and did not affect the proportion of total sales accounted for by the company by more than 1/10 of 1 percent.

[b] Data withheld to avoid disclosing figures for individual companies.

TABLE 6 (continued)

Region and State	4 Largest Baking Companies (2051) (thousand dollars)	All Manufacturing Bakeries (2051) (thousand dollars)	Percent of Value of Shipments of Manufacturing Bakeries Accounted for by 4 Largest Companies	All Bakeries Including Retail Bakeries (2051 and 5462) (thousand dollars)	Percent of Value of Shipments of All Bakeries Accounted for by 4 Largest Baking Companies
East south central:					
Kentucky	18,656	34,605	53.9	39,353	47.4
Tennessee	29,579	58,092	50.9	61,179	48.3
Alabama	17,013	31,678	53.7	35,335	48.1
Mississippi	9,630	15,392	62.6	16,218	59.4
West south central:					
Arkansas	10,901	19,378	56.3	(b)	(b)
Louisiana	15,070	49,772	30.3	54,663	27.6
Oklahoma	16,137	30,331	53.3	32,618	49.5
Texas	61,970	132,412	46.8	143,359	43.2
Mountain:					
Montana	6,075	9,071	66.9	10,895	55.7
Idaho	3,793	5,839	64.9	6,575	57.6
Wyoming	1,033	2,476	41.7	3,112	33.1
Colorado	12,767	26,186	48.7	29,234	43.6
New Mexico	4,106	6,422	63.9	8,163	50.3
Arizona	10,475	13,262	78.9	15,163	69.0
Utah	9,697	13,596	71.3	15,564	62.3
Nevada	1,846	2,260	81.6	3,034	60.8
Pacific:					
Washington	18,615	42,015	44.3	49,598	37.5
Oregon	12,994	29,795	43.6	34,956	37.1
California	112,445	256,527	43.8	308,517	36.4

[b] Data withheld to avoid disclosing figures for individual companies.

independent companies that have grown large in terms of their relevant market. Vertically integrated bakeries owned by grocery chain companies usually have not been one of the largest four companies in bread markets. The number and size of bakeries comprising the fringe of small companies usually depends on their ability: (1) to cut out a specialty product market—variety bread, cookies, sweet goods and so forth; or (2) to disaggregate markets into several distinct segments—restaurant, hotel, institution, house-to-house, and retail with a more secure market position than wholesale grocery store sales. As a result, the fringe of small companies often is not strictly competitive with the large wholesale companies distributing primarily at wholesale through grocery stores.

Buyer Concentration in Wholesale Bread Markets 1948—58

Perhaps the most important change in the structure and organization of bread markets since World War II is the increased con-

centration on the buyer side of these markets brought about by the increased size and buying power of food retailers. Whereas, in the 1930's and early 1940's, wholesale bakeries dealt primarily with independent grocers, today the bulk of their bread sales is through corporate and voluntary grocery chains. Moreover, an increasing number of retail grocery organizations are able to integrate vertically into the baking industry when this is more profitable than buying from existing wholesale bakery companies. This places baking companies under probably the most severe economic pressure of their history. Grocery chains control the terms under which outlets for most bread products are made available and possess the added leverage of actual and potential vertical integration. Grocery chains have become highly concentrated buyers as well as vertical integrators into the industry.

Since World War II, the number of retail food outlets for bread products has decreased rapidly. In 15 food markets surveyed by the Federal Trade Commission, the number of food stores decreased from 12,466 in 1948 to 8,742 in 1958, or 30 percent (Table 7). There has been a similar decline for the nation as a whole. Census of Business reports show a 27 percent decline in number of food stores between 1948 and 1958.

Practically all of this decline reflects the failure and liquidation of unaffiliated food stores. It has been associated with increasing numbers of corporate, cooperative, and voluntary food chain stores. Even more important, it is related to the increase in size of chain

TABLE 7

NUMBER OF STORES AND AVERAGE SHARE OF GROCERY STORE SALES BY CORPORATE CHAINS, COOPERATIVE AND VOLUNTARY CHAINS, AND UNAFFILIATED INDEPENDENTS IN 15 METROPOLITAN AREAS OF THE UNITED STATES, 1948, 1954, AND 1958[a]

Store Groups	Number of Stores and Percent of Total Grocery Store Sales					
	1948		1954		1958	
	Number	Percent	Number	Percent	Number	Percent
Corporate chain	627	29.2	548	36.8	663	43.8
Cooperative and voluntary chains	1,264	12.3	1,762	22.7	2,134	30.8
Unaffiliated independents	8,832	58.5	6,525	40.5	5,749	25.4
Total[b]	12,466	100.0	9,844	100.0	8,742	100.0

SOURCE: Federal Trade Commission, *Economic Inquiry into Food Marketing*, Par. I, *Concentration and Integration in Retailing* (Washington, D.C.: Government Printing Office, 1960), pp. 241 and 245.

[a] Cities surveyed were Altoona, Atlanta, Bridgeport, Denver, Des Moines, Fort Smith, Indianapolis, Lubbock, Manchester, Peoria, Phoenix, Roanoke, Spokane, Stockton and Utica. Total food sales were $989 million in 1948, $1,348 million in 1954, and $1,697 million in 1958. Total population was 5.6 million in 1959. Chains were defined as companies with 11 or more stores, either corporate, cooperative, or voluntary.

[b] Total stores is greater than the sum of the parts due to unavailability of some data.

stores. Corporate chains, in the F.T.C. study cited in Table 7, had only a 6 percent increase in number of stores as compared with a one-third increase in market share from 1948 to 1958. Cooperative and voluntary chains had a 70 percent increase in number of affiliated stores, and more than twice as great (150 percent) an increase in market share for the same period. Table 7 shows that in sample markets the share of corporate chains increased from 29 percent in 1948 to about 44 percent in 1958, while that of cooperative and voluntary chains increased from 12 percent to about 31 percent during the same period. Meanwhile, market share of unaffiliated independent grocers declined from about 59 percent in 1948 to 25 percent in 1958. This comparison based on sample markets tends to understate the extent of increased concentration of grocery store sales by voluntary and cooperative chains. Mueller and Garoian reported national data for 1958 showing the following: corporate chains, 43 percent of total grocery sales; voluntary and cooperative chains, 41.6 percent; and unaffiliated independent stores, 15.4 percent of total grocery sales.[9] These tabulations compare closely with national data from the F.T.C. survey.

An important implication for the wholesale segment of the baking industry is the development of bilateral oligopoly. A greater share of total food sales, including bread products, is now channeled through large corporate, cooperative and voluntary chains than ever before. This results in a changing balance of power between wholesale baking companies as sellers and retailers as buyers. In typical U.S. cities, the structural features of the retail grocery market for bread products include a concentrated core of a few grocery chains (corporate, cooperative, and voluntary), and a fringe consisting of a large number of small unaffiliated independents.

Typically, stores of the largest grocery chain account for 30 percent (ranges from 14–49 percent) of the total retail food sales, stores of the four largest chains account for 63 percent (ranges from 39–90 percent),[10] the rest being distributed through a large number of smaller firms essentially in different economic markets owing to convenience of location or specialization of function. Indeed, by

9. Willard F. Mueller and Leon Garoian, *Changes in the Market Structure of Grocery Retailing, 1940–58* Research Report No. 5, Agricultural Experiment Station, University of Wisconsin (Madison, April, 1960), p. 7.

10. The Federal Trade Commission studied concentration in the 15 urban markets shown in Table 7. Federal Trade Commission, *op. cit.*, p. 248. Mueller and Garoian found very nearly the same concentration levels in 133 U.S. cities in 1957. Willard F. Mueller and Leon Garoian, *Changes in the Market Structure of Grocery Retailing* (Madison: University of Wisconsin Press, 1961), pp. 35–36.

1958 market concentration on the buyer (retail grocery) side of wholesale bread markets was very high, yet, it should be noted, not appreciably higher than on the seller side, among wholesale baking companies supplying bread to food retailers.

Another development affecting wholesalers is the increasing number of retail groups now able to enter baking when this is more profitable than buying from existing bakery companies. The potential integration of retail groups into the baking industry is more significant than existing levels of integration would indicate.

While the 1958 Census of Manufacturers shows that retail grocery groups produce only about 10 percent of the total U.S. output of bread products, corporate grocery chains produce approximately 39 percent of all bread products sold in their own stores.[11] Moreover, trade sources suggest that 38 percent of the supermarkets ($1 million sales or more annually) in 1959 had bake shops on their store premises, half of which were owned by the retail food firm.[12]

On the other hand, the best available data indicate that the existing level of integration by voluntary and cooperative chains was much less. For example, voluntary chains reporting to the 1958 F.T.C. survey owned only four bakery plants producing only $3 million worth of bread products.[13] While voluntary and cooperative chain stores purchased about 44 percent of their total food requirements through their affiliated group,[14] they undoubtedly purchased less of their bread this way.

Garoian reported that bread products were supplied to affiliated stores by only 23.6 percent of the voluntary chains in 1957.[15] It will be shown later in this report that most of this was private label bread produced under contract with wholesale baking companies. Thus, organized buying and baking of bread products by retail grocery groups would appear to be potentially more significant than existing levels would indicate.

Role of Mergers in Structural Change

Growth of individual baking companies occurs both internally, by building additional plants or expansion of existing plants, and externally by acquisition or merger. Merger as used here includes

11. Calculated from sales data in *Report, op. cit.*, p. 103; and, Federal Trade Commission, *op. cit.*, p. 30.

12. *Annual Report,* 1959. Super Market Institute, Chicago, 1959, p. 19.

13. Federal Trade Commission, *op. cit.*, p. 295.

14. Mueller and Garoian, *op. cit.*, p. 7.

15. Leon Garoian, "Changes in the Market Structure of Food Retailing, 1940–1957," unpublished Ph.D. thesis, University of Wisconsin (Madison, 1959), p. 304.

acquisitions, combinations, or consolidations; it implies the integration of previously independent businesses under a single ownership unit.[16] The most important vehicle for the development of large corporations in the baking industry has been merger. Mergers explain much and perhaps most of the differential growth among large firms. They explain most of the increased share of total bakery sales of the eight largest baking companies. The 1946-58 merger movement seems to have been largely motivated by the desire to: (1) achieve economies of scale through better utilization of existing plant, equipment, and personnel, or (2) lessen the impact of risk and uncertainty by expanding market share and by diversifying into new geographic areas, distribution channels, or types of product.

Medium and large baking companies have been using mergers to grow since 1907. The movement gained in momentum until the mid-twenties when several of the giants in the industry were formed.[17] Prior to that time the industry was characterized by relatively small single-plant firms distributing in local market areas or single cities. In 1924, Continental Baking Corporation was formed, and by 1925 had combined approximately 80 bakeries. General Baking Corporation was formed in 1925, and by 1926 owned 42 bakeries located in 32 cities. Through these and other consolidations, the multi-plant structure of a few large bakery corporations emerged and remained relatively stable until after World War II[18] when mergers again began to have an important effect on concentration in the bakery industry.

Types of Bakery Mergers

Bakery mergers have been of four types: (1) *horizontal* integration of baking companies performing the same production and

16. See J. Fred Weston, *The Role of Mergers in the Growth of Large Firms* (Berkeley: University of California Press, 1953), p. 3.

17. Carl L. Alsberg, *Combination in the American Bread-Baking Industry With Some Observations on the Mergers of 1924–25,* Miscellaneous Publication No. 3, Food Research Institute, Stanford University (California, 1926), pp. 146–7.

18. The early merger movement was temporarily halted in 1926 when the Department of Justice entered into a consent decree with Ward, Continental and General, the defendants agreeing to dissolve the Ward Food Products Corporation, a holding company whose purpose was to consolidate the three companies with 160 baking plants and approximately 20 percent of the total baking business in the United States. Federal Trade Commission, *Bakery Combines and Profits,* 69th Congress, 2nd Session (Washington, D.C.: Government Printing Office, 1927), p. 47. The one major exception to relative structural stability from 1926–1946 is the formation of the Campbell Taggart holding company in 1927. By 1929, it had acquired 16 plants, and by 1939, had added 22 more. *Report, op. cit.,* p. 135.

distribution function, (2) *forward vertical* integration of wholesale baking companies with firms performing production and distribution functions in different segments of the baking industry, (3) *backward vertical* integration primarily of grocery retailers, into the baking industry, and (4) conglomerate integration of baking companies into other industries. Most but not all of the recent merger activity of baking companies has been horizontal integration. The most notable example is the merger of firms in the wholesale segment of the industry. These were approximately 55 percent of the bakery mergers reported in the years 1952–58.[19] But an additional 16 percent of the reported acquisitions resulted in the vertical integration of different distribution levels within the bakery industry. Examples are the acquisition by large wholesale baking companies of house-to-house and multi-unit retail baking firms. Moreover, for the first time in the history of the industry, almost one-third (29 percent) of the mergers reported by baking companies were the conglomerate type such as diversification into frozen foods, candy, and potato chip manufacturing. No backward vertical integration into flour milling or bakery equipment manufacturing via merger was reported in the years 1952-58; in fact, Omar, the only producer of perishable bakery products owning a flour mill in the post World War II period, disposed of its milling division with assets of $1 million.[20]

In addition to types of mergers in which a baking company is the principal acquirer, there has been considerable *backward vertical* integration through acquisition of baking companies by retail grocery chains since World War II. Food retail organizations have entered bread production through acquisition since the 1920's when 67 bakeries were added to the 18 bakeries operated by food retailers in 1920.[21] From 1930 to 1947, vertical integration by food retailers into bread production stabilized with the addition of only five bakeries during the 17 year period. Since 1947, vertical integration into bread production again proceeded at a rapid rate until, in 1958, food retailers operated 88 more bakeries for a total of 178 plants, and produced about 10 percent of all bakery products consumed in the United States.

19. Paul E. Nelson and Allen B. Paul, *Ownership Changes By Purchase and Merger in Selected Food Industries,* Report No. 369, Agricultural Marketing Service, U.S. Department of Agriculture (Washington, D.C., October, 1959).

20. *Moody's Industrials.*

21. Leon Garoian, "Changes in the Market Structure of Food Retailing 1940–1957," unpublished Ph.D. thesis, University of Wisconsin (Madison, 1959), p. 171.

With the rapidly increasing size of many grocery chains and independents affiliated with buying groups, more and more food retail organizations have achieved sufficient size to integrate into bread production. Whereas during World War II only 11 of the top 20 chains were integrated into baking, and only three more were large enough to be potential integrators, by 1957, 19 of the top 20 chains were integrated into baking, and all of the top 40 chains were large enough to be potential integrators.[22] They have developed "private labels" that are acceptable to consumers; they have access to substantial financial resources, and, by buying out operating bakeries while retaining the previous owner as manager, they can overcome the lack of technical and business know-how in the bakery field. Moreover, they can often obtain bakeries in distressed economic condition at bargain prices, far below new construction costs.

Much, if not most, of the recent vertical integration by food retailers into bread production has been through merger. In 1958, all of the 10 largest food chains were integrated into bread production operating 83 bakeries. Moreover, their combined value of bakery shipments had increased from $247 million in 1954 to $321 million in 1958, or a 30 percent growth, only about half due to an increase in bread prices.[23] Much of this expansion in the production of bakery products was the result of acquisitions. For example, all of the National Tea bakery growth resulted from the acquisition of Miller Supermarkets which operated its own bakery in Denver. Kroger's Houston bakery plant was acquired in 1955 with the purchase of the Henke and Pillot chain. Colonial Stores became a bakery operator in Ohio when the company purchased Albers Supermarkets in Cincinnati in 1955. Colonial, through its Albers division, acquired the Pennington Brothers Bakery in Norwood, a suburb of Cincinnati, in 1958.[24] Much of Winn-Dixie's bakery growth can be traced to the 1955 merger of Winn-Lovett with Dixie Home Stores. Smaller chains, too, have acquired baking companies. Examples are Red Owl[25] of Minneapolis and Eberhard's Supermarkets of Grand Rapids, Michigan.[26] Red Owl is the 18th largest

22. Willard F. Mueller and Leon Garoian, *Changes in the Market Structure of Grocery Retailing, 1940–58,* Research Report 5, Agricultural Experiment Station, University of Wisconsin (Madison, 1960), p. 16.

23. *Report, op. cit.,* p. 104.

24. *Bakers Weekly* (March 17, 1958).

25. Garoian, *op. cit.,* p. 330.

26. In 1959, Eberhard acquired the Polly Anna Pastry Kitchens, a multi-unit retail bakery with one plant and 16 retail bakery stores. *Baking Industry Magazine* (October 31, 1959), p. 18.

grocery chain, while Eberhard's is a medium sized chain with about 25 stores in Eastern Michigan.

Dimensions of the Recent Merger Movement

The external growth of large companies through merger has been fairly widespread and has increased in recent years. In the seven year period from 1952 to 1958, more than 30 of the 161 multi-plant companies in the baking industry made one or more acquisitions.[27] This represents at least a 20 percent participation in the merger movement. However, most multi-plant companies failed to participate and, as will be shown subsequently, most non-participants were the smaller firms.

Among acquiring firms, the degree of merging activity varied. Of a total of 104 acquisitions reported, no single company acquired more than 20 previously independent businesses, while two companies made between 10 and 20 acquisitions. Seven companies acquired five or more firms each. Nineteen companies made two or more acquisitions, and 12 made one acquisition each.

Large baking corporations made the greatest number of mergers and usually acquired the larger companies sold (Table 8). The few baking corporations with more than 5,000 employees made 42 percent of the acquisitions reported from 1952-58 and, of the total

TABLE 8

NUMBER OF MULTI-PLANT BAKERY FIRMS WITH NUMBER AND SIZE OF ACQUISITIONS ARRAYED BY THE SIZE OF ACQUIRING COMPANIES, UNITED STATES, 1952–58

Firm Size (Number of Employees)	Total Number of Multi-Plant Firms, 1954		Total Number of Firms Acquired 1952-58		Percent of Employment in All Acquired Companies 1952-58
	Number	*Percent*	*Number*	*Percent*	
5,000 and over	9	5	44	42	77
1,000–4,999	21	11	18	17	12
500–999	27	15	22	21	5
100–499	74	40	17	17	5
0– 99	52	29	3	3	1
Total	183	100	104	100	100

SOURCE: Paul E. Nelson and Allen B. Paul, *Ownership Changes By Purchase and Merger in Selected Food Industries,* Report No. 369, Agricultural Marketing Service, U.S. Department of Agriculture (Washington, D.C., October, 1959), pp. 20-21; and, unpublished tabulation based upon the *Company Statistics Report,* 1954, Bureau of the Census, U.S. Department of Commerce (Washington, D.C.).

27. Although 92 percent of all multi-plant baking companies were included in the U.S. Census survey, only about 70 percent of the companies with 100 or more employees participated. The latter size group of firms accounted for 99 percent of all reported mergers, thus the sample may tend to understate merger activity. Nelson and Paul, *op. cit.*

plant capacity transferred as measured by numbers of employees, they acquired a sizable 77 percent share. Companies with 500 to 5,000 employees made 38 percent of the acquisitions reported, but they accounted for less than half as great a share of total plant capacity transferred. While about 70 percent of the multi-plant companies were small (with less than 500 employees), they made only 20 percent of the acquisitions reported. And the companies they acquired were small, representing in the aggregate only 6 percent of the total employment of all acquired companies. Thus, small baking companies experienced very little external growth in recent years.

The number of mergers has increased in recent years. About two-thirds of all acquisitions reported in the seven year period between 1952–58 were made between 1956–58. The average size of acquired firms during the most recent years was considerably smaller than for the 1952–55 period. This suggests that increasing numbers of small companies have been absorbed into larger organizations. About 10 percent of the companies acquired from 1952–58 were large themselves with more than 1,000 employees, and were usually acquired by corporations with more than 5,000 employees. But more of the acquired firms were small at the time of acquisition. More than half had between 20 and 100 employees, while one-fifth had fewer than 20 employees. In addition, about one-fifth were medium-sized with 100–300 employees.

Comparison of published sales figures for 1954 and 1958 reveals that the eight largest wholesale baking companies grew faster than the rest of the industry. Their sales, not corrected for inflation, increased by 32 percent while sales of the rest of the industry increased by only about 12 percent. Most of this increased concentration among a few sellers has come about by external growth through merger. Mergers by the eight largest baking companies conservatively accounted for over half of their growth between 1954 and 1958, and added more than $150 million in sales.[28] Price rise accounted for another 12 percent of growth during this period, and internal expansion through better utilization of existing and construction of new plant and equipment accounted for approximately one-third of increased concentration at the eight firm level.

Among the big eight companies, those with the largest or most frequent mergers grew the fastest. Six made mergers and two did

28. *Hearings, op. cit.*, p. 6039; and Annual Reports to Stockholders of these firms.

not. Sales of the six merging companies grew by 35.5 percent and the non-merging by only 8 percent. From 1954 to 1958, the most active merging firm, Continental, grew by 76 percent, with an average increase in sales per year of about $40 million.[29] These comparisons are of sales growth in terms of current dollars. When sales are adjusted for an increase in the index of bakery prices of 12 percent between 1954 and 1958, the divergent growth trends become even more pronounced. While the largest baking companies that merged grew an average of about 5 percent a year, the rest of the industry, with the exception of vertically integrated grocery chain bakeries, experienced declining real sales. It was evident that without mergers, several of the largest wholesale bakery corporations, too, would have experienced declining bakery sales.

Bases for Merger

Industrial experience in the American economy suggests several reasons why growth through merger may be a more profitable way for a firm to expand than internal growth. For the acquirer, mergers may be less expensive, quicker, or less uncertain; they may involve fewer competitive problems, be more easily financed, increase market power, and afford certain tax advantages.[30] For the acquired, merging with a larger company may provide a tax advantage, may facilitate financing of plant expansion, and may lead to less economic uncertainty as part of a multi-plant organization. This study did not attempt an exhaustive empirical analysis of all these reasons, but the information discussed below suggests their relative importance to the bakery industry.

Individual mergers are motivated by a variety of reasons, depending, of course, on the circumstances of the economic environment and the goals of the participating firms. The economic environment of the bakery industry is unique in that it presents a special combination of limiting conditions. These include: (1) significant economies of scale in production and distribution, (2) relatively stable and inelastic demand for the output of the industry, (3) relatively high barriers to entry, (4) homogeneity, bulk and perishability of product so that population density limits extent of the market, and (5) durability of specialized machinery in the industry.[31] The pres-

29. Includes estimated sales of acquired companies in 1958.

30. J. Fred Weston, *op. cit.*, pp. 74–75.

31. These conditions are in contrast with those environmental conditions assumed by George J. Stigler, "Monopoly and Oligopoly by Merger," *American Economic Review* (May, 1950).

sure of these condtions in the past decade and a half has intensified the drive to expand through merger on the part of wholesale baking companies. Two hypotheses to account for this recent merger movement will be explored here: (1) acquisition to gain share of existing markets to achieve sufficient market power, to stabilize oligopolistic behavior, and to realize economies of scale in production and distribution; and (2) acquisition to diversify into the protective cover of new geographic markets, distributive channels, or specialty product areas.

First, many baking companies have initiated mergers to enlarge the share of markets served by their existing plants. They have been *primarily interested in the acquisition of functioning distribution systems rather than productive facilities,* but have usually purchased the plants and equipment of the acquired company along with the rights to its distribution system. Frequently, the less efficient plant contingent to or within the acquiring firm's market areas has been discontinued, dismantled and sold piecemeal for scrap or to other lines of commerce. There is considerable evidence of this practice. Of companies reporting disposal methods in a U.S. Census pilot survey of 87 baking companies with 250 or more employees, 17 sold 52 plants, and at least ten of these were liquidated piecemeal with baking operations discontinued.[32] To give specific examples, published operating statements show that General acquired at least 18 plants since 1946 and discontinued operations in five. Continental acquired ten companies with a total of 14 plants since 1950, and discontinued operations in three of them.[33] In many cases of discontinued operations of acquired plants, the acquired brands may be kept on the market in an attempt to hold all its former customers.[34] All production is transferred to the usually larger, more efficient plant of the acquiring firm to realize economies of scale in production.

There is another reason why baking firms try to increase their share of the market through mergers. They seek greater power to confine future competition for share to nonprice behavior as opposed to price competitive practices. Even if price competition were effective in gaining share, it would have serious implications for self-destruction because of the static and inelastic demand for

32. Paul Nelson, "Ownership Changes Within Selected Food Industries—A Progress Report," *Marketing and Transportation Situation,* U.S. Department of Agriculture (Washington, D. C., April, 1958).

33. *Report, op. cit.,* pp. 135–136.

34. Federal Trade Commission, *Report on Corporate Mergers and Acquisitions* (Washington, D.C.: Government Printing Office, 1955), p. 110.

bread (see footnote 60 of this chapter). Each competitor in an oligopoly group has an incentive to gain market power so he can better influence the stability of pricing practices. The dominant firm that shares a market with few competitors is in a much better position to influence price and nonprice methods of competition for its own benefit than one not so favored.

In the second place, expanding bakery firms have entered new market areas in nearly all cases by merger rather than by constructing new plant facilities. This has been equally true for all three forms of company diversification—geographic, distributive channel, and product. A typical case of geographic expansion through merger is the purchase of plants in high growth markets for bread products such as the West Coast and other areas where population is growing rapidly. Acquired plants frequently have been modernized with larger, more efficient equipment and operations continued.

In 1956, General Baking Company (second largest) acquired a regional West Coast bakery and a Northwest bakery with annual sales of about 30 percent of total sales of the parent company. Largely as a result of these and two other recent mergers, General increased coverage of bakery markets in the East and Central states while operating for the first time west of the Rocky Mountains. General's management explained these acquisitions to its stockholders saying they wanted to offset the uncertainties of local market structure and behavior by a more balanced pattern of national distribution and at the same time expand operation to markets with high population growth.

It is apparent that the primary basis for multi-plant and multi-market operations in recent years has been to spread among many plants and markets the internal competitive risks of local markets such as price wars, active promotional campaigns of rivals, and bakery worker strikes that cut off a plant's earning capabilities. Large baking companies are aware that if oligopolistic price leadership and the approved methods of nonprice competition are to work effectively in any particular market area, each of them must spread its influence nationally to nullify any disadvantage it may have among a single group on the local level.

Slater found sound reasons, from the viewpoint of the expanding firm, for using mergers to get established in new markets:[35]

> In order to achieve economies in production, it needs to enter a market on a substantial scale. A small plant would

35. Slater, *op. cit.*, p. 216.

> not achieve low costs, and a large plant operated at part capacity would not be efficient either. But there are strong barriers to the quick building up of a large sales volume in a new market. Time is required to build a sales organization and (in the case of a wholesale baker) obtain a place on grocers' shelves. Furthermore, the gradual growth of market demand (tied to population changes) precludes the startling growth of one seller without a decline in the market share of other sellers. This would result in a sharp and costly competitive struggle. Mergers avoid such problems, for the company buys "market share" along with bricks and mortar of a plant.

Moreover, the entry into new market areas may be smoother if accomplished through external expansion; it avoids the risk of antagonizing the local community which otherwise might result from driving out the existing firm and causing local unemployment.[36]

Diversification into new channels of bread distribution is another factor that accounts for many of the recent bakery mergers. The usual case has been for primarily wholesale baking companies to integrate through merger into the home delivery or multi-unit retail channels. The integrating company has sought the protective environment of a high margin, direct contact, consumer market. For example, General, primarily a wholesaler baker, merged with Van de Kamp's, the largest multi-outlet retail baking company of California, in 1957. Estimated 1957 net earnings on sales of the acquired division were about twice that of the parent company in 1956.[37]

Perhaps the most notable example is the acquisition by Continental Baking Company (largest wholesale baker in the nation) of Omar, Inc., Midwest home service company, in 1958, with annual sales representing more than 10 percent of the parent company. Continental also may have been motivated by desires other than further diversification into the home service channel of bread distribution. Perhaps Omar was underpriced at $5.2 million (net worth was $8.6 million in 1957).[38] There was an opportunity to trim some managerial overhead from the operating costs of Omar in subsidiary relationship to the parent company. Moreover, Omar was already

36. Weston, *op. cit.*, p. 75.

37. *Baking Industry Magazine* (July 13, 1957), p. 55.

38. *Moody's Industrials.* Continental Baking Co. entered into a consent order with the Federal Trade Commission on April 2, 1962, to dispose of Omar, Inc., and was forbidden for ten years to acquire any bread company without permission of the F.T.C.

experimenting with diversification into the production of chain store and cooperative contract private label bread. It thus offered Continental the opportunity to enter this volatile market area under the protective cover of an organization separate from the wholesale division.

Omar operated 81 retail stores for the sale of "day-old" surplus bakery products. While wholesale bakers seldom have an incentive to retail all of their own output, there are certain advantages in retailing some. For example, a baker may find that at 19 cents a loaf he can distribute only 20,000 loaves a day via driver-salesmen delivery to grocery stores. In order to get an additional 2,000 loaves sold through grocery stores, he would have to lower the price to 15 cents a loaf under drop shipment delivery to a small chain. But to avoid alienating his regular grocery store customers, he would soon have to give the same price concession to all and sell his entire output of 22,000 loaves per day for 15 cents, rather than only the last 2,000. Thus, he may be better off selling the last 2,000 loaves through his own surplus bakery product stores at day-old prices, even if retailing costs are somewhat higher than those of grocery stores.

In recent years, diversification of product has become increasingly important as a factor explaining the merger of large baking companies with other baking companies and with firms producing other than bread products. A large firm may thereby obtain a competitive advantage over smaller competitors by lengthening its product line to provide certain bakery products and sometimes non-bakery products not previously supplied, but which were generally used by the acquiring company's present customers. Also, diversification of product by major wholesale baking companies has frequently been into unrelated product areas having more favorable demand prospects than bread.

Fully 29 percent of the bakery mergers reported between 1952–58 in a U.S. Census survey were of a conglomerate type.[39] Since 1955, Continental, primarily a wholesale baking company, has diversified into the manufacture of potato chips, mayonnaise, snack items, frozen meat pies, frozen cakes, frozen TV dinners, and frozen biscuits, all by merger.[40] By 1958, about 10 percent of company sales were non-bakery products. In 1958, General, primarily a wholesale

39. Nelson and Paul, *op. cit.*, p. 21.

40. Continental acquired Morton's Frozen Foods, Inc., and Stewart's, Inc. (potato chips, mayonnaise) in 1955, and Brownies Chip Co. of Oklahoma City, Oklahoma, in 1959. *Moody's Industrials.*

baking company, acquired two candy manufacturers.[41] Other wholesale baking companies had diversified into non-baking products to a lesser extent or not at all, but a noticeable diversification trend was in evidence. Pepperidge Farms, a wholesale baking company with $40 million annual sales, first entered the frozen food field in 1957 through merger.[42] In 1959, Interstate, the fifth largest wholesale producer of bread products, diversified into cake production with the acquisition of Kingston Cake Company with annual sales of $6.5 million in Pennsylvania.[43] In the same year, Ward, the sixth largest wholesale producer of bread products, diversified into frozen pies by acquiring the Johnston Pie Company of Los Angeles.[44]

Product Differentiation

Another dimension of market structure is product differentiation or the degree of consumer substitution between the output of competing sellers. Where product differentiation is present, consumers have developed preferences for the output of certain sellers over others. Consumers will be willing to pay at least slightly more for a preferred brand, and/or grocery store outlets will be eager to stock it. Thus, product differentiation can have an important influence on the competitive relationships between bakery firms.

The principal product of the bakery industry is white bread, to which we shall confine our attention in considering product differentiation. But the industry is not a single product group. It consists of bakeries primarily engaged in the production of white bread, variety breads, rolls, cakes, sweet yeast goods, pastries, doughnuts, pies, cookies, and similar perishable bakery products chiefly for off-premise sale. White bread, however, accounts for about 56 percent of total industrial output (in pounds).

The common bases for product differentiation in most industries are: (1) the opportunity for producing significantly different designs and qualities of the goods, (2) the relative ignorance of buyers with respect to the merits of various alternative products, and (3) the susceptibility of buyers to persuasive appeals concerning the alleged superiority of the outputs of individual sellers.[45]

As far as baking is concerned, the findings suggest that white

41. General acquired Vernell's Buttermints and Thompson's Candy House, both of Seattle, Washington, in 1958. *Moody's Industrials.*

42. *Baking Industry Magazine* (October 19, 1957). Pepperidge Farms was merged with Campbell Soup Co. in 1960.

43. *Baking Industry Magazine* (October 31, 1959), p. 88.

44. *Report, op. cit.,* p. 137.

45. Bain, *op. cit.,* p. 219.

pan bread is a homogeneous product in physical quality, nutritive value and palatibility. The output of one firm is highly, if not completely, substitutable for the output of other firms in any given market area. Limitations in differentiating the physical quality of white bread are, however, partially offset by the consumer's lack of information with respect to the similarity of alternative bread products and his susceptibility to locational differentiation on the grocery shelf and to the persuasive appeals of bread advertising.

Perhaps the leading factor making it increasingly difficult for bread bakers to differentiate the physical quality of their product from that of competitors is the widespread dissemination of technical and business know-how. Important ingredient and operational determinants of bread quality vary only slightly if at all between bread bakers in any given market area. General uniformity has been achieved in the quality of ingredients and formulas used in the cleanliness and timing of production and delivery operations, and in the enrichment and subsequent nutritive value of white bread.[46]

Product specifications vary somewhat between regions of the country, but within any given region, product characteristics are generally homogeneous among bakery firms. There are a few exceptions. A development of small but growing significance is white bread made from stone-milled flour to save the vitamins lost in modern milling, as well as breads made from honey, molasses, natural-sugar syrup, whole milk and butter. Of course, most of the known vitamins of importance are added to all enriched white breads, but the nutrition and chemical additive scares of recent decades explain, in part, the ability of many small bakers and a few large ones (notably Pepperidge Farms and Brownberry) to sell a somewhat differentiated product as a special "old-fashioned" bread.[47]

Another important aspect of bread quality is its perishability. Although "staling" is one of the major problems of the industry, its cause has not yet been fully determined or controlled. The widespread addition of calcium propionate as a mold inhibitor and lecithin as an emulsifying agent, combined with rapid cooling and immediate wrapping are characteristic efforts to minimize bread staling. Despite these efforts, within two or three days after baking,

46. See L. C. Taylor and M. C. Burk, *Review of Cereal Food Enrichment in the United States, 1950–53*, National Food Situation No. 69, Agricultural Marketing Service, U.S. Department of Agriculture (Washington, D.C., 1954), pp. 17–20.

47. See for example, *Chemicals in Food Products, Hearings*, House of Representatives, 81st Congress, 2nd Session (Washington, D.C.: Government Printing Office, 1951).

the crumb of all bakers' bread becomes dry and hard, the crust soft and leathery, and the flavor less desirable.[48] Heroic attempts are made to overcome these factors since success would enable an individual firm to differentiate its product and make its advertising more effective.

Despite repeated bread purchases at short intervals, the typical consumer does not know enough about bread quality to make a reasoned and informed choice among alternative brands. Several consumer preference studies have demonstrated this lack. The most notable example is a 1955 study of the preferences of a representative sample of approximately 300 families in Rockford, Illinois.[49] Among five experimental white pan breads purposely made of distinctly different formulas, consumer discrimination powers were almost nil. Analysts used a ten-point scale expressing a range of preference from zero, "dislike extremely," to ten, "like extremely." The five breads varied as to specific volume, and contents of lard, sucrose, and nonfat milk solids, but the mean preference ratings were between 6.06 and 7.35. There was no statistically significant difference among the mean ratings for each of the quality characteristics evaluated.

It is a rare consumer, indeed, who, applying the usual tests of flavor, freshness (squeeze), texture and keeping quality, can discriminate between the bread produced from distinct alternative formulas. Discriminating powers are considerably less in actual bread markets where the alternative seller brands are produced with essentially the same formula.

Whatever basis there is today for product differentiation of white bread results primarily from the sales-promotion activities of sellers. Advertising is an obvious example. In addition to advertising, efforts to make the bread output of the individual baker something special in the consumer's mind take various forms including: attractiveness and convenience of the display, including size, location, and height above the floor; differential loaf size and/or weight; differentiation in wrapping material; driver courtesy; and other intangible factors sold along with the product itself. These factors will be considered again in Chapter 5.

48. *Bread Staling,* Consumer Service Department, American Institute of Baking, (Chicago, 1954); as quoted in *Bread Facts for Consumer Education,* Agricultural Research Service, U.S. Department of Agriculture (Washington, D.C., 1955), p. 19.

49. Hugh P. Bell, *Consumers' Preferences Among Bakers' White Breads of Different Formulas—A Survey in Rockford, Ill.,* Report No. 118, Agricultural Marketing Service, U.S. Department of Agriculture (Washington, D.C., May, 1956).

A recent study showed that even consumers themselves realize that advertising plays a more significant role in shaping their preferences for bread than physical quality.[50] In a sample of 500 households in a western city, advertising accounted for 60 to 80 percent of the reasons given for brand preference. Moreover, changes in brand loyalty stem from a sense of monotony with the staple article of diet and a desire for something new or different stimulated by persuasive advertising. Advertising of bread is aimed at creating product preferences for brands or company names through generally phrased praises of the attributes of a branded product or simply through dinning into the potential buyer's mind an awareness of the brand through endless repetition. Thus, the most important efforts to achieve bread differentiation are based primarily on a nonrational or emotional basis. The possibility of informational type advertising of bread, though consistent with the goal of an informed discriminating consumer, would be inconsistent with the short-run profit maximization goal of bakery firms. Informing the consumer of the physical uniformity of alternative breads may tend to destroy whatever consumer franchise is attached to particular brands, and thus reduce an important source of market power held by some bakery firms.

Barriers to Entry

Conditions of entry of potential new sellers into bakery product markets may be defined as the circumstances under which potential competition from new firms will or will not be realized.[51] Papandreou and Wheeler classify the common barriers to entry in most industries as: (1) terms under which technology is made available; (2) terms under which factors of production are made available; (3) terms under which outlets for the product are made available; (4) consumer allegiances based on product differentiation by existing firms, and (5) outright legal restrictions.[52] In the bakery industry, the importance of most of these factors is continually changing. Some barriers are becoming higher and others lower. Some apply to one segment of the industry and some to others. The important consideration is the *net* height of the barriers to entry in each bakery segment.

There appear to be no outright legal restrictions or trade secrets

50. Nathanael H. Engle, "Bread Buying Habits," *Journal of Marketing* (October, 1956), p. 193.

51. Bain, *op. cit.*, p. 3.

52. A. G. Papandreou and J. T. Wheeler, *Competition and its Regulation.* (New York: Prentice-Hall, 1954), p. 179.

to forestall entry into baking. Factors of production and technological know-how are freely available. Kaplan comments on these variables as follows:[53] "Competent bakers can be found anywhere in the country and little is required in the way of working capital with which to get started. Machinery and equipment can frequently be obtained on credit and financed by installment payments. Trucks can be leased. Raw material inventories are relatively low because of rapid turnover. Little or no finished-goods inventories exist because of perishability."

Market Barriers to Entry into Wholesale Bread Markets

These factors making it easier to enter the production of bread products are largely offset by higher market barriers. In recent years, the leading factors making it increasingly difficult to enter the wholesale segment of the industry are: (1) the implicit and explicit preferential shelf space agreements of many established firms with grocery outlets, (2) the penetration of one or another of the largest baking companies and grocery chains into virtually all markets in the country, (3) a uniform quality product giving rise to differentiation efforts such as large scale advertising which puts an entering company of limited size and resources at a disadvantage both with the grocer and the consumer, and (4) the existing and potential integration of grocery chains into baking.

The existence of preferential agreements between owners of grocery outlets and established bakery firms is a substantial barrier to entry into wholesale bread distribution through grocery stores. In many cases, shelf space is not made available to newcomers on the same terms on which it is made available to firms already in the stores. Perhaps the most notable example is the provision of display cabinets by an established firm in return for dominant display space, position, and restriction of other brands. In this and other ways, potential entrants are often prevented from reaching the final buyers of their products or from achieving minimum cost display scale. Shelf space control may take other forms, of course, and will be considered more fully in Chapter 5, as will other market barriers presented in this section.

Until shortly after World War II, many companies sold in interior markets essentially isolated from the largest baking companies and from chain store private label bread. These were the small cities and rural communities where chain stores had not

53. David Kaplan, President, the Economics of Distribution Foundation, New York, testimony before, *Hearings, op. cit.*, p. 6494.

penetrated. The main obstacles to the expansion of large baking companies with plants in metropolitan areas into rural fringe markets were distance and perishability of the product. Small and medium sized bakeries entered such environments and prospered until recently when two major displacements occurred. Either a major chain acquired a small local chain of stores and introduced private label bread, or a large city baking company set up a delivery system in the outlying community and launched a large scale advertising and promotional campaign which local companies were unable to match.

Costwise, distance of market expansion by large city companies through drop shipment to outlying area depots and subsequent delivery to stores by driver-salesmen is limited by the relationship between the slope of the production cost curve and the increased costs of distribution due to increased outlying market area sales. Roughly estimated from data presented in Chapters 3 and 4, these balance at 150 miles. Distance of market expansion by grocery chains through common carrier delivery to store docks is limited by the relation between the slope of the production cost curve and increased common carrier costs to the outlying market area. Roughly estimated these balance at between 400 and 500 miles.

The increased importance of regional and national brands often means that a small or medium sized company cannot compete effectively with the largest firms and cooperatively affiliated companies in advertising. Ability to enter is partially dependent on large scale advertising to develop brand acceptance by consumers and retailers, as shown in Chapter 5. It has been demonstrated that white bread is essentially the same product in every quality characteristic, thus more significance is attached to *who* defines the product than to *how* it is defined. Insufficient volume to justify the costs of large scale advertising forces many potential entrants to abandon the contest before it begins. This is also a factor which contributes to the discontinuance of many existing small and medium sized firms. Under increased selling competition many firms bid for private label contract accounts and experience complete loss of consumer franchise.

Perhaps the most significant single barrier to entry into wholesale baking is that an increasing number of grocery chains (corporate, cooperative and voluntary) have become large enough to bake their own products if they so choose. Widespread acceptance of retailer labels by consumers has enabled grocery chains to integrate into many lines of food processing, the most extensive of

which has been baking.[54] Moreover, preferential display of a store's own brand of bread restricts the shelf space available for wholesaler brands, reduces their volume of sales, and increases their per unit costs of delivery. This forces some wholesalers to abandon the outlet. Also, some chains have limited the number of wholesaler brands allowed in the store. Thus, vertical integration by already established grocery chains makes it increasingly difficult for newcomers to enter wholesale baking.

The above barriers to entry apply primarily to wholesale bakeries. Although other segments of the industry may not share these particular barriers, they have others. For example, home delivery and multi-outlet retail bakeries have a higher selling cost barrier. A primary barrier to chain store entry into baking bread is ownership of a sufficient number of grocery outlets to take all of the output of a minimum optimum-sized bakery plant. However, because of the economies of private label bread distribution, the entry of grocery chains into bread production may occur via a smaller sized, higher unit cost baking plant; the chain may still achieve lower total unit costs than the potential wholesale baking entrant who will experience much higher unit costs of driver-salesman distribution. Evidence for this is presented in Chapters 3 and 4.

Inelastic Demand with Respect to Price and Income

The baking industry as a whole has experienced a paucity of market expansion since World War II. Under almost static demand conditions, the successful entry of a new producer requires almost equal displacement of output by established producers. Total consumption of the industry's products has increased at an average annual rate of about 0.7–0.8 percent since 1947, or about half of the annual population growth of 1.8 percent. This annual growth rate is hardly sufficient to encourage the entry of new firms into most bakery product markets. This was not always true. Prior to 1947, entry into the baking industry had been eased by the substitution of commercially produced bread for home baking. This was in spite of the steady decline in per capita consumption of bread from an estimated 130 pounds in 1920 to about 75 pounds in 1955.[55] Hence,

54. In 1958, the total value of shipment by food manufacturing plants owned by chains (with 11 or more stores) was $1,303.6 million, about 30 percent of which was bread products. Of the $228.6 million increase in the product of chain food plants from 1954–58, about 40 percent was bread products. Federal Trade Commission, *op. cit.*, p. 30.

55. *How American Buying Habits Change,* U.S. Department of Labor (Washington, D.C., 1959).

lack of demand did not present a serious barrier to entry. By the end of World War II, however, this substitution was largely complete. In a recent year, for example, only 5 percent of U.S. households baked bread in the home.[56]

Table 9 shows per capita consumption of the industry's products for the Census of 1947, 1954, and 1958. Per capita consumption of standard bread products (white, wheat, and rye breads) has declined regularly since 1947, from 72 pounds per person to 62 pounds in 1958. This was partially offset by increased output of

TABLE 9

ANNUAL PER CAPITA SALES OF PERISHABLE BAKERY PRODUCTS, UNITED STATES, 1947, 1954 AND 1958

Product[a]	Year		
	1947 (pounds)	1954 (pounds)	1958 (pounds)
White pan bread	59.4	55.2	54.1
White hearth bread	2.1	1.6	1.4
Wheat breads	6.2	6.1	3.9
Rye	4.3	3.8	2.8
Standard breads, total	72.0	66.7	62.2
Raisin and other specialty breads (diet, protein, buttermilk)	1.3	2.0	3.6
Rolls, bread type (including brown-and-serve)	6.6	9.2	9.5
Specialty breads and rolls, total	7.9	11.2	13.1
Sweet yeast goods	4.3	3.9	4.5
Cakes	8.4	6.5	6.2
Pies	4.2	4.5	4.0
Cookies	.6	.4	.4
Doughnuts, cake, type	2.2	2.3	2.0
Sweet goods, total	19.7	17.6	17.1
Bakery products, total	99.6	95.5	92.4

SOURCE: 1947, 1954, and 1958 *Census of Manufactures, Bakery Products, op. cit.*, p. 12.

[a] Omits for all years small amounts of miscellaneous bakery products not specified by kind, but does include for white pan bread about 14 percent in 1958 and 4 percent in 1954 reported as "not specified by kind." Excludes retail bake shops. .

specialty breads and rolls from about eight pounds per capita in 1947 to 13 in 1958. Per capita consumption of sweet goods dipped sharply in the middle fifties, and leveled off by 1958 to 17 pounds per person. In total, it appears that per capita consumption of the industry's products declined by approximately 7.2 pounds between 1947 and 1958.

Thus, the overall demand picture for bread is less than encouraging. The slight increase the industry has experienced since World

56. *Home Baking by Households in the United States by Region*, 1955, Report No. 13, U.S. Department of Agriculture (Washington, D.C., 1958), p. 2.

War II cannot be attributed to the general rise in consumer incomes. In fact, many investigators have found that income is inversely associated with bread and flour consumption, which suggests a negative income elasticity. Using 1929–53 data, Juree found that a 1 percent increase in income is associated with a 0.27 percent decrease in per capita consumption of wheat flour products as a whole.[57] More recent data suggest there has been a continued negative relationship between per capita income and per capita bread consumption. A U.S. Department of Agriculture study shows that as incomes rise from very low levels to the national average, per capita consumption increases somewhat, but incomes above the national average are associated with declining bread consumption.[58] Further estimates based on the U.S.D.A. survey suggest that had per capita income increased $1,000 above the actual level, cereal consumption including bread would have declined by 4.6 percent.[59]

Moreover, there is general agreement among competent analysts that the response of bread consumption to changes in price are insignificant. Using 1923–47 data, Meinken found that a 1 percent change in price is associated with a −0.06 percent change in per capita consumption of bread, rolls and coffee cakes.[60] Using earlier data (1921–34), Schultz estimated a price elasticity coefficient of between −0.17 and −0.25 for total domestic demand for wheat.[61] Malenbaum summarizes the relationship by observing that a price elasticity of demand of zero, or no consumption response to price changes, is a reasonably close conclusion.[62] This has an important implication for entry. Lower bread prices resulting from potential cost-reducing innovations by entering firms have little potential for measurably increasing per capita consumption, and thus successful entry by new firms requires an almost equal loss of sales by existing companies.

57. L. Juree, "Long-run Trends in Food Consumption: A Multi-Country Study," *Econometrics* (Volume 24, 1958), pp. 1–21.

58. *Household Food Consumption Survey,* 1955, Reports 1–10, U.S. Department of Agriculture (Washington, D.C., 1956).

59. John R. Wetmore, Martin E. Abel, Elmer W. Learn, and Willard W. Cochrane, *Policies for Expanding the Demand for Farm Food Products in the United States,* Agricultural Experiment Station Technical Bulletin 231, University of Minnesota (Minneapolis, 1959).

60. Kenneth W. Meinken, *The Demand and Price Structure for Wheat,* Technical Bulletin No. 1136, U.S. Department of Agriculture, (Washington, D.C., 1955), p. 21.

61. Henry Schultz, *The Theory and Measurement of Demand* (Chicago: University of Chicago Press, 1938), p. 397.

62. Wilfred Melenbaum, *The World Wheat Economy, 1885–1939* (Cambridge: Harvard University Press, 1953), p. 72.

Economies of Scale in Bread Plants

Under conditions of static demand, all potential entrants face a scale efficiency barrier with respect to plant and distribution systems (see Chapters 3 and 4). Entry at the optimum scale of production and distribution is essentially foreclosed, except to already existing grocery chains that own a sufficient number of retail outlets to take all of the output of a minimum optimum-sized bread plant.

A grocery chain serving about 360,000 people in a 150-mile radius could enter bread production and distribution at near optimum scale with an investment of about $1.1 million. As shown in Chapter 3, a 6,000 pound per hour automatic bread plant operating at about three-fourths of capacity 24 hours per day, six days per week, at minimum rated machine capacity, with allowance for breakdowns, could approach within 10 percent of least cost operation. Average total costs of production would be about 7 cents per pound and, as shown in Chapter 4, average costs of distribution to grocery stores would be about 1.5 cents per pound. Weekly output would be about 500,000 pounds of bread and bread type rolls, average consumption of which was about 1.4 pounds per capita per week in 1958.

Average total costs of production and distribution estimated at about 8.5 cents per pound in the above example are essentially outside the realm of possibility to the potential entrant into the wholesale bread segment of the industry. This is because the share of market necessary to operate a bread plant of near-optimum scale would be sizable.

For example, in the Omaha market with 400,000 to 500,000 people, the required market share for entry at optimum levels of efficiency would be roughly 70–90 percent. Given the further condition that five operating plants share the bulk of that market and operate at varying levels of under-capacity such that any two of them with nearly full plant utilization could supply the entire market, the height of the entry barrier is further raised.

Economies of scale and the existing excess capacity of plants effectively foreclose entry at optimum levels of operation. For markets with lower population than the above example, economies of scale and utilization levels of existing plants most likely present an even greater barrier; for markets with higher or increasing population, the barrier may be somewhat less, but it is still a significant deterrent to entry at optimum levels of efficiency.

3 / Technology and Costs of Bread Production

The preceding chapter dealt with the changing patterns of market structure in the bakery industry. Here and in Chapter 4 we shall examine baking technology and costs, since they have a bearing on our later appraisal of the industry's performance. Recent changes in technology and costs seem to foreshadow changes in the number and size of bread plants, the resource inputs required per unit of output in bread production, the methods of production and distribution, and the levels of horizontal and vertical integration.

Changes in Cost Factors of Production

Average costs provide some insight into the impact of technological and volume factors on optimum or model plant costs. Moreover, the industry's experience with changes in specific factor costs of production may help to shape its future market structure and behavior. In 1947, production costs accounted for about 60 cents of the consumer's bread dollar, or 7.5 cents per pound of wholesale bakery bread sold through retail stores. By 1958, the share of the consumer's bread dollar going for production costs had decreased to about 49 percent, or 9.4 cents per pound. Thus, while total production costs increased by about 25 percent, or 1.9 cents per pound, they declined as a share of the consumer's bread dollar. From 1947 to 1958, an estimated 1.9 cents, or only 28 percent, of the 6.8 cent increase in the retail price of a one-pound loaf of white bread was due to an increase in bakery production costs.

Table 10 shows the postwar changes in the relative proportions of selected factor costs in bread production. It is readily apparent that all costs of bread production except costs of ingredients have increased since 1947, and at a rate in excess of the 55 percent increase in the average retail price of bread. Costs of ingredients have decreased both relatively and absolutely. As a share of the con-

sumer's bread dollar, they have dropped from about 41 percent in 1947 to about 26 percent in 1958. Moreover, as costs to the baker they would have declined even more if it were not for absolute increases in transportation (despite the introduction of bulk handling) and relative increases in exchange costs, both of which are included in prices paid by bakery firms for ingredients. Also, modern baking demands higher quality flour and a higher ratio of chemical additives—sugar, powdered milk, shortening and water to flour—which have caused a significant composition change in "ingredients." Combined, these factors tend to understate the postwar decline in prices paid to the producers of raw materials used in

TABLE 10

ESTIMATED AVERAGE PRODUCTION COSTS OF WHOLESALE WHITE BREAD, UNITED STATES, 1947–1958

Cost Item	Average Costs per Pound Produced[a]		Percentage of Retail Price[e]	
	1947	1958	1947	1958
	Cents	*Cents*	*Percent*	*Percent*
Shop labor[b]	1.15	2.08	9.20	10.78
Ingredients[c]	5.10	5.00	40.80	25.90
Wrapping supplies[b]	.62	1.02	4.96	5.28
Depreciation[d]	.20	.35	1.60	1.81
Miscellaneous	.43	.95	3.44	4.93
Total production costs	7.50	9.40	60.00	48.70

[a] One-pound loaf of white bread. Average cost estimates differ depending on the source, the internal and external economies of firms included in the tabulation, and other variables. These data are presented as reasonably typical; statistically significant data for the industry as a whole are not available. Also see Table 28.

[b] *Hearings, op. cit.*, p. 6084.

[c] Richard H. Long and V. John Brensike, "Marketing Margins for White Bread," *The Marketing and Transportation Situation*, July, 1958, p. 18; and *Developments in Marketing Spreads for Agricultural Production 1958*, Agricultural Marketing Service No. 316, U. S. Department of Agriculture, 1959, p. 11.

[d] Derived from cost data on the four largest bread manufacturers as presented in *Hearings, op. cit.*, p. 6580.

[e] Based on average retail prices published by Bureau of Labor Statistics of 12.5 cents per pound in 1947 and 19.3 cents per pound in 1958.

bread production. For example, the average prices received by farmers for wheat dropped 25 percent in the period 1947-58.[1] Although there is generally a close relationship between the price of flour and the price of wheat, there is little relationship between the price of flour and the price of bread.

Baking companies do not pay a uniform price for ingredients. This is due in part to locational advantage of some firms with respect to sources of supply, in part to different levels of quality

1. *Hearings, op. cit.*, p. 6089. Figures furnished by the Agricultural Marketing Service, U.S. Department of Agriculture.

control necessitated by machinery employed, and in part to the market power advantages of size. In 1958, the four largest baking companies purchased ingredients for prices averaging about 10 percent less than those reported by bakery plants of the five major grocery chains and by independent baking companies affiliated with cooperative buying groups.[2] Although ingredient costs for the remaining unaffiliated independent baking companies are not available for 1958, data reported for the end of World War II suggest their ingredient costs average considerably higher than those of the largest four baking companies.[3]

Labor is the primary factor among production costs contributing to higher retail prices for bread in the postwar years. Increased costs of production labor accounted for about half of the total postwar increase in production costs, but it should be noted that this factor accounted for only about 14 percent of the 6.8 cent increase in the average retail price of bread from 1947–58. There is evidence suggesting that substantially all of the increase in per unit cost of production labor was due to increased wage rates, fringe benefits, social security taxes, and vacation allowances. The volume of bread produced per production worker has increased in the postwar years. Because of substitution of capital for labor, average productivity of plant labor has increased, and per unit production labor costs have not increased as much as hourly earnings.[4]

Depreciation allowances and costs of wrapping supplies both rose a little faster, on a per unit basis, than did bread prices after World War II. Together their 1947–58 increase amounted to slightly more than one-half cent. Higher depreciation costs reflect inflated values of land and buildings as well as the widespread adoption of

2. *Report, op. cit.*, pp. 31 and 113.

3. June, 1945, costs of ingredients and materials for the four largest baking firms (then Continental, Purity, General and Ward) averaged 3.66 cents per pound as compared with 3.87 cents per pound for medium and medium-large sized bakeries, 3.92 cents per pound for medium-small sized bakeries, and 4.62 cents per pound for the smallest bakeries. Blair suggested that without the advantage of power to buy materials cheaply which stems from size, the total unit costs of the Big Four would have been only slightly lower than those of small bakeries in 1945. It is important to note that changes in technology and other conditions since that date may significantly alter these findings. John Blair, "Does Large-scale Enterprise Lower Costs?" *American Economic Review* (May, 1948), pp. 147–148.

4. From 1947–54 Census data as reported in *Farm-Retail Spreads for Food Products,* Miscellaneous Publication 741, Agricultural Marketing Service, U.S. Department of Agriculture (Washington, D.C., November, 1957), p. 35. Also see Imogene Bright, "Trends in Labor Input and Output in Selected Agricultural Processing Industries, 1947–57," *Agricultural Economics Research* (October, 1959), pp. 115–120.

new bakery machinery. Wrapping supplies rose in cost partially because of the increased use of more expensive wrapping materials, more cellophane and polyethelene and less waxed paper. Increases in miscellaneous production costs including return on investment, plus light and power, fuel, repairs, and other expenses, accounted for slightly more than one-half cent of the 1947-58 increase in baking company costs.

Technological Advance and Increasing Scale

Since the beginning of the industrial revolution in baking at the turn of the 20th Century, there has been a tendency for the scale of operations to increase. Early mechanization involved the development of machines to take the place of repetitive hand operations. Mixing machines were introduced in about 1880 followed by special machines for dividing, slicing, and wrapping.[5] The largest bread plants which in 1900 turned out 1,000 pounds of bread an hour, or 15,000 loaves per day, by 1930 often surpassed 2,000 pounds per hour in a single production line, and some multi-line plants produced more than 100,000 loaves per day.[6] By 1958, the median bread plant operated at a capacity of about 3,000 pounds per hour and some of the larger plants operated bread lines with output levels of 8,000 pounds per hour, or as much as 192,000 pounds per single production line in a 24 hour period (Table 4). The basis for this long-run trend has been technological innovation which has provided the capital equipment for a larger scale of operations. Table 11 shows the recent level of investment in selected bakery machinery. Since technological changes and machinery adoption have important effects on the baking industry, several of the more important developments will be considered here.

Pneumatic Ingredient-Handling Equipment

During the past 15 years the expanded use of pneumatic conveyors had made possible the bulk handling of ingredients all the way from the rail siding or truck dock to the mixing machines. Although their chief use is to move flour, pneumatic conveyors also carry dried milk, granulated sugar, and other ingredients. Introduced in the bakery industry in 1946, bulk handling of ingredients by pneumatic conveyors is best suited for medium and large scale

5. Herman J. Rothberg, *Studies of Automatic Technology, A Case Study of A Large Mechanized Bakery,* Bureau of Labor Statistics Report 109, U.S. Department of Labor (Washington, D.C., 1956), p. 1.
6. Panscher, *op. cit.,* pp. 123–124.

bread plants among which there was an estimated 75 to 90 percent adoption by 1958 (Table 12). During the same period, it was adopted by only about 15 percent of the small bread plants. Significant labor saving results as the bulk material is moved by air through tubes

TABLE 11

INVESTMENT IN SELECTED BAKERY MACHINERY, UNITED STATES, 1954 AND 1958

Machine	1954		1958	
	Number	Value	Number	Value
Dough mixers	N.A.	$ 3,810,000	N.A.	$ 6,584,000
Traveling tray ovens	320	4,805,000	274	5,126,000
Other ovens	481	2,580,000	N.A.	3,085,000
Slicing machines	1,426	2,371,000	N.A.	1,176,000
Other bakery machinery and equipment	N.A.	23,540,000	N.A.	29,222,000
Bakery machinery and equipment not specified by kind		3,034,000		697,000
Total	N.A.	$43,247,000	N.A.	$48,869,000

SOURCE: *Census of Manufactures, op. cit.*, as reported in *Baking Industry Magazine* (March 19, 1960), p. 41.

N.A. -Not available. Total shipments include interplant transfers.

and hoses. A case study showed a substantial (40 times) increase in output per man hour for unloading flour into the plant, or from less than 1,000 pounds per man hour for bagged delivery to 40,000 pounds per man hour for bulk delivery.[7] Investment pay-out time on the basis of labor saving alone has been estimated at less than three years. In addition, it reduces the cost of flour through reduced transportation costs of bulk as compared with bagged delivery. Pneumatic handling eliminates loss due to sack breakage. It also facilitates sanitation and quality control as the conveyor system is sealed air tight and the bulk ingredient passes through sifters and an intoleter to assure product purity and proper aeration.[8]

Continuous Mix

Recent combination of the various dough preparation stages into one machine that will mix, develop, divide, shape, and pan bread dough automatically provides the element of automation between automatic ingredient handling and the automatic oven, depanner, slicer, and wrapper. Although there had been substantial automation of the individual stations replaced by continuous mix, the

7. Rothberg, *op. cit.*, p. 6.

8. Inter-Bureau Committee, *Technology in Food Marketing*, U.S. Department of Agriculture (Washington, D.C., 1952), p. 28.

TABLE 12

ESTIMATED PERCENTAGE OF BREAD PLANTS HAVING ADOPTED SELECTED EQUIPMENT BY 1947, 1954, AND 1958, UNITED STATES[a]

Automatic Equipment	Approx. Year Introduced	Percentage of Plants of Specified Size Adopting Specified Equipment by Year											
		2000 Lb./Hr. (from 1000-3000)			4000 Lb./Hr. (from 3000-5000)			6000 Lb./Hr. (from 5000-7000)			8000 Lb./Hr. (7000 and above)		
		1947	1954	1958	1947	1954	1958	1947	1954	1958	1947	1954	1958
Depan-o-matic, pan return conveyor	1949	....	20	75	....	40	90	....	40	95	....	45	95
Cooler, conveyors to slicers	1930	0	25	50	30	60	75	40	70	90	50	80	90
Pan stacker and unstacker	1955	0	0	0	0	0	0	0	0	1	0	0	1
Final proofer	1915	0	0	0	0	2	5	5	8	10	5	8	10
Pneumatic flour handling	1946	0	8	15	5	50	75	5	50	85	5	75	90
Continuous dough mix	1956	0	0	0	0	0	5	0	0	3	0	0	2
Tro hoists	1930	25	50	75	75	80	85	75	85	95	70	75	95

[a] Informed estimates by bakery equipment manufacturers.

elimination of batch mixing is of major significance in facilitating fully automated bread production.

Developed out of basic research in cereal chemistry, the process of fermenting a yeast broth rather than the dough itself cuts dough-processing time from several hours to a matter of minutes. An optimum blend of: (1) equal parts of Hard Red Spring and Hard Red Winter wheat flour; (2) oxidant solution with potassium bromate and iodate; (3) melted shortening; and (4) yeast broth, is metered continuously and automatically into the dough mixing machine. Introduced in 1953 and operational by 1956, continuous mix is apparently best suited for medium sized plants among which it had been adopted by approximately 5 percent by 1958.[9] Table 12 shows it had been installed in none of the small and only a few of the large bread plants. The rate of adoption is expected to increase substantially in the 1960's owing in part to a dramatic labor saving potential of three to four men per shift (Table 13). For an investment cost of $150,000, continuous-mix machines enable bread plant managers to replace six of 12 stages in the conventional production line: flour-scaling units, batch mixers, fermentation room, dough troughs and hoists, dividers, rounders, an overhead proofer, and a molder-panner.

Through a sizable effect on the capital-labor ratio in bread plant cost structure, *continuous mix intensifies the economic disadvantages of under-capacity plant utilization.* Investment pay-out time in terms of labor saving is from three to four years with three-shift operations, five to six years with two shifts and increases to eight to 12 years with a single shift operation. Continuous mix also introduces a certain inflexibility into plant operations as only white, rye, and whole wheat breads can be produced. If other variety breads, buns, rolls, and sweet goods are produced, additional automated-batch equipment of minimum size requirements must also be maintained. Some ingredient savings are realized because dusting can be eliminated and because improved automatic control of metering devices allows closer compliance with minimum weight laws. Improved fermentation control produces a bread structure

9. The Do-Maker of Baker Process Company, a subsidiary of Wallace and Tiernan Chemical Co. is the outstanding case in point. The number of operating units increased from two in 1955 to five in 1956, to ten in 1957, to 21 in 1958, to 56 in 1959. A second unit manufactured by the American Machine and Foundry Co. entered the field in 1958. See, "The Progress of Automation—What It Means to the Economy of the Baking Industry," *Bakers Weekly* (June 19, 1961), pp. 22–26.

TABLE 13

COMPARISON OF SELECTED AUTOMATIC BAKERY EQUIPMENT COST WITH LABOR COST SAVING AND YEARS TO PAY OUT INVESTMENT IN PLANTS OF 4000 LOAVES PER HOUR CAPACITY, 1954[d]

Automatic Equipment[c]	Cost[b]	Number Men Replaced	Labor Cost Saving[a]		Years to Pay-out
Continuous mix[f]	$150,000	3	1 shift[e]	$12,840	11.68
			2 shifts	25,680	5.84
			3 shifts	38,520	3.89
		4	1 shift	17,120	8.76
			2 shifts	34,240	4.38
			3 shifts	51,360	2.92
Depan-o-matic, pan return conveyor	$ 16,000	2	1 shift	8,560	1.86
			2 shifts	17,120	.93
Cooler, conveyors to slicers	$ 65,000	2	1 shift	8,560	7.58
			2 shifts	17,120	3.79
Pan stacker and unstacker	$ 17,000	1	1 shift	4,280	3.97
			2 shifts	8,560	1.98
Final proofer[g]	$ 75,000	2	1 shift	8,560	8.76
			2 shifts	17,120	4.38

[a] The approximate labor cost per man per year is assumed to be $4,280 per man. This cost is based on a wage of $2.00 per hour, a 40 hour week, and an additional 7 percent of fringe benefits and Social Security matching costs.

[b] Cost of equipment is taken from an equipment company, *Approximate Installed Equipment Cost,* table dated March 1, 1954.

[c] Equipment was selected on basis of replacement equipment of a different nature than that replaced, addition without replacement, and replacement especially pertinent to labor saving rather than on the basis of a larger size of the same type. Continuous mix is an example of replacement of old equipment of more than one station by a single new machine.

[d] Total standard equipment assumed in operation of the plant is $291,000 before the addition of any equipment.

[e] The 4000 loaves (pounds) per hour plant size is assumed to be operating at full capacity while in operation whether it be one, two, or three shifts.

[f] Continuous mix replaces at least three men and under optimum conditions replaces four men.

[g] With a plant of 8,000 loaves per hour production capacity, the addition of an automatic final proofer would cost $120,000, or $45,000 more than at the 4,000 loaves per hour capacity plant, and would replace four men. The result would be a labor cost saving of $17,120 on one-shift basis; $32,240 on a two-shift basis; and $51,360 on a three-shift basis. The pay-out time would be seven years, 3.5 years, and 2.33 years respectively for one-, two-, and three-shift operation.

of uniform, small cells which has provided some visible basis for claiming a differentiated product.

Automatic Conveyor Systems

Traveling aprons move bread-in-process between and within the stages of production in a continuous assembly line operation. From the panner through a final proofer, oven, depanner, cooler, slicer-wrapper, and to the loading dock, panned bread is moved by an

automatic conveyor system. There is considerable variation among the rates of adoption of the newer machines at the various production stages. For example, modification of final proofing to allow continuous flow of panned bread by traveling apron from the panner to the oven has proceeded slowly in the postwar years.

With an investment of $75,000, the automatic final proofer replaces two men resulting in a pay-out time of about 4.5 years under two-shift operations of medium sized plants (Table 13). Although introduced as early as 1915, by 1958 automation of the final proofing operation had occurred in only about 10 percent of the large plants, 5 percent of the medium sized plants, and none of the small bread plants. Table 12 shows, however, that there has been a 150 percent increase in the number installed since 1947. This increase in the use of automatic proofing equipment seems to be associated with adoption of the continuous-mix process and with more precise oven control. Prior to the development of automatic continuous mix and closely controllable ovens, flexibility was required in the final proofing operation to adjust to plant breakdowns and to variability in oven output, and in mixing and first proofing time. With the current innovations and plant engineering facilities, the feasibility of automatic final proofing is greatly increased.

Modification of the cooler to allow continuous flow of baked bread by traveling apron from the oven and depanner through to the slicer-wrapper was introduced in 1930, and by 1958 had been adopted in approximately 90 percent of the large plants, 75 percent of the medium sized plants and 50 percent of the small bread plants. While none of the small plants had installed automatic coolers and traveling aprons by 1947, nearly half of the medium and large sized plants had done so by that date. Under two-shift operation of medium sized plants, with an investment of $65,000, the automatic cooler and conveyor replace two men resulting in a pay-out time of about 3.8 years.

Introduced in 1949, the automatic depanner and pan return conveyor were adopted in 90–95 percent of the medium and large sized bread plants and in about 75 percent of the small plants by 1958. The number of medium and large sized plants in which this innovation was adopted more than doubled from 1954 to 1958, while among small bread plants, adoption quadrupled during the same time period. The high rate of adoption among all plant sizes probably reflects the relatively low capital investment, which in the case of medium sized plants was $16,000 in 1958. Nonetheless, the

automatic depanner and pan return conveyor replace two men, providing a pay-out time of about one year under two-shift operations. They not only save labor but increase the average life of bread pans.

Oven Operation and Design

With the end of World War II practically all bread plants, regardless of size, changed their bread formula—increasing the ratio of sugar, shortening, and skim milk to flour. This change, coupled with improved oven performance and stepped up heat is estimated to have cut average baking time per pound from approximately 35 minutes to 18 minutes.[10] The additional heat and zone control of heat supply combined with the modified bread formula roughly doubled the capacity of practically all bread ovens in the United States during the postwar years. During the changeover period, a continuous automatic oven into which products are automatically loaded, baked, and unloaded without continual supervision, was adopted in 90 percent of the medium and large sized plants, and in 75 percent of the small bread plants. With little or no time lost due to adjustment, the modern oven is capable of baking pan breads, sweet goods, pies, cakes and rolls.

In summary, it has been shown that while advances in baking technology have been utilized in small bread plants to a limited extent, *most of the recent innovations have been readily fitted into the operations of medium and large scale plants. This is due, in part, to the lower investment and labor costs per unit of output of large as compared with smaller versions of the same machine.* The significant innovations are in the areas of production process and materials handling. Moreover, each stage of bread production has been subject to output-increasing mechanization and to labor saving automation of the station-to-station movement of product.

Foremost among technological developments are those that have made possible a shift from batch operations to continuous mixing. The conventional batch method of bread production by its nature took more time and labor. There were periods of dough fermentation and intermediate proofing and considerable hand labor, putting the product-in-process into or taking it out of machines or rooms at each of the 12 production stages. Thus, baking has become an organized and partially automated assembly line through development of the pneumatic ingredient handling equipment, continuous

10. *Hearings, op. cit.,* pp. 6189–6190.

dough mix, automatic final proofer, automatic oven, automatic slicer and wrapper, automatic depanner, pan return conveyor, pan stacker and unstacker, automatic cooler, conveyor to slicer, and conveyor to loading racks.

Under typical conditions, the shift to automated baking in any given plant is only partial, with several of the operations carried on as before, and thus many bread plants have not achieved the optimum level of equipment utilization. Although the adoption of new equipment is far from complete, the equipment is available and its efficiency and output-increasing potentials are felt in nearly every bread market.

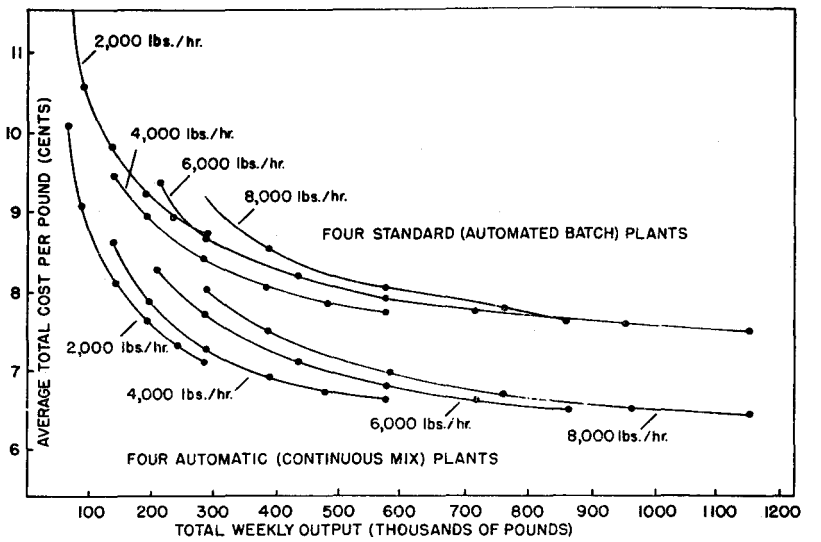
Technological Advance and Production Costs

A comparison between the cost of bread production in model plants with standard automated-batch equipment and continuous-mix equipment reflects the magnitude of cost changes associated with technological change in the postwar years. In this context, "technological change" is interpreted as any change in input-output relations that is not directly attributable to changes in factor prices or variations in the rate or scale of production.[11] The synthesis of unit cost curves for model bread plants of various sizes used for this comparison has the advantage of focusing attention on the merits of currently employed baking equipment in relation to optimum equipment available. Of course, an increasing number of plants use all of the latest available equipment, but the vast majority do not.

Figure 1 demonstrates that under the existing level of technology, the efficiency potential of automatic continuous-mix equipment relative to standard automated-batch equipment is significant for each of the four representative sizes (see Table 4) of model bread plants. At an output rate of 56 hours per week, the advantage of automatic equipment over standard equipment ranges from 1.6 cents (15 percent) per pound when comparing small scale plants to 1.1 cents (13 percent) per pound when comparing large scale plants. Subtracting the 1.1 cents per pound from the 1.6 cents per pound in the example above yields a cost advantage for the small plant compared with the large plant due to automatic equipment of 0.5 cents per pound. However, the cost advantage due to automatic equipment at an operating rate of 36 hours per week is *less* for a small than for a large scale automatic plant. A decrease in plant

11. Conference on Price Research, *Cost Behavior and Price Policy* (New York: National Bureau of Economic Research, 1943), p. 143.

operation from a 54 hour week to a 36 hour week is associated with a per unit cost increase of 1.3 cents in the case of the small



SOURCE: These short-run plant cost curves are based on engineering studies and accounting experience shown in Tables 29, 30, 31, 32, and 33.

FIG. 1.—Comparison of average total cost curves for model bread plants with standard and with automatic equipment, and no daily variation in demand, 1959.

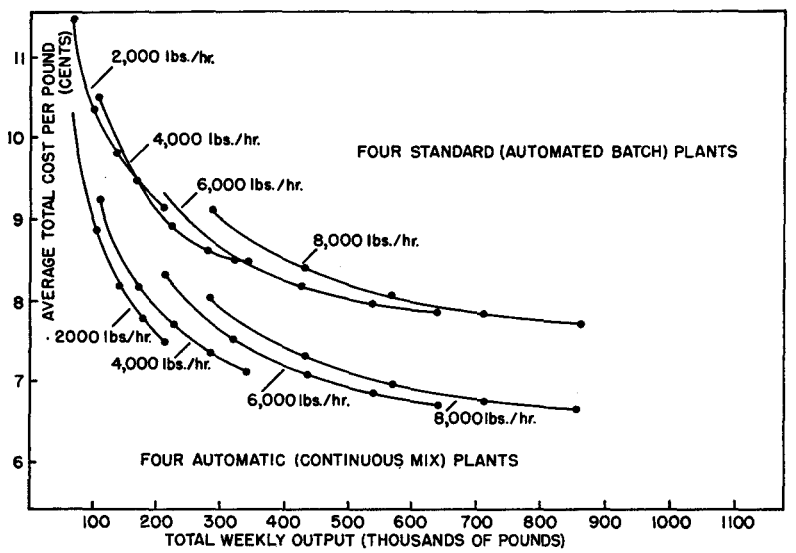
automatic plant as contrasted with only 0.7 of a cent in the case of the large automatic plant, or a difference of 0.6 of a cent in cost in favor of the large scale automatic bread plant. Under-capacity utilization of small automated plants is relatively more costly than it is for large plants.

These economies of automatic processes in baking are due largely to change in the capital-labor ratio per pound of output. In a medium sized bread plant, for example, replacing hand labor and less efficient machines with fully automatic continuous-mix equipment results in a decrease in direct production labor from 15 workers per shift to five workers per shift. At full-capacity operation, per pound production labor costs are reduced from 0.9 of a cent to 0.3 of a cent. The concurrent increase in capital investment required for this medium sized plant is approximately $158,000, from $674,200 to $832,000, which amounts to a per pound increase in cost due to increased investment of only .03 of a cent, from 0.34 of a cent to 0.37 of a cent per pound, or a 9 percent increase. Thus, since the reduction of labor cost due to the increased investment

is 0.6 of a cent per pound, or 67 percent, there is a net saving of 0.57 of a cent per pound of bread output due to the substitution of continuous-mix equipment for labor and standard automated-batch equipment.

Production Scale Economies

There are marked economies of scale in bread production. With an increase in size of plant, at full capacity utilization, unit production costs decrease significantly for the relevant range of plant size. Scale economies are due primarily to larger equipment which results in: (1) less investment per unit of output and, hence, lower per unit depreciation costs, (2) economy of labor utilization, and (3) economy of plant administration. In order to estimate the magnitude of scale economies, model plants of 2,000, 4,000, 6,000 and 8,000 pounds per hour were synthesized from engineering and accounting data.[12] Shown in Figures 1 and 2, these model bread



SOURCE: Tables 29, 30, 31, 34, and 35.

FIG. 2.—Comparison of average total cost curves for model bread plants with standard and with automatic equipment, operated under conditions of average daily variation in demand, 1959.

12. Model plants were synthesized through the application of the building block method based primarily on engineering data. For a review of the methodological framework used, see L. L. Sammet, "Structural Trends and Economics of Scale in Agricultural Marketing and Processing," *Proceedings of the Western Farm Economics Association* (August 13–15, 1958), pp. 187–201. See notes to Tables 30 and 31 for the data sources and assumptions made. See Tables 32 to 35 for a detailed tabulation of fixed and variable costs per pound of bread.

plants coincide approximately with the typical small, medium, and large plants in current operation, with both the 6,000 and the 8,000 pound-per-hour model plants falling in the large size category (Table 4). In addition to analysis of the four plant sizes from 2,000 pounds-per-hour output to 8,000 pounds-per-hour output, comparisons within size are made on the basis of: (1) standard batch equipment *vs.* automatic mix equipment, and (2) production geared to daily variation in demand *vs.* uniform production through the week —capacity fixed independently in all cases (Tables 14 and 15).

TABLE 14

COMPARISON OF PER POUND PRODUCTION COSTS OF SMALL AND LARGE MODEL BREAD PLANTS UNDER A RANGE OF HOURS PER WEEK OPERATION AND WITHOUT DAILY VARIATION IN OUTPUT, UNITED STATES, 1959

	STANDARD BATCH EQUIPMENT				CONTINUOUS MIX EQUIPMENT			
Hours per Week	2,000 Lb./Hr. Small	8,000 Lb./Hr. Large	Difference	Percent	2,000 Lb./Hr. Small	8,000 Lb./Hr. Large	Difference	Percent
36	11.69¢	9.11¢	2.58¢	22	10.19¢	8.04¢	2.15¢	21
48	10.59	8.52	2.07	20	9.14	7.49	1.65	18
72	9.84	8.08	1.76	17	8.08	6.99	1.09	13
96	9.21	7.75	1.46	15	7.62	6.70	.92	12
120	8.93	7.57	1.36	14	7.32	6.54	.78	9
144	8.74	7.49	1.25	14	7.12	6.43	.69	9

SOURCE: Same as Figure 1.

TABLE 15

COMPARISON OF PER POUND PRODUCTION COSTS OF SMALL AND LARGE MODEL BREAD PLANTS USING STANDARD AND AUTOMATIC EQUIPMENT UNDER A RANGE OF HOURS PER WEEK OPERATION AND TYPICALLY DAILY VARIATION IN OUTPUT, UNITED STATES, 1959

	STANDARD BATCH EQUIPMENT				CONTINUOUS MIX EQUIPMENT			
Hours per Week	2,000 Lb./Hr. Small	8,000 Lb./Hr. Large	Difference	Percent	2,000 Lb./Hr. Small	8,000 Lb./Hr. Large	Difference	Percent
36	11.72¢	9.12¢	2.6¢	22	10.22¢	8.05¢	2.17¢	21
54	10.39	8.40	2.	19	8.84	7.34	1.5	17
72	9.86	8.09	1.77	18	8.19	7.00	1.19	14
90	9.33	7.81	1.52	17	7.74	6.76	.98	11
108	9.15	7.70	1.45	16	7.49	6.62	.83	11

SOURCE: Same as Figure 2.

Under conditions of 54 hour week operation, a daily variation in demand for bread, standard equipment, and no storage of product, cost per pound decreased from 10.4 cents for the small plant to 8.4 cents for the largest plant, a scale economy of 2.0 cents per pound (19 percent) between the small and the large bread plant. Using automatic equipment rather than standard equipment, other things remaining the same, the per pound decrease in cost was 1.5 cents

(17 percent) from 8.84 cents for the small plant to 7.34 cents for the largest plant.

Increasing the hours of weekly operation from 54 to 108, also assuming weekly cycle of demand, standard equipment, and no storage of product, the per pound cost decreased from 9.15 cents for the small plant to 7.7 cents for the largest plant or 1.45 cents (16 percent). Substituting automatic equipment for standard equipment under the same conditions, cost per pound declined from 7.49 cents for the small plant to 6.62 cents for the large plant, or a decrease of 0.83 cents (11 percent).

Comparing the small plant with the large plant, but under the assumption of uniform production, 48 hour weekly operation, and standard equipment, cost per pound declined from 10.59 cents to 8.52 cents, a difference of 2.07 cents per pound (20 percent). Substituting automatic for standard equipment, *ceteris paribus,* cost per pound decreased 1.65 cents (18 percent) from 9.14 cents for the small plant to 7.49 cents for the large plant.

Expanding weekly operation to the full 144 hours possible under uniform daily production and using standard equipment, cost declined from 8.74 cents per loaf for the small plant to 7.49 cents per loaf for the large plant, or a decrease of 1.25 cents (14 percent). Under the same conditions, except for the use of automatic equipment rather than standard equipment, cost per pound decreased .67 cents (9 percent) from 7.12 cents for the small plant to 6.43 cents for the large plant.

Thus, it can be concluded that under a variety of conditions economies of scale are considerable. Costs decline with each increase in size of plant, but at a decreasing rate. Additional increases in the size of a bread production line beyond 8,000 pounds per hour, however, do not result in significant increases in efficiency. A 10,000 pounds-per-hour bread line, for example, has essentially the same per-pound costs as an 8,000 pounds-per-hour line.

Under-Capacity Utilization of Plants

Station Excess Capacity

The technical organization of production extant in the bakery industry can still be characterized as a "batch process" or discontinuous process of manufacturing. This combined with the perishability of the product-in-process results in a critical relationship of output rates between machines or stations. With the exception of sweet goods in some plants, storage or stockpiling of partially fin-

ished product between production stages is virtually impossible. Thus, sustainable output rate of the lines is in large part limited to the output rate of the lowest capacity machine or station on the line. Stations or machines with higher output capabilities simply run at under-capacity. There is a minimum of flexibility in a bread line for adjustment of a particular machine in terms of running longer hours to achieve fuller utilization of other machines. This is because once the bread production process is started, there must be continuous movement of product through the various stations until the baked bread is wrapped. Variations in time between operations must be kept to a minimum. Mixing time, for example, is crucial to a fraction of a minute. From mixing through fermentation, dividing, rounding, intermediate proofing, and panning there is very little opportunity for adjustment in production time. Once the bread has been panned and final proofing is in process, it must be baked before proofing goes too far. Baking time cannot be altered significantly; cooling proceeds only until the bread is at the proper temperature for slicing; and wrapping is combined with slicing to maintain freshness. Bakers typically install machines at each station with sufficient capacity so that the oven can be operated at close to its rated output. Hence, in practical operation of the plant, the speed of the production line is geared to oven capacity. With demand fixed, the baker sets the number of hours of oven operation that will meet that demand schedule. This means operation of from one to three shifts with varying amounts of overtime rather than adjustments of oven speed within the limited flexibility of the oven output rate. Since all other stations are usually geared to the output rate of the oven, all machines or stations usually have a rated capacity equal to, or greater than, that of the oven.

The life of equipment at the different stations of the line varies, typically lasting 30 years or more without excessive maintenance cost due to wear. Significant disparity between machine capacities at stations develops through the process of replacement. Technical advance that raises both output per man hour and output per hour of operation does not occur simultaneously at stations. Replacement of equipment at a given station, whether the available equipment be more advanced technically or simply larger, poses a problem of station excess capacity owing to piecemeal replacement of equipment in the normal course of events over a period of years. Under these conditions much equipment is commonly operated at some percent of its rated capacity. There are, however, some notable exceptions to the tendency toward excess capacity within plant

stations. Moulder-panners and slicer-wrappers, for examples, are sometimes operated in multiples in large plants. Use of the large oven and multiple machines at some stations allows closer matching of station machine capacities and, hence, more efficiency within station use of capital equipment.

The implications for line or plant excess capacity which stem from the introduction of continuous mix into an existing plant may be dramatic. A continuous mix machine replaces six of the 12 stations in the conventional bread line. Hence, with a given oven, a continuous-mix machine of sufficient capacity to utilize the oven fully will of necessity idle one-half of the existing production line, in the event that conventional equipment is not discarded. In view of the apparent taste and texture difference between bread made by conventional mix and bread made by continuous mix, a firm is unlikely to adopt the latter process for its entire production. Assuming that the changeover to continuous mix is only partial (a realistic assumption particularly if the plant produces variety goods as well as bread), either the continuous mix equipment or the equivalent half of the conventional line will be idle at all times.

Cyclical Excess Capacity

The weekly cycle of consumers' grocery shopping habits in conjunction with the perishability of bread seems currently to necessitate a weekly cycle in bakery production schedules (Table 16). Thus, plant capacity adequate to supply the peak demand for bakery products on Saturday results in various lower levels of capacity utilization during the week. The most extreme deviation in demand occurs on Tuesday with an average demand output of 42 percent less than on Friday. It should be kept in mind that this figure is an arithmetic average for those plants that baked on Tuesday and Friday. Moreover, although average plant output on Sunday most closely approaches the weekly Friday peak level, it falls short of that peak by 22 percent. Thus, a daily variation in aggregate weekly production, or an index of daily variation, can be constructed. This allows capacity to be defined in terms of the cycle and the aggregate of weekly demand as they exist. The index of daily variation in production (Table 16) is applied to the model bakery plants (Figure 2). The resulting estimated practical utilization of capacity at rated hourly output is 108 hours per week, or approximately 75 percent of a full 144 hours per week (24 hours per day, 6 days per week) of physical production capacity.

This type of cyclical excess capacity, or variation in daily output

TABLE 16

ESTIMATED DAILY VARIATION IN BREAD PRODUCTION CAPABILITIES OF WHOLESALE BAKERY PLANTS, UNITED STATES, SECOND QUARTER, 1958

Days	Index of Daily Variation[a]	Daily Hours of Operation	Daily Volumes for Hourly Outputs of			
			2,000 Lb./Hr.	4,000 Lb./Hr.	6,000 Lb./Hr.	8,000 Lb./Hr.
	Percent	*Hours*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Sunday	77.7	18.7	37,296	59,052	111,888	149,184
Monday	74.1	17.8	35,568	56,316	106,704	142,272
Tuesday[b]	57.7	13.8	27,696	43,852	83,088	110,784
Wednesday	67.7	16.2	32,496	51,452	97,488	129,984
Thursday	70.5	16.9	33,840	53,580	101,520	135,360
Friday	100.0	24.0	48,000	76,000	144,000	192,000
Total or average	74.6	107.4	214,848	340,176	644,544	859,392

[a] Index of daily variation constructed as follows: Based on actual daily operating rates of 20 plants located throughout the U.S. Average daily output was greatest on Friday, assigned a value of 100, with other days assigned an index value as a percent of output on Friday. Since the range of variation between plants with respect to level of utilization of capacity within the week was large, from 0 to 113 percent of plant output on Friday, no statistical significance can be attributed to the index of average daily variation presented in Table 16. Consultation with informed sources, however, suggest it is representative of the wholesale segment of the industry for the range of plant sizes considered. It compares favorably with expenditures for bakery products by day of the week in *Fleischmann's Consumer Panel Report on Baked Food Purchases, 1955-57*, Standard Brands, Inc. (New York, 1957).

[b] Average for those plants that bake; five plants out of 20 closed down completely on Tuesday, and were not included in this average.

rates within the week, is not generally subject to control within the bakery industry. The opportunity for bakery management to control cyclical excess capacity varies depending upon: (1) the channel of distribution, (2) the multiplicity of bakery products, (3) the size of firm, and (4) the development of efficient freezer storage. With respect to channel of distribution, control of the variation in daily output rates is very limited. The home delivery channel has most nearly approached uniform daily sales within the week, but home delivery has declined rapidly during the postwar years. Distribution to institutions and some kinds of restaurants often approaches uniform daily sales. However, such outlets usually take only a small part of the total output from any one bakery plant. By far the largest segment of the industry distributes wholesale to grocery stores and the daily variation in output is controlled largely by the weekly cycle of consumer grocery purchasing.

So much for within the baking industry proper. Grocery chains, integrated into the industry, have some opportunity for levelling out their bakery plant production because they are in complete control of retail shelf space. Production in the grocery chain bakery plant can be scheduled at a level below average weekly store sales, allowing wholesalers to fill in on peak demand days. This can be done by grocery chains that sell 80 to 90 percent of their private label bread and allow two or three wholesale bakers a small amount of shelf space throughout the week. As the grocery chain brand runs short on peak selling days, more wholesale bread can be brought from the stock room or two to three daily deliveries can be required of wholesale driver salesmen. As expected, wholesale bakeries distributing to grocery chains that control shelf space in this manner tend to have greater variation in daily output within the week. Wholesale plants distributing more than 5 percent but less than 20 percent of their weekly output to stores of grocery chains tend to have more plant output variation than either those selling less than 5 percent or more than 20 percent to grocery chains. In fact, some wholesale plants with more than 20 percent of their distribution through grocery chains close down their operations on Tuesday as a result of low grocery chain sales on Wednesday.

There is a tendency for plants producing primarily bread and bread type rolls to have somewhat larger variation in daily output than plants producing a full line of breads, variety breads, sweet goods, cakes and cookies. This is because cookies, and some cakes and sweet goods, can be produced in the middle of the week on days of low bread demand. Also, within-the-week cold storage has

proved more practical for cakes and sweet goods than for bread owing to their smaller volume-to-value ratio. The success of efforts to control daily variation in production, through filling in with variety goods, and thereby increasing plant efficiency depends upon: (1) the ability of workers to shift from one function to another within the same shift, and (2) the joint use of some equipment with respect to diverse products.

There is a tendency for medium and large sized plants to have a greater variation in daily output than small plants, which may be related in part to the multiplicity of products discussed above. There is some evidence also that multi-plant firms have experienced more daily variation in demand than single-plant firms. As a result, large multi-plant firms often can adjust production schedules of various products between plants in order to schedule longer runs at each plant. For example, a major multi-plant firm combines the Kansas City and Omaha market area and produces a specialty bread in one plant and rolls in the other, distributing both products to both markets. The trans-shipment of products between markets to improve plant utilization depends also upon plant locations and transportation costs. Moreover, it may be that some medium and large sized plants of multi-plant firms have greater variation in daily output partly because through trans-shipment one of a group of plants can be closed down completely on the lowest demand day.

Control of the weekly variation in output, decreasing the attendant costs of excess plant capacity, is possible through the use of freezer storage on a weekly cycle basis.[13] Whether this method of cost control decreases total per unit production cost depends upon the cost of excess capacity maintained in order to meet the peak of the weekly demand cycle *vs.* the cost of freezer operations necessary to level out the cycle. For a medium sized model plant using automated-batch equipment and operating a six day week, freezing of

13. In addition to the decrease in production costs, marketing of frozen bread would result in the elimination of the cost of stale returns and there would be a substantial decrease in distribution costs. See Robert V. Enochian, *Marketing Frozen Bread: A Preliminary Report,* AMS-395, Market Development Research Division, Agricultural Marketing Service, U.S. Department of Agriculture (August, 1960), p. 12. According to Enochian, "... it has been estimated that the net cost of unsold bread returned to the baker-wholesaler by the retailer runs as high as 4.3 percent of the wholesale price valuation, or 2.1 percent of cost.... In either case, the cost of stales... would be entirely eliminated."

Also, under the assumption that bread could be marketed through frozen food channels, Enochian estimated that distribution costs could be decreased by two cents per pound from the current wholesale distribution costs (p. 5) largely due to the drop shipment method of distribution utilized

product hypothetically decreases production costs by approximately 0.675 of a cent per pound, and also increases weekly plant capacity from 214,848 to 288,000 pounds (or 34 percent). This cost estimate was obtained by subtracting 25 percent of the 0.5 cents per loaf cost of freezing estimated by Enochian from the 0.8 cents per loaf cost saving estimated from our model plant cost data. We estimated 25 percent of the 0.5 cents by Enochian because, only about 25 percent of a plant's weekly output would need to be frozen in order to level out the weekly production cycle. For a large plant using automated-batch equipment and operating a six day week, there is no significant decrease in production costs due to freezing of product. Plant capacity, however, increased from 859,392 pounds per week to 1,152,000 pounds per week (also 34 percent). Thus, for large scale plants, the output increasing potential of within-the-week frozen storage of product is more significant than its impact on unit production costs. However, very little freezing to level out weekly production cycles in wholesale baking currently occurs except in the case of some specialty products of retail bakers.[14]

While a single plant or a single-plant firm may introduce excess machine capacity at either the station or the plant level through machinery replacement and adoption, a multi-plant firm has some opportunity to limit this inefficiency. Among a number of plants having a variety of lines with the attendant potential disparities of station capacity, the multi-plant firm can make inter-plant equipment transfers so that station by station the equipment of a production line is roughly of the same capacity. This possibility depends primarily, of course, upon the possibility of inter-plant demand sharing within a market, or the trans-shipment of special products between market areas. The advantage in the alleviation of excess capacity of the multi-plant firms over the single-plant firms, with demand remaining unchanged in both cases, may result from under-utilizing the least efficient plant of the multi-plant firm. This would give the multi-plant firm an advantage through greater economy in variable costs—assuming that the multi-plant is able to idle old equipment rather than under-utilize the newer equipment. A single plant firm that has adopted some new equipment would probably be using the old equipment at capacity while a multi-plant firm may ship equipment between plants, or ship products between markets, and use the old equipment at under-capacity while using the newer equipment at closer to full capacity.

14. *Ibid.*, p. 7.

Secular Excess Capacity

It is important to develop a logical explanation for the existance of secular or long-run excess capacity in the bakery industry and an empirical basis for analysis of its economic significance. The primary basis for the development of secular excess capacity is found in the nature of bakery equipment and its adoption; the proportion of variable to fixed costs; the economic organization of bread markets; and the relationship of consumer demand to population growth. Plant capacity estimates and average total cost curves for model plants provide an empirical basis for estimating the economic significance of secular excess capacity in the industry (see Figure 2).

Postwar increases in distribution and selling costs resulted in pressure on bakery management to seek out ways to reduce production costs. Since most individual bakery managers could not achieve this result through variation in the amount and quality of ingredients, or through an expanding volume of sales, the obvious alternative was to seek reduction in the production wage bill. The adoption of output-increasing labor-saving machinery occurred in direct response to the economic goal of reducing variable costs by a greater amount than the additional investment increased fixed costs. Innovations that virtually doubled the capacity of nearly all bread ovens in the nation induced bakery management to adopt other pieces of machinery with capacities of approximately twice the scale of the machines replaced. The cumulative result has been the replacement of a sufficient amount of equipment, on the basis of obsolescence rather than wear, to increase the aggregate capacity of bread plants at a phenomenal rate in the postwar years.

By 1958, the best available evidence of plant utilization levels for the bakery industry as a whole was approximately 40–60 percent of practical capacity of durable production equipment. This assumes capacity is an operation averaging 24 hours daily, 300 days per year.[15] This level of secular excess capacity in the bakery industry is an approximation based on the records of bakery machinery manufacturers, testimony of informed industrial sources, and experience in 30 bakeries surveyed and/or observed by the authors.

A superior estimate of under-utilization of bread plants can be

15. Seasonal demand for bakery products would apparently justify excess plant capacity of 3 percent currently and 6 percent if the industry were operated at capacity levels. The monthly Federal Reserve Board index of bakery industry production divided by the average annual index, 1953–58, ranged from a low of 96.5 percent in January to 102.4 in July. David A. Storey, *Market Performance in the Perishable Bakery Products Industry,* Purdue University Research Bulletin No. 734 (Lafayette: December, 1962), p. 30.

made from Census and Senate subcommittee data. The reported capacity of the 275 bread plants owned by the eight largest wholesale baking companies combined with the reported capacity of the 83 bread plants owned by the largest eight integrated grocery chains together amounted to 12.2 billion pounds in 1958 (see Table 4). This was almost sufficient to supply the 13 billion pounds of bread consumed in this country that year, based on a per capita consumption estimate of 75 pounds of bread and bread type rolls and a population of 175 million. In other words, the 1958 bread output of the rest of the industry about equaled the idle capacity of 358 bread plants operated by the largest eight wholesale baking companies combined with the largest eight integrated grocery chain bakeries. There are 1,353 bakeries which are 90 percent or more specialized in the production of bread and bread type rolls. About all of the 995 plants owned by smaller companies than the above group could have been closed with no ill effects on the industry's capacity to supply consumer demands for bread and bread type rolls.* On this basis, excess number of plants is estimated at 74 percent, and excess plant capacity is estimated at 60 percent. This understates the excess capacity of bread plants, because it includes only those plants specialized 90 percent or more in the production of bread and bread type rolls. There are in addition 383 plants specialized 75–89 percent in the production of bread and bread type rolls, 729 plants specialized 51–74 percent in the production of bread and bread type rolls, and an unknown number of plants classified primarily in the production of sweet goods, cakes, pies, etc., that also produce bread and bread type rolls.

The economic significance of secular excess capacity in terms of production cost may be estimated by considering the per unit costs of bread production at various levels of model plant utilization. Cost differentials between capacity operation and various levels of under-capacity utilization are sizable for each of the four model plant sizes considered. Per unit costs decline at a decreasing rate with each increase in the level of plant utilization until practical physical capacity is reached. Thereafter, per unit costs increase sharply. To determine the magnitude of this relationship the rate of plant utilization is varied from 108 hours per week to 36 hours

* This is not stated as a recommendation that these plants should be closed. Possible increase in delivery costs due to poor location of the remaining plants is not considered here. This is merely an illustration of long-run excess plant capacity in the industry. Possible reorganization of the industry to resolve the excess-capacity problem will be discussed in Chapter 6.

per week under typical conditions which include daily variation in demand, no freezer storage of product, and the use of standard automated-batch bakery equipment. For the small plant, per unit costs increase from 9.1 cents per pound for a 108 hour week to 11.7 cents per pound for a 36 hour week, or an increase of 2.6 cents (29 percent) for the range of utilization rates considered. For the large model plant, per unit costs increase from 7.7 cents per pound for a 108 hour week to 9.1 cents per pound for a 36 hour week, or an increase of 1.4 cents (18 percent) per pound.

4 / Costs of Bread Distribution

Thus far the analysis of bakery technology and costs has been limited to the production process. We shall now examine distribution and selling costs to complete the foundation for the analysis of industrial performance.

Economic Functions in Bread Distribution

Although bread must be distributed and sold much the same as any other food product, its perishability, bulk, and inelasticity of demand create unique selling and distribution problems. Thus, a brief discussion of the various functions[1] involved in moving bread to the point of retail purchase may help to reveal the route distribution cost structure. The fairly distinct functions making up selling and distribution are: transportation, bearing the risk of product deterioration, display servicing, record keeping and collection of payment, and information and advertising.

Bread is transported from the bakery to retail outlets (or in the case of home delivery, to the consumer) in large part by truck and to some extent by rail. Truck transport by large semi-trailers from the plant to the grocery chain dock has been on the increase but much of the industry's output still moves via smaller trucks to grocery stores. Time is the over-riding consideration in all delivery service because of the demand for fresh bread. Also, handling in transit must avoid crushing and damage to the wrapper. Another important distribution cost is risk of product deterioration. The unpredictability of through-the-week cyclical demand, combined with the perishability of bread, results in some loss in value through deterioration. Hence, wholesale price less salvage value of stales is a significant risk that must be borne at some point as a function of the distribution system. Daily servicing of bread racks and display

1. A more definitive discussion of the functions performed by the various distribution channels can be found in Slater, *op. cit.*, Chapter 5.

in retail outlets is performed by either the driver-salesmen or in-store labor. The consumer's desire for fresh bread and the perishability of the product make daily deliveries imperative; these necessitate a complete reorganization of the bread rack every day. In some cases the bread rack is attended throughout the day and in all cases stale items are either returned to the plant or marked down in price for in-store disposal. Record keeping and collection of payment are another important distribution cost. With daily delivery and the resulting typically small dollar volume delivery relative to grocery items in general, the labor time necessary for record keeping and collection of payment is significant on a per unit basis. Thus, although record keeping and collection are required just as much for other products as for bread, volume deliveries and end-of-month billing have greatly increased distribution efficiency for many other products, an opportunity that has been largely ignored in the case of bread distribution. The function of information and advertising is much the same as with food products in general. There are, however, limits to the utility of bread advertising in the aggregate owing to the product's homogeneity and its inelasticity of demand.

Nature of Distribution and Selling Costs

The functions listed above can be further broken down into cost elements. Our discussion of distribution and selling costs will be limited to these cost factors that affect the economics of bread distribution. The costs of some of the above functions are joint costs while others are but a fraction of the total cost associated with a particular distribution function. Driver-salesman compensation, for example, is allocated jointly among driving, delivery, display servicing, and record keeping. Vehicle expense, on the other hand, is only part of the total cost of the transportation function. These examples illustrate the problems encountered in the analysis. Many of the costs are separable by accounting records while others require detailed labor-time studies. This investigation will draw from both accounting records and labor-time studies from secondary sources.

Delivery vehicle expense consists primarily of gasoline, oil, grease, repairs, tires, and depreciation. These include both fixed and variable costs. Thus, total vehicle cost directly affects route efficiency. It is fixed with respect to size of drop, varies with length of route, and varies to some extent with aggergate sales per week. Driver compensation cost may be a straight hourly truck driver wage or a guaranteed minimum per week plus commission on all

sales with higher commission on the increases in dollar volume above given levels. Thus driver compensation costs may or may not vary with volume per route-week depending upon the channel of distribution and union-management wage agreements. Also, driver compensation may or may not vary with size of drop and length of route largely for the same reasons.

Sales supervision, salaries, and expenses of the plant or firm are not directly incurred on the route. Consequently, their cost level is associated primarily with the number of routes and turnover in route delivery labor rather than per week route volume, size of drop, or length of route. Indirect selling costs, such as sales management salaries and expenses and also shipping clerk wages, are a part of general overhead costs of a firm. This type of cost varies, therefore, with the general policies of a firm and between the segments of the industry. However, these costs are fixed for a given route with respect to volume per route-week, size of drop, and length of route.

Advertising costs are fixed with respect to a route and vary with the nature and composition of a given market as well as between the segments of the industry. Thus, the per loaf advertising cost decreases with an increase in route volume and with the level of output in a given plant. There are minor variations in the intensity of advertising market by market. Of major significance, however, is the fact that advertising costs vary between industry segments or channels of distribution, with the largest cost differential existing between the wholesale baking group on the one hand and the integrated grocery chain and private label bakers on the other. Discounts and allowances are costs closely associated with the composition of a given market and the relative competitive position of a firm. Allowances may vary between firms or channels of distribution and usually are variable with respect to volume per route-week. Display servicing costs are either: (1) a part of driver-salesman compensation and hence, fixed per loaf regardless of volume per route, size of drop, or length of route, or (2) an in-store labor cost fixed irrespective of volume per route-week, size of drop, or length of route. Thus, display servicing costs can be expected to vary with the method of distribution and with size of delivery.

Changes in Relative Importance of Cost Factors in Wholesale Bread Distribution and Selling

This section introduces the element of change into the discussion of factor costs of bread distribution. This is an important

consideration because: (1) prices paid by consumers for bread are affected by changes in the costs of wholesale bread distribution (distribution costs increased faster than production costs in the postwar years and by 1958 accounted for more than half of the consumer bread dollar); and, (2) changes in specific factor costs have played an important role in shaping the organization and practices of the industry. Essentially, they reflect changes in scale of operations, in services rendered, and in merchandising practices employed. This section deals with the distribution costs of bread moving through the bakery wholesale channel only, which has been the predominant method of bread distribution in the postwar years. Omitted in this discussion are retail and home service bakery distribution as well as integrated grocery chain bakery and private label dock delivery operations.

In 1947, approximately 25 cents of the consumer's bread dollar was paid for wholesale distribution, or three cents per pound of wholesale bakery bread sold through retail stores. This compares with a total distribution margin for bread from the bakery plant to the consumer of about 40 cents of the consumer's bread dollar or five cents per retail pound of bread. By 1958, the share of the consumer's bread dollar paid for wholesale distribution had increased to 35 cents or about seven cents per pound of wholesale bakery bread sold through retail stores. The total distribution margin for bread from the bakery door to the consumer increased to more than half of the consumer's bread dollar or to approximately ten cents per retail pound of wholesaler's bread sold. Thus, from 1947 to 1958, an estimated 3.7 cents, or 55 percent, of the 6.8 cent increase in the retail price of a one-pound loaf of bread went for wholesale distribution and selling services, while only 1.2 cents, or approximately one-fifth went for retail grocery services. In total, distribution cost increases accounted for approximately 72 percent of the bread price increase for this period, compared with 1.9 cents, or 28 percent, of the increase going for bakery production and administrative overhead.

Table 17 gives the estimated changes in relative importance of specific factor costs in wholesale bread distribution. Driver compensation is the main rising cost contributing to the increase in the average retail price of bread in the postwar years. While it is evident from the table that all distribution costs have increased faster than has the average retail price of bread, increased delivery wages accounted for about one-third of the total postwar increase in wholesale distribution costs or margins.

Part of the increase in per unit costs of driver compensation reflects increased fringe benefits, higher commission rates, and minimum guarantees won by the Teamsters Union. Average weekly earnings of bread salesmen increased by about 50 percent from $94 in 1947 to about $140 in 1958, but this represents only 0.6 cents[2] of the 1.6 cent increase in the average cost of driver-salesman compensation and fringe benefits per pound of bread sold (1.4 cents in 1947 and 3.0 cents in 1958 as shown in Table 17). Even more important, from an efficiency standpoint, is the fact that volume of bread delivered per wholesale route and per wholesale route driver has decreased in the postwar years. Slater[3] reported that while the

TABLE 17

ESTIMATED AVERAGE DISTRIBUTION AND SELLING COSTS OF THE WHOLESALE AND RETAIL FUNCTIONS, BREAD, UNITED STATES, 1947 AND 1958

Functions	Average Costs per Pound of Net Sales[a]		Percentage of Retail Price[b]	
	1947	1958	1947	1958
	Cents	*Cents*	*Percent*	*Percent*
Driver compensation and fringe benefits	1.4	3.0	11.2	15.5
Sales supervision salaries and expenses	.24	.5	1.9	2.6
Shipping clerk salaries and miscellaneous expenses	.26	.5	2.1	2.6
Advertising, discounts and allowances	.4	1.0	3.2	5.2
Delivery vehicle expenses	.6	1.0	4.8	5.2
Stale returns less salvage	.2	.8	1.6	4.1
Total, wholesaling[c]	3.1	6.8	24.8	35.2
Total, retailing[d]	1.9	3.1	15.2	16.1
Total, wholesaling and retailing	5.0	9.9	40.0	51.3

[a] One pound loaf of white bread.

[b] Based on average retail prices published by Bureau of Labor Statistics of 12.5 cents per pound in 1947 and 19.3 cents per pound in 1958.

[c] Bakery wholesaling cost items are estimates derived from route cost summaries of medium to large sized bakeries. *Hearings, op. cit.*, pp. 6055, 6079–6085, 6579–6581, 6588–6594. Also see Table 29 for a comparison of these sources.

[d] Spread between average retail and wholesale prices in urban areas published by the Bureau of Labor Statistics and appears in Richard H. Long and V. John Brensike, "Marketing Margins for White Bread," *The Marketing and Transportation Situation* (July, 1958), p. 18; and *Developments in Marketing Spreads for Agricultural Production 1958*, Agricultural Marketing Service Report No. 316, U.S. Department of Agriculture (Washington, D.C., 1959), p. 11.

2. *Hearings, op. cit.*, p. 6084. Calculation for 1947 based on reported average weekly bread route volume sold of 6,746 pounds. Calculation for 1958 based on the same route volume as 1947 to eliminate the effect of an actual decline in average route volume to 4,714 pounds by 1958.

3. Slater, *op. cit.*, pp. 352–354. Slater reported that by 1954 average volume per route declined to 72 percent of the 1945 level. His analysis was based on distribution data supplied by 12 large interstate baking companies on several thousand routes from 37 wholesale bread plants located through the U.S.

historic pattern in average volume (pounds) of bread handled per route increased from 1935 to a peak in 1945, there has been a downward trend since then. By 1958, average volume per route declined to 70 percent of the 1947 level.[4] Also, the conversion to a five-day work week in 1951 in many bakery markets, while bread continued to be delivered six days, resulted in the addition to the distribution payroll of a "swing man," working one day a week on each of five routes. Thus, the driver-salesman wage share was increased and divided among a larger number of delivery personnel while route volume continued to decline. Comparison of non-production labor input and output in the baking industry with the dairy, meat, canned and frozen foods, sugar, and grain mill products industries reveals that, from 1947 to 1957, baking was the only industry in which output per non-production employee and man-hour decreased during this period.[5]

The second most important increase among distribution costs occurred in product deterioration commonly referred to as "stale returns." Stale returns less salvage value represented about one-fourth of the total percentage increase in the wholesale distribution margin. Product deterioration is, in part, a production cost resulting from management's inability to predict daily sales, but it also reflects a shift to the selling expense of excessively large displays. The third most important increase in distribution costs occurred in advertising, discounts, and alllowances. These selling and product promotion expenses accounted for about one-fifth of the increase in distribution costs between the two base years. To a large extent, advertising costs have resulted from intensified efforts to differentiate the branded bread product, while discounts and allowances are a payment to the grocer for the right to attract the consumer with grocery shelf display in an increasing struggle for share of markets. Postwar increases in sales supervision, shipping clerk, and miscellaneous distribution salaries and expenses only slightly exceeded percentage bread price increases, as did delivery vehicle expenses. Aggregated, these factors accounted for only 1.2 cents of the 10.4 cents increase in the share of the consumer's bread dollar going for wholesale distribution and selling expenses.

Route Factor Relationship and Distribution Efficiency

This analysis of wholesale bread distribution costs will help us to compare the various channels of bread distribution, and also to

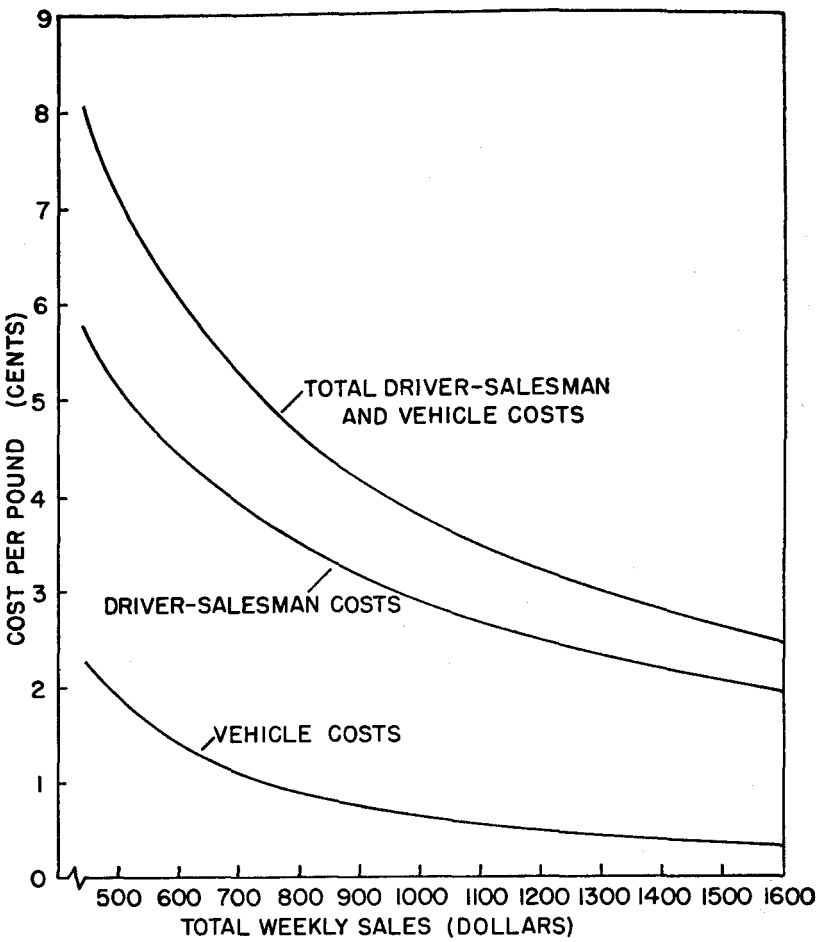
4. *Hearings, op. cit.*, p. 6084.
5. Bright, *op. cit.*, p. 19.

analyze market behavior. As will be shown, efficiency in wholesale bread distribution is primarily a function of volume per route-week, volume per delivery, and length of route. The principal per unit cost factors conditioned by these variables are driver-salesman labor and vehicle operating expenses.

Volume Per Route-Week

To develop relationships between route cost factors and efficiency in wholesale bread distribution, data were obtained on 490 routes, and the effect of route volume on per unit cost was estimated. Typical operating conditions and 1959 cost-price relationships were assumed. How costs varied with size of route is shown in Figure 3. Three characteristics of this relationship are particularly significant. First, an increase in the size of wholesale bread routes from $450 to $1,500 sales per week was associated with a decline of approximately 5.5 cents per pound in route costs, excluding advertising and other non-route costs of distribution and selling. Second, unit costs declined with each increase in route sales, but at a decreasing rate. A 100 percent increase in size of wholesale bread routes (from $450 to $900 per week) was associated with a 50 percent decline in cost per pound, whereas, the second $450 increase (from $900 to $1,350 per week) was accompanied by a 25 percent decline; thereafter, the unit cost declines by 16 percent for the maximum size route considered. Unit cost might continue to decline for route volumes in excess of $1,600 per week, but would soon level off and conceivably increase.

Third, the way factor costs vary with changes in weekly sales is significant. The cost that declined the most, 3.8 cents per pound, over the range of volumes considered, was driver compensation. This was due largely to the fact that most driver-salesmen were employed under contracts specifying a guaranteed minimum wage per week and a base pay plus commission on sales above a given level. See the appendix for an example of Teamsters Union contract specifications. A significant proportion of driver-salesman cost was fixed for the lower route volumes while the proportion of variable cost became more significant for the higher volumes. Vehicle operating expenses declined by a lesser amount, 1.7 cents per pound. This is associated with the allocation of fixed vehicle expenses over increased unit sales, but it is also related to the lower mileage traveled on the higher volume routes. The latter aspect of route factor costs will be considered in a subsequent section. Another important factor, not shown in Figure 3, the variation of non-route



SOURCE: Five wholesale baking companies with plants in the Midwest and East reported on 490 wholesale driver-salesman routes as follows: all routes were ranked on the basis of sales volume per week, and data were reported on the lowest volume route, the first quartile volume route, the medium volume route, the third quartile volume route, and the highest volume route. Solpe coefficients in all cases are significant at the 1 percent level.

FIG. 3.—The effect of volume on per unit cost of truck and driver-salesman, wholesale bread routes, 1959.

costs of distribution and selling—such as advertising, discounts and allowances, sales supervision salaries and expenses, and shipping clerk wages—are largely fixed per route-week. If added to the route cost curve, they would have a marked effect in increasing its vertical slant.

Volume per Delivery

Data made available by the Economics of Distribution Founda-

tion illustrate how labor efficiency varies with volume per delivery.[6] Loscher made route labor-time observations from which the effect of volume per delivery on labor efficiency can be estimated. She found that large volume stops were more efficiently served than small volume stops. Labor efficiency in terms of units delivered per minute increased with each increase in sales per delivery but at a decreasing rate. The first 100 percent increase in size of drop from $1 to $2 was associated with a 45 percent increase in labor efficiency; the second 100 percent increase from $2 to $4 was accompanied by a 33 percent increase in efficiency; the third 100 percent increase from $4 to $8 resulted in a 20 percent increase in labor efficiency; the fourth 100 percent increase from $8 to $16 was accompanied by a 13 percent increase in labor efficiency; thereafter increases in volume per delivery observed up to approximately $28 were accompanied by practically no change in labor efficiency.

The average percentage of delivery time spent by driver-salesmen in record keeping declined from about 50 percent to 20 percent from the smallest to largest delivery volume considered. Labor time devoted to physical handling of merchandise increased from 50 percent to about 80 percent of total delivery time over the same range of delivery volumes, reflecting primarily an increase in average percent of delivery time spent in performance of the display function from 20 to 50 percent.

Thus, it was observed that the record-keeping function became increasingly efficient over the range of delivery volumes considered, that delivery efficiency increased with size of drop, and then stabilized at the highest volume observed. Efficiency in rearranging goods on the display shelf increased sharply from the lower to medium range of volumes delivered but declined slightly for the larger drops. These relationships are the closest approximations that can be made from the available information which is illustra-

6. Elan M. Loscher, *An Analysis of the Job of Driver-Salesman,* report submitted to the Economics of Distribution Foundation, Inc. (New York: October 17, 1956), p. 6. Of particular relevance here is a case study of a typical New York City bread route which in August, 1956, experienced the following daily sales:

Sales per Stop	Number of Stops
Less than $1.00	6
$1.00 to $2.99	19
$3.00 to $7.99	15
$8.00 to $11.99	3
Over $12.00	4
Total daily deliveries	47

tive of the general tendencies stated.[7] Studies of milk delivery by Clarke and Bressler provide ready examples of comprehensive distribution analysis based on a large number of observations of route cost and volume relationships. Although the basis for analysis here is less extensive than that of the Clarke and Bressler studies, the logical implications for economies of route delivery are very much the same.

Length of Route

The remaining relationship to be considered with respect to the influence of route factors on wholesale bread distribution is how efficiency may be affected by changes in length of route. Two characteristics of this relationship are of major importance. First, truck operating expenses, owing to a high proportion of variable costs, are largely a function of number of miles driven.[8] Thus, when route mileage per week is allowed to vary from 200 miles (a city route) to 500 miles (a suburban route) to 1,000 miles (a rural route), with route sales per week held constant at 5,000 pounds, vehicle costs per pound increase from 0.61 cents for the city route to 1.04 cents for the suburban route to 1.75 cents for the rural route. Rising vehicle cost per pound delivered associated with increased length of route has implications for inefficiencies due to cross hauling and the location of bread plants. Hence, geographic expansion of wholesale bread routes will increase the total cost of bread distribution unless route volume can be increased at a rate sufficient to offset the rise (see Figure 3).

Second, variation in the length of wholesale bread routes results in changes in driving time which, in turn, affect the amount of labor time available for servicing stores. Driver-salesman time is allocated primarily between the driving and servicing functions, exclusive of approximately 20 percent of labor time per week for loading and unloading merchandise at the plant, turning in receipts and the next day's order, and personal break time on the route. If

7. See D. A. Clarke, Jr., *Milk Delivery Costs and Volume Pricing Procedures in California,* California Agricultural Experiment Station Bulletin 757 (Berkeley, December, 1956); and R. G. Bressler, Jr., *City Milk Distribution* (Cambridge: Harvard University Press, 1952).

8. *Hearings, op. cit.,* p. 6084. These figures are averages for several thousand wholesale bread routes throughout the U.S.

TRUCK EXPENSES (PER 100 MILES)

	1947 National	1958 National
Total variable expenses	6.90	$7.19
Total fixed expenses	2.00	3.87
Average size of routes	402	436

length of route is allowed to vary, as in the example above, weekly driving time increases from approximately 10 hours for the city route to 16.6 hours for the suburban route to 20 hours for the rural route.

The amount of labor time spent in driving the delivery truck depends on the distance to be traveled and the rate of speed maintained. Speed, in turn, depends on such factors as traffic and road conditions. Obviously, rural routes with some driving on high speed highways achieve less driving time per mile than routes operating on congested city streets.

Thus, in the calculation here, driver time for the city route is based on a speed of 20 miles per hour as roughly representative of city conditions, while for the suburban route it is based on 30 miles per hour, and the rural route on an average speed of 50 miles per hour. If labor time is held constant at 50 hours per week, then the time available for servicing stores declines from approximately 30 hours for the city route to 23.4 hours for the suburban route to 20 hours for the rural route.

Hence, where average delivery time per customer is uniform for the three routes considered, the decline in total delivery time available would result in 22 percent fewer customers being served by the suburban route compared with the city route and 33 percent fewer customers served by the rural route compared with the city route. Also, under the same conditions, route sales per week would decline by similar proportions.

Wholesale bread firms are to some degree able to avoid the effects of the required additional labor time for servicing stores that is associated with longer routes by off-loading the problem onto labor. This stems from the driver-salesman commission system of compensation in which delivery labor cost is a function of weekly sales volume and has little relation to the number of hours worked.

In actual operations observed, driver-salesmen with longer routes tend to work longer hours. Thus, if length of route is allowed to vary as in the example above, while the amount of time for servicing stores is held constant at 30 hours, the driver of the city route works 50 hours per week, the driver of the suburban route 56.6 hours per week, and the driver of the rural route 60 hours per week. Therefore, despite a 20 percent increase in hours of work, and under the assumption that both routes have the same weekly sales, the rural route driver receives the same compensation as the city route driver.

To sum up, the efficiency of wholesale route delivery is largely a function of driver-salesman labor and delivery truck costs as they

are related to economies of volume per route, volume per delivery, and length of route. Driver-salesman labor efficiency increases with both increases in volume per route and volume per delivery and, to a lesser extent, with decreases in route length. Truck operation efficiency by contrast is most closely associated with length and volume of route and is affected by size of drop only to the extent that size of drop is a function of route length and volume. In conclusion, there is an empirical basis for believing that distribution and selling costs will vary within and between channels of distribution according to route factor utilization and the extent of services performed.

Costs of Bread Distribution by Alternative Methods

To the extent that the changing structure of the bakery industry is associated with changes in the competitive relationships between segments of the bread market, comparison of the cost of alternative distribution methods becomes of major importance. The comparisons presented as Table 18 may be used to estimate the relative efficiency of different distribution methods. Average total costs of bread distribution exhibit considerable variation between the three primary methods used by the industry. It must be recognized, however, that variation in average costs reflects different marketing functions performed and the size composition of route customers, as well as different efficiencies of the alternative distribution systems. In 1959, a sample of typical wholesale bakeries utilizing the driver-salesman system of distribution experienced an average cost of 6.8 cents per pound of bread delivered primarily to retail stores, while a sample of typical chain store owned bakeries and private label wholesalers using a semi-trailer dock delivery system had average distribution costs one-fourth as great, or about 1.5 cents per pound of bread delivered to retail stores. This compares with an average distribution cost of 14.7 cents per pound of bread delivered direct to the customer's door by a small sample of home service bakeries utilizing the driver-salesman system.

The major difference between costs of wholesale and home service bread distribution occurs in direct and indirect route labor. These costs are higher for home delivery, reflecting primarily the differences in bread volume handled per stop and per week. Practically all bread sold through home delivery is in lots valued at less than 50 cents, requiring an average of about four minutes per delivery. Thus, for a 50-hour week, route volume is limited to about $375 which, in turn, limits driver compensation to about $77. As

a result, the turnover in driver-salesmen is high, leading to higher supervisory and training expenses. Home delivery, on the other hand, avoids the retail grocery margin which averaged 3.1 cents per pound in 1958. The net result is an estimated difference in total cost of about 5.8 cents per pound for home delivery above that for wholesale bread distribution.

TABLE 18

AVERAGE DISTRIBUTION COSTS PER POUND OF BREAD PRODUCTS SOLD, BY DISTRIBUTION CHANNEL, UNITED STATES, 1959

Item	House-to-House Driver-Salesman Routes[a]	Wholesale Driver-Salesman Routes[b]	Semi-Trailer Dock Delivery Routes[c]
	Cents	*Cents*	*Cents*
Distribution costs, total	14.7	6.8	1.5
Delivery vehicle expenses	1.2	1.0	0.7
Driver compensation	8.0	3.0	0.3
Sales supervision salaries, expenses	3.0	0.5	0.0
Other distribution costs	2.5	2.3	0.5
Advertising	0.5	1.0	
Stale return loss		0.8	(d)
Shipping clerk salaries, expenses		0.5	
Indirect selling salaries, expenses, stale returns	2.0		

[a] Driver compensation and delivery vehicle expenses are a median of five house-to-house routes in a large Midwest market, 1959; advertising, supervisory and indirect salaries and expenses are estimates based on Clayton D. Nielson, "An Analysis of the Door-to-Door Selling Methods of Omar, Inc. for the Period 1951, 1952 and 1953," Master of Business Administration thesis, University of Nebraska (Lincoln, 1954). For example, sales supervision salaries and expenses includes: junior salesman, 2 percent; supervisor, 2.6 percent; and route administration, 6.2 percent; for a total of 10.8 percent of sales valued at 24 cents per pound.

[b] These cost items are typical based on average data from: (1) 490 wholesale routes and (2) route cost summaries of 122 medium to large sized bakeries supplied by a national association of bakers. *Hearings, op. cit.*, p. 6084.

[c] These items are estimates of typical semi-trailer dock delivery operations of chain store bakeries and supermarket private label operations of wholesale bakers in large Midwestern markets, and are reasonably consistent with other data available. A chain store bread distribution cost study by the U. S. Senate Subcommittee on Antitrust and Monopoly reported costs of one cent per pound for delivery labor and truck expenses, which is the same as our estimates. The Senate study reported chain bread advertising costs of about 0.08 cents per pound, but did not report display servicing costs. *Report, op. cit.*, p. 113.

[d] Whatever costs are incurred from the discount and instore sale of day-old products are allocated as a cost of retailing and compensated out of retail store margins.

The major difference between the costs of wholesale and private label bread distribution reflects the different combinations of services performed and the resulting level of efficiency of labor utilization. Practically all bread sold at wholesale in the United States is tied to a "service package" that includes in-store and media advertising, delivery and display handling, point of sale payment, and assumption of the risk of value loss through overstocking.

Most private label bread, on the other hand, is delivered by semi-trailer to grocery docks or warehouses from which point grocery management controls the remaining distribution functions. It is

handled and displayed by in-store workers, and when overstocked may be featured as a "special" within the store at marked-down prices. It is advertised jointly with 50 or more other food products. It is often ordered and paid for by mail through a general accounting system.

The net result is an estimated total cost of more than five cents per pound more for wholesale than for private label bread distribution. The implication is that organizing labor by function rather than by product, especially in large volume super markets, results in more efficient labor utilization.

It is important to note that differences between the costs of wholesale and private label bread distribution reflect, in part, different size compositions of route customers served. Wholesale delivery labor requirements are higher because of the time required to provide the "service package" to a combination of: (1) a large number of small outlets such as small grocery stores, gasoline stations, drug stores, and dime stores, (2) supermarkets and grocery chains that carry 6–8 brands of bread on their shelves in addition to a private label brand that dominates total bread sales, and (3) a few medium-large outlets such as independent supermarkets where the wholesale brand may dominate total bread display and sales.

While, in general, private label distribution has a cost advantage over wholesale distribution, the combination of both systems in one retail outlet may increase distribution cost above either system operating alone. Given that wholesale bakers operate on a relatively steep average distribution cost curve, the replacement of a part of their sales in a particular retail outlet by private label bread would significantly increase wholesale distribution costs. Private label delivery, on the other hand, operating on a relatively flatter average cost curve, may not lower its distribution cost enough to offset the increased cost experienced by wholesale bakers supplying the same retail outlet. Thus, for a significant range of volumes, the combination of the two distribution systems in one retail outlet may prove more costly than either system alone. Moreover, in an outlet handling both private label and wholesale brands, the wholesale brands may also bear the production and distribution costs inherent in the weekly cycle of demand for bread discussed in Chapter 3, thereby subsidizing the decrease in costs for the private label operation. As above, the decrease in average cost per loaf for private label bread would probably not be sufficient to offset the increased costs experienced by the aggregate of wholesale brands.

5 / Price and Nonprice Conduct of Firms in Bread Markets

Since retail prices of bread have risen much faster in the past decade than those of other foods and indeed of all consumer products,[1] there is good reason to consider the conduct of firms in bread markets to see how it may have contributed to this development.

Price Leadership in Large City Wholesale Markets

Price leadership is the generally accepted practice in large-city wholesale bread markets in the post World War II years. Executives of large wholesale baking companies freely testify to its prevalence. Company replies to a U.S. Senate investigation questionnaire regarding 1952–58 bread price changes in selected large-city markets demonstrate its ubiquity. Uniform prices for wholesaler brands are achieved by the leadership of either dominant or cost barometric firms. Price leadership tends to have results analogous to those of collusive price fixing, which is infrequently discovered in bread pricing. Moreover, it is generally acceptable in the eyes of the law, whereas collusive price fixing has been held in violation of Section 1 of the Sherman Antitrust Act.[2]

Price leadership can be inferred from the repeated occurrence of virtually simultaneous price increases of equal magnitude. For example, between 1953 and 1958, bread producers in Seattle, Washington, including two large companies, Continental and Langendorf, raised their prices simultaneously on five separate occasions.[3] In New York City, on February 11, 1957, the large companies, General, Ward, and Continental, raised their prices simultaneously. In

1. Data from the U.S. Bureau of Labor Statistics and Department of Agriculture presented in *Hearings, op. cit.,* pp. 6093 ff.

2. Alfred R. Oxenfeldt, *Industrial Pricing and Market Practices* (New York: Prentice-Hall, 1951), p. 302.

3. *Hearings, op. cit.,* p. 6123.

Detroit, Michigan, in 1954 and again in 1956, wholesale baking companies including Continental and Ward raised their prices effective the same day. In San Francisco, on June 11, 1956, Continental raised the price of white bread and on August 13, 1956, Langendorf and Campbell Taggard raised their price to approximately the same level as Continental. Again, on June 12, 1958, Langendorf raised the price of a one-pound loaf from 17.8 to 18.8 cents, followed the next day by Continental and Campbell Taggart.[4]

Over the six year period from 1952–58, there were a total of 80 price changes in 24 cities surveyed by a Senate subcommitte, and in only three instances did the large baking companies *reduce prices of their principal brands of bread.*[5] In virtually every instance of change, all large baking companies adjusted their prices to the same level within four days of an increase by a price leader. The president of a large wholesale baking company testified at the Senate hearings that "we cannot get a penny more than our major competitors."[6] By and large, price competition occurs infrequently in large city markets and then often only under duress. A director of a large management affiliation of independent baking companies and a Massachusetts bakery operator testified before the Senate subcommittee that bakery firms try not to compete on price.[7] But this does not result in a uniform price for all bread sold in a given market owing to the increase in private label and secondary brands, although these also tend to sell at uniform though somewhat lower prices.

Firms generally accept price leadership on the basis of an "identity of interest" in maintaining returns on investment and market shares rather than with the view of joint profit maximization. In wholesale bread markets, sellers typically are few, but they differ in size, and they face the possibility of private label expansion by grocery chains in markets with essentially static demand. Under these conditions, firms tend to practice uniform pricing and distribution costs tend to rise owing to nonprice competition for market shares. Members of the wholesale bakery oligopoly group recognize their mutual identity of interest and accept price leadership which results in periodic adjustment of price to cover

4. *Ibid.*, p. 6118.
5. *Report, op. cit.*, pp. 146–147.
6. *Hearings, op. cit.*, p. 6120.
7. *Ibid.*, p. 6540.

increasing costs and to achieve profit goals. In the vernacular of the trade, price followers raise price "to meet competition."[8]

Thus, in the typical large city market, a price leadership pattern has emerged. The price at which most of the firms in the market offer to sell bread of like quality and weight is determined by adopting the price announced by one of their number.[9] The role of price leader may rotate among the few but usually falls to the larger firms in the market. Smaller rivals generally follow for one of two reasons. First, they consider the larger companies better equipped to assess full costs and to frame a satisfactory price policy for the entire market group. Usually changes in average input prices occur simultaneously for all companies in the area, and the barometric price leader is thought to be watching weekly cost changes, both his own and those of his competitors.[10] Second, dominant firm price leaders are followed because they are recognized as having the greatest interest in preventing price cutting

8. Although the phrase "to meet competition" is used by the "...major baking companies [to] explain such practices as price discrimination, secret discounts, stales clobbering," etc., it is "...something more than a convenient explanation to offer persons outside the industry. Rather, it is so deeply ingrained in the industry's own price-making philosophy and operation that it is frequently found in the interoffice working documents upon which decisions to change bread prices are based." It is most frequently used in connection with the justification of price increases. The following quote is illustrative: Memorandum from the Chicago regional office to the president of Continental Baking Co., dated February 23, 1959, "This is to advise that Interstate Baking Co. made the following changes in the wholesale prices of their bread products this morning....I recommend on our following bread products we *meet this competitive increase....*" [italics added] *Report, op. cit.,* p. 148.

9. For a discussion of this definition of price leadership, see Arthur F. Burns, *The Decline of Competition* (New York: McGraw-Hill, 1936), pp. 76–77.

10. *Hearings, op. cit.,* p. 6124. This analysis treats all baking companies as separate entities. A number of large wholesale companies have interlocking directorates with each other and with potential suppliers of bakery inputs. An F.T.C. study of interlocking directors among the 1,000 largest manufacturing companies in the U.S. showed that Continental, General, American, Interstate, and Ward had direct or indirect ties with each other and/or with several suppliers of bakery inputs. For example, Continental interlocked with General through Marine Midland Trust, with General Foods, National Biscuit, Standard Oil, and American Sugar Refining; and, with Swift (which produces shortening) through Underwood, and with Wilson (also produces cooking oil) through Guarantee Trust. General Baking Co. interlocked directly with National Sugar Refining and indirectly with National Dairy, American Sugar Refining, Anheuser-Busch, General Mills, and Best Foods. These ties provide channels for a meeting of minds among the top companies in the baking industry and with suppliers. It was reported that interlocking directorates were much more numerous than similar relations in any of the branches of the food industry previously studied. Federal Trade Commission, *Interlocking Directorates* (Washington, D.C.: Government Printing Office, 1951), pp. 64–73.

and they are the most able to enforce their policies upon others because they often command the greatest amount of productive capacity and financial resources.

Price leadership, then, involves the selection of a price by a leader as opposed to the case in a purely competitive market where price would be determined by independent market forces. It is imperative that the price level be satisfactory to all members of the oligopoly group in order to forestall open price competition. Thus, the prevailing price level for a particular market area, as established by the actions of leader and followers, is derived largely through the application of the cost barometric or "cost covering" principle.* Costs are well known in the industry through trade and cooperative management associations that publish various informational and advisory material. Hence, a price leader is reasonably well supplied with information upon which to base changes in price based on changes in costs of firms participating in the oligopoly core.[11]

Oligopolists naturally wish to protect their profit position even while competing for market shares. The maintenance of profit levels has had a special appeal for some members of the baking industry who are somewhat disadvantaged as compared with manufacturers at large. Further, the increasing level of excess capacity in the baking industry as a whole places most bakers in a vulnerable position with respect to the point at which they produce on their average total unit cost curve. Thus, the price level resulting from oligopoly pricing behavior is partially determined by the relative cost structures of the oligopolists within any single market. Moreover, when the aggregate industry level of analysis is considered, it is apparent that price is determined also by their recognition of mutual dependence on a broader level, market area by market area.

While one might expect that the price chosen by the price leader would conform pretty closely to his production costs, there is considerable evidence* that the price set acts more like an umbrella that will cover average unit costs of any members of the oligopoly group in the market, irrespective of plant size and utilization level of the price followers. The umbrella price is frequently set at a level to cover costs not only of the large baking company participants but also of any large independent bakeries with a sizable share of the market, which may be affiliated with one of the three bakery cooperative management groups in the industry.

* See footnote 12 of this chapter.

11. *Hearings, op. cit.,* pp. 6054, 6589–6594.

This type of price leadership arises from the fact that there are many combinations of market shares and plant sizes from market to market. For example, while company A may be the price leader in market I, because it has a substantial share of that market and as a consequence is producing with a large plant at a high level of utilization, it may face company B in market II under conditions such that size of plant, market share, and level of plant utilization by company B are far superior in that market to those of company A. Thus, the determination of price level by a price leader within any given market area may be largely in terms of the cost relationship between large multi-plant companies on the national level, with only the question of *who* is going to be the leader being determined, usually by share of market or concentration, within the area.

Share of market and cost advantage within a market area notwithstanding, leadership is sometimes provided by a major or an independent firm with a very small share of the market and/or high costs.[12] This apparent contradiction to expected price behavior on theoretical grounds is partially explicable in terms of historic establishment of leadership, membership among the largest eight multi-plant companies, and demonstrated reliability of the firm in initiating price increases justified by rising costs, i.e., correctly gauging the price level desired by the various participants in the market.

Once price leadership is established and prevailing prices are accepted by most producers, price leaders have little trouble keeping other firms informed of price changes. The president of a large baking company testified before a Senate committee that prenotification several days in advance of price change is required by grocery chains, which pass the information along to other bakery route men servicing the stores.[13] Price change information is also made available by phone, mail, and at meetings.[14]

12. While in many instances of price increases the advances have first been announced by the dominant firm in the market, in a surprising number of other cases the lead has been taken by companies with relatively low profit rates or relatively small shares of the markets in question. Perhaps the most conspicuous example among the largest eight bakeries in this respect has been Ward Baking Co. From 1955 to 1959, Ward's average annual rate of return on stockholders' investment has been the lowest in the group (6 percent). Six of the other large firms have shown average annual rates of return of from two to three times that of Ward (12–19 percent). Despite this, Ward has been a frequent price leader in the markets in which it sells. *Report, op cit.,* p. 149.

13. *Hearings, op. cit.,* p. 6121.

14. *Report, op. cit.,* p. 159.

Most wholesale bread producers quickly adjust their prices to that of the price leader. There are sound bases in economics for their action. Most bakers have learned that they cannot materially increase their share of the aggregate volume of bread sales with an openly aggressive pricing policy because each price decrease is met with at least similar decreases by competitors. They are forced to go down with the leader when he drops his price if they are to maintain volume. Moreover, when the leader raises his price, they have good reason to follow suit. If the price rise was due to cost increases, the follower firms may need the higher price even more than the leader firm, which may be operating at a lower cost level. In addition, all firms stand to gain from increased revenue in the short run as aggregate sales remain substantially the same. If they do not follow, the price leader can simply drop his price again, and little has been gained or lost.

Failure to follow the price leader would be interpreted by the leader and other firms in the market as "price competitive," and inconsistent with expected behavior. Open price competition may be avoided also to discourage consumers from shopping or buying on the basis of price. Oligopolists much prefer to persuade consumers through advertising of product differences other than price and thus to keep their market shares undisturbed by price-induced shifts. Also, nonprice competition is preferred to price wars which might bring about distress selling, i.e., sales at prices below costs. In recent years, nonprice competition has been widely used as a pricing tactic. This includes changing loaf size, baking a secondary loaf, giving special allowances to grocery stores, and similar forms of price concession other than a downward change in price itself.[15] These competitive practices have the advantage that they can usually take place at the same time that price covers increasing costs.

Differential Pricing in Outlying Wholesale Markets

In the section above, wholesale bread pricing was approached from the viewpoint of typical behavior in large city markets. There are, however, several important subordinate cases. Paramount among these is the case of differential pricing behavior in the "outlying" or fringe areas of large city bread markets. Company replies to a U.S. Senate investigation of 1958 bread prices show a price differential of from 1–4 cents per pound between the large city and

15. *Ibid.*, pp. 66–90.

the outlying market areas served by large city plants.[16] Figures 4 through 8 illustrate five typical cases of this differential bread pricing. These territorial price differentials are the result of the historic failure of large city companies to increase prices in outlying areas as much or as fast as they do in the city.

In its effects, this has approached discriminatory price cutting, and it explains, in part, the increased concentration among large baking companies and the correlative decrease in the number of wholesale baking companies. It has the advantage of generally being considered legal, whereas, discriminatory price cutting has been held in violation of the Clayton Act as amended by the Robinson-Patman Act.[17] It should be pointed out that the practice here described as differential pricing in outlying areas of large city wholesale bread markets was defined as "route price discrimination" by the Senate subcommittee report.[18] In the course of the hearings, the persistent theme of the independent bakers was: "we feel it is unfair competition. It is an example of the profits of operation in one area financing the development of the invaded area."[19] Equally persistent, moreover, was the reply by major bakers: "If we want to do business in that area we have to do it at the lower price. We have to meet competition in that area."[20] Apparently this defense has proved effective in recent years, for the case on record in which the Federal Trade Commission issued orders against territorial price discrimination by a bread producer was before World War II, and then not against a large baking company.[21]

During the war, most outlying areas in small cities and rural communities located within 150 miles of large city markets had been dominated by smaller independent firms. With the end of World War II and the easing of distribution restrictions, major baking companies with plants in large cities looked with renewed interest upon the possibilities of expanding into these outlying

16. Differential pricing "assumes its most striking form when the price charged at a distant community is *lower* than that charged at the plant where the bread is baked. This was found to be a very prevalent practice among the larger wholesale bakers...." *Ibid.*, p. 39. This finding is supported by extensive testimony of company management and is documented by market area maps with prices, plants, and mileage shown. *Ibid.*, pp. 38–66.

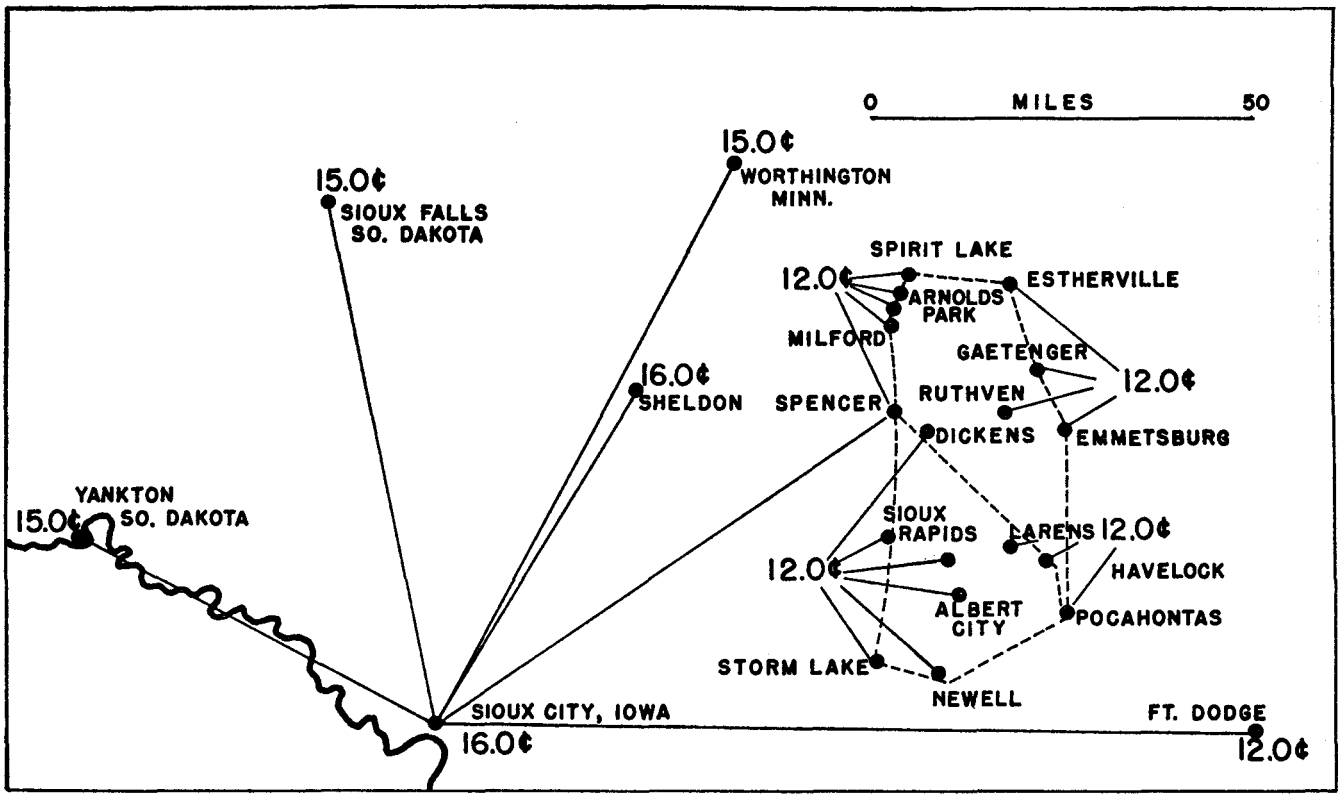
17. Corwin D. Edwards, *The Price Discrimination Law: A Review of Experience,* The Brookings Institution (Washington, 1959), p. 458.

18. *Report, op. cit.,* p. 39.

19. *Ibid.,* p. 49.

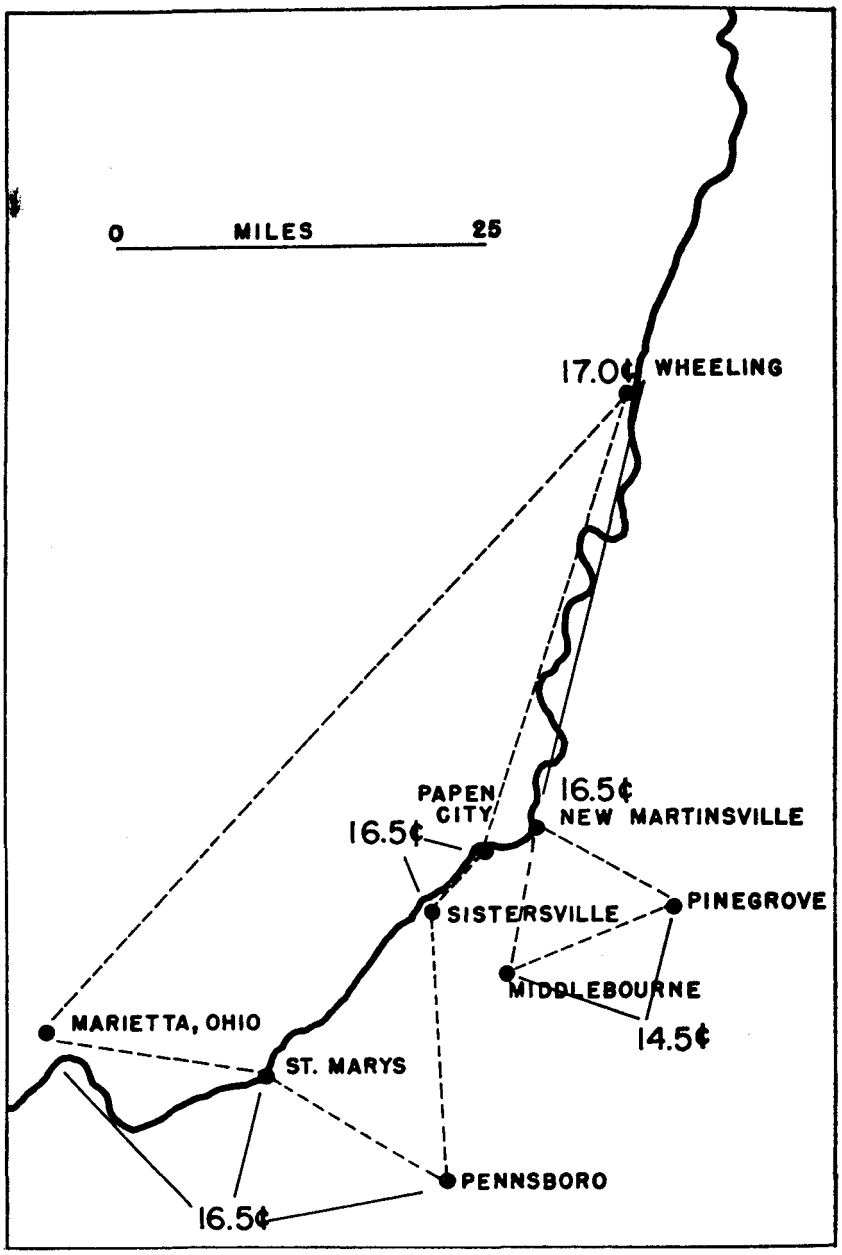
20. *Ibid.,* p. 55.

21. *In the matter of Metz Brothers Baking Co., Sioux City,* Docket 3740, U.S. Federal Trade Commission, September 16, 1938.



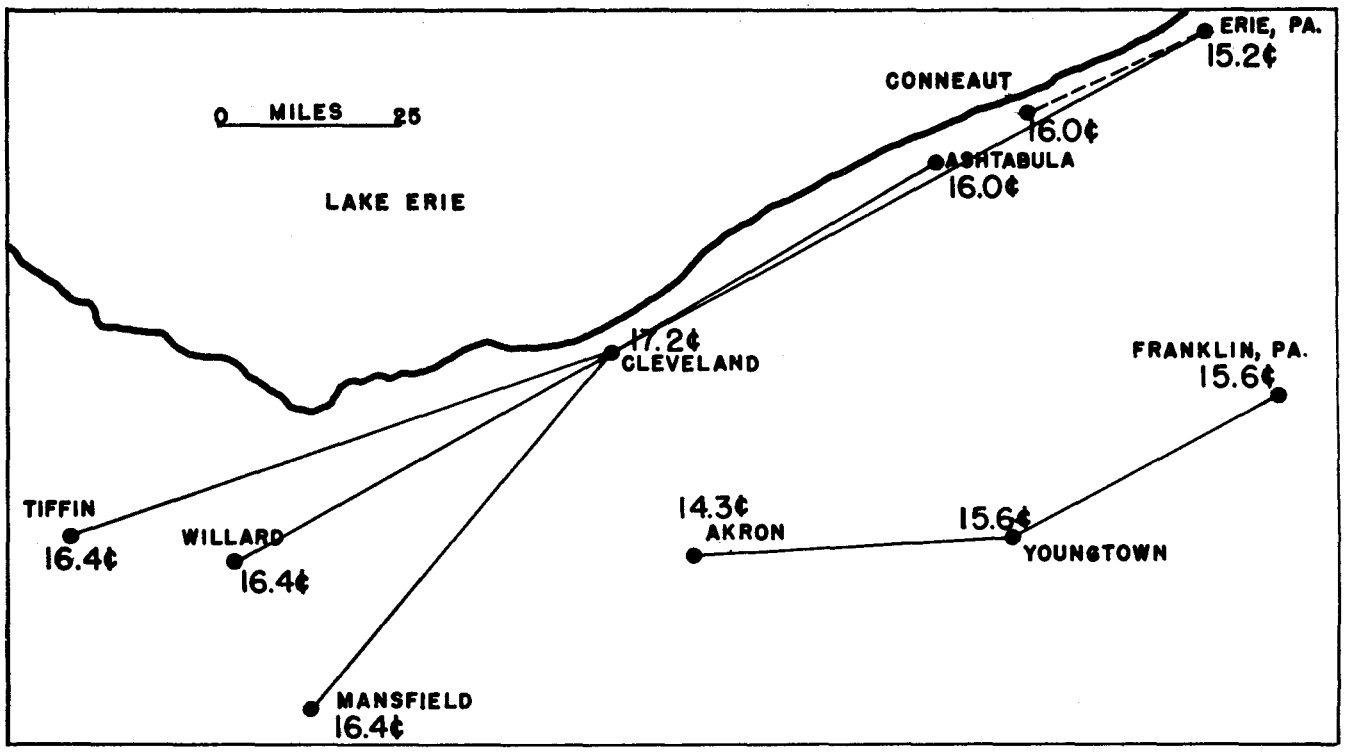
SOURCE: *Hearings*, p. 6167.

FIG. 4.—Differential pricing of bread in outlying areas of the Sioux City, Iowa, market.



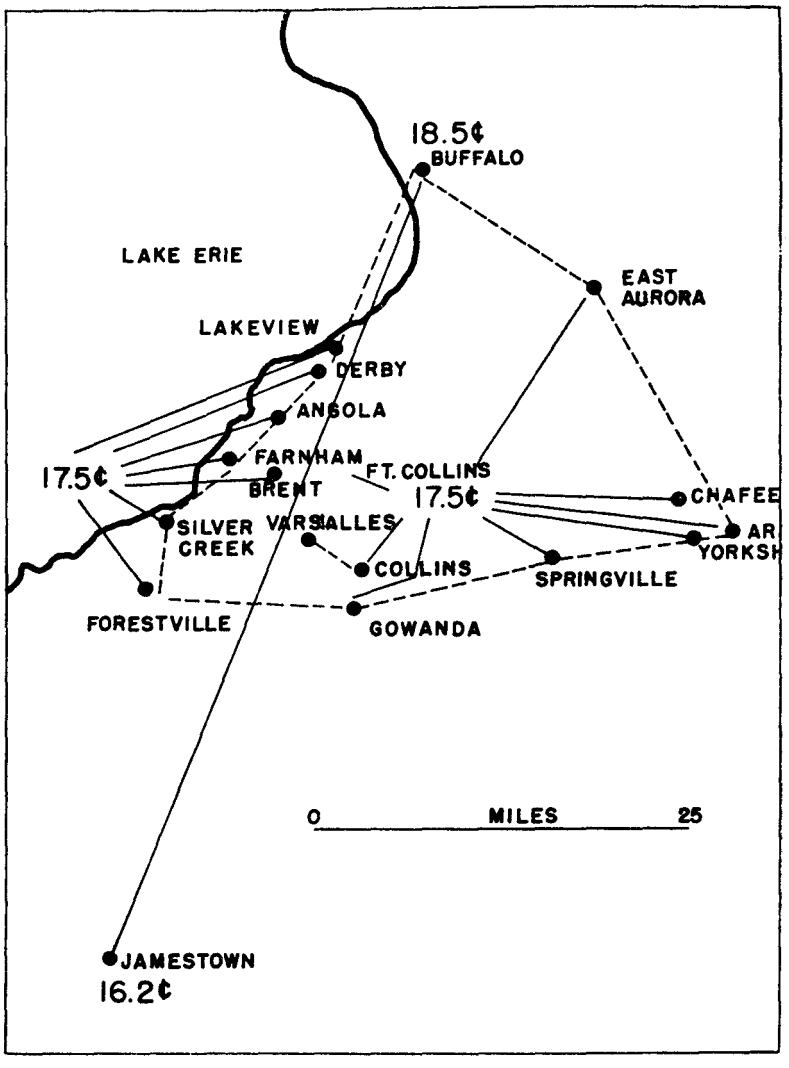
SOURCE: *Hearings*, p. 6224.

FIG. 5.—Differential pricing of bread in outlying areas of the Wheeling, West Virginia, market.



SOURCE: *Hearings*, p. 6264.

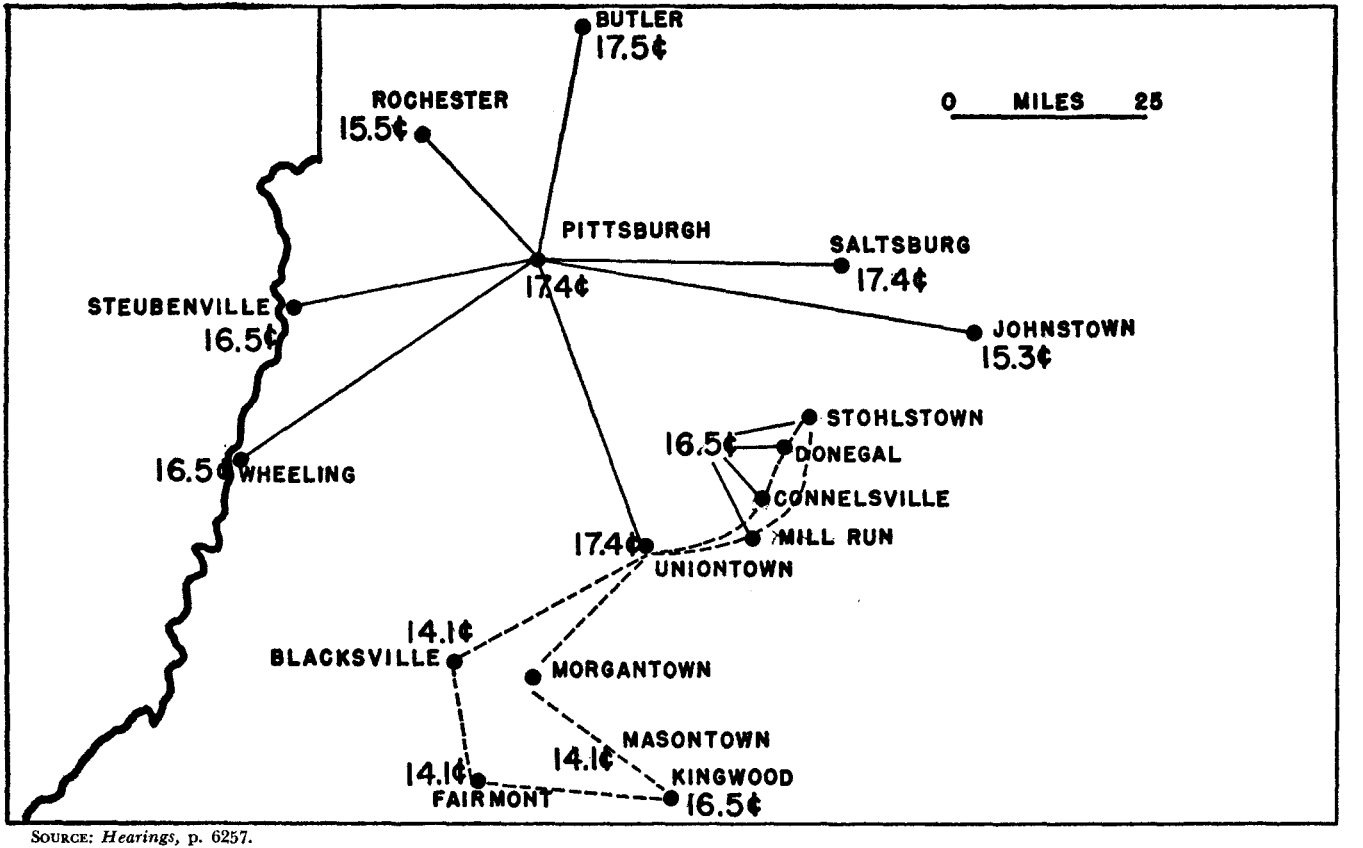
FIG. 6.—Differential pricing of bread in outlying areas of the Cleveland, Ohio, market.



SOURCE: *Hearings*, p. 6219.

FIG. 7.—Differential pricing of bread in outlying areas of the Buffalo, New York, market.

markets. The need for wider distribution consistent with the adoption of new machinery of greater capacity inspired many of them to initiate semi-trailer delivery to depots set up in outlying areas some 150 miles from their large city plants. Driver-salesmen delivery systems operate out of these outlying depots much the same as in large cities.



SOURCE: *Hearings*, p. 6257.

FIG. 8.—Differential pricing of bread in outlying areas of the Pittsburgh, Pennsylvania, market.

In general, price behavior of large city firms entering an outlying area differs from their price behavior in large stable metropolitan markets because their goals differ. Their objective in outlying areas is to capture substantial market share rather than to hold their own or to rely upon gradual accretion to their sales as population increases in the metropolitan areas. It follows that outlying independents cannot all share in the identity of interest that typically exists in large city markets. Most independents in outlying market areas are in the position of attempting to hold their sales volume against the inroads of large city companies.

When a major firm attempts to sell in an outlying area, it no longer faces the identity of interest typically shared by the oligopoly group in large city markets. For if price leadership had been exercised in the outlying market previous to the large city firm's entry, it is doubtful that the market participants would be willing to recognize a new leader without serious price competition. Or, if there had been no price leadership previously, the firms in the outlying market probably would react by using price as a competitive weapon. Thus, although the dominant independents of an outlying market area may or may not conform to the general picture of oligopolistic price behavior, when the area is entered by one or more large city companies, price *may* become one of the competitive tactics used.

Differential prices in outlying market areas usually arise out of the refusal of large city companies to raise prices there as large city market prices are increased. Although there are a few notable examples of open and hidden price cutting by large city companies in the process of entering outlying areas, the typical case is pricing at a level "to meet competition" in the initial stage, and then refusing to participate in efforts to raise prices as costs increase. As a competitive tool of large city companies operating in outlying market areas, price is thus used almost exclusively in a negative sense. This is due, in part, to the expectation that independents may respond in kind to positive price actions. Moreover, the indirect price approach is not as questionable to the Federal Trade Commission.

That large city baking companies seldom take the lead in lowering prices in outlying areas may be understandable in view of the propensity of independent bakers in these areas to initiate price decreases themselves. Many independents apparently believe they can preserve or improve their market shares only through price competition and, hence, do not pay strict attention to the rules

of the oligopolist's competitive game. Price competition is about the only tactic that is as freely available to the great majority of independent firms as to the large companies. They are prone to use it in last-ditch attempts to stay in the baking business. Moreover, they also have improved their plants through the adoption of volume-increasing equipment and need a larger market to maintain "economic" production. However, they are virtually foreclosed from entering the large city markets of the major companies, owing to the possibility of severe retaliation by them, as well as their access to advertising.

An independent bakery in an outlying area can hardly persuade a sizable number of grocery retailers in the large city to accept a new unknown brand in preference to long established brands. Even if it did succeed in entering some large city outlets, they would probably be scattered, of small size, and hence uneconomic. Moreover, interviews by the authors with independent bakers in outlying areas of Midwest markets suggest that they cannot readily afford the discounts, free bread, and/or other concessions expected by the large city grocer, that might secure adequate shelf space in a sizable number of grocery outlets. Also, they believe the oligopoly group established in a large city market would take immediate action to forestall such an entry of new wholesaler brands. On the other hand, the independent baker in an outlying area can sometimes invade the large city area of the market by the use of private label contracts and drop shipment. Evidence presented later in this study shows that many small grocery chains have secured private label bread from outlying independent bakers when the oligopoly group in large city areas refused to supply it.

The refusal of large city companies to raise prices in outlying areas to cover cost increases can only be enforced as a pricing tactic because they are relatively secure from retailiation above the single-market level, owing to the one-plant, one-market nature of most independent baking companies operating in these areas. Their security vis-a-vis the outlying independents is in marked contrast to their vulnerability in large city markets which are dominated by an oligopoly core of wholesale bakers. In the latter situation, the use of price tactics in one market is subject to retailiation in another market in which the same firms may meet and the relative positions with respect to scale efficiencies and market share may be reversed. A big company may gain in one large city market through price tactics but would lose through retaliatory price tactics in another one, so price is much less apt to be used in large cities than in out-

lying markets by baking companies. The power to retailiate through price in another market is not usually available to independents operating in outlying market areas. Large city bakers are therefore not so reluctant to use price tactics in those outlying areas where they can do so with relative impunity. Price tactics can be effectively used to squeeze the profits of independents until they are forced to close, whereas market-share distribution in large city markets is determined almost entirely by nonprice tactics.

Notwithstanding the economic facts of the matter, the practice of differential pricing, as described above, has thus far been successfully defended by large multi-plant companies as not being "area price discrimination." It can be argued that differential pricing reflects real cost differentials in marginal terms. The defense can rest on realized returns to scale in production, advertising, and other overhead costs;[22] the relatively small increase in per unit costs of delivery over greater distances; and the *assumption that bread produced for shipment to the outlying area is the marginal product.* A price difference alone cannot be labeled discriminatory until a nondifference in costs is demonstrated; as Adelman suggests, buyer A in an outlying area may pay a lower price than B in a large city area of a market and yet be discriminated *against.*[23]

Large city firms have a real incentive to extend their market. They want to expand sales enough to realize the returns to scale made possible by advances in baking technology. But the oligopolistic structure and behavior in large cities tends to foreclose their sales expansion there, so they naturally try to gain business in outlying areas. The Senate report presents data suggesting that refrigerated semi-trailer delivery of bread a distance of 50 miles costs about one-half cent per pound.[24] When only this cost item is considered, it is apparent that its absorption by large city plants selling in outlying market areas offsets the locational advantages of small independents in these communities.[25] But this overlooks the shape of the production cost schedule. Chapter 3 of this report shows that with production at some point less than optimum, the large city plant can be expected to produce additional products for distribution to outlying market areas at costs justifying a differ-

22. E. A. G. Robinson, *The Structure of Competitive Industry* (Chicago: University of Chicago Press, 1932), p. 72.

23. M. A. Adelman, "Review of the 'Price Discrimination Law,' by Corwin D. Edwards," *American Economic Review* (September, 1960), pp. 790–795.

24. *Report, op. cit.,* p. 96.

25. H. L. Purdy, M. L. Lindahl, and W. A. Carter, *Corporate Concentration and Public Policy* (New York: Prentice-Hall, 1950), p. 651.

ential price of some considerable magnitude. Whether a price differential of from 1–4 cents per pound, the range actually found in 1958, or even greater differentials are justified, depends on a consideration of advertising, and other overhead costs, and whether, as is assumed, the bread sold in outlying market areas is the *marginal product* of a plant.

Although this assumption would be consistent with marginal economic analysis at the firm level, its use as a defense of differential pricing of bread in large city and outlying market areas may be questioned. As the Attorney General's committee to study the antitrust laws puts it, "the idea that the cost of serving a given buyer is less than that of serving other buyers, for no other reason than that this buyer's additional volume spreads the overhead, imputes arbitrarily to a particular buyer the savings of larger volume."[26] Adelman also suggests in this connection that the outlying area buyer might with equal logic have been considered the first buyer and have the whole overhead charged to him, as to be called the marginal buyer and have none of it imputed to him.[27]

Predatory Price Practices

Collusive Price Fixing

Collusive price fixing by direct and express agreement is infrequently discovered in bread markets. In so far as it exists, it is usually concealed because of its illegality under the antitrust laws. Nonetheless, there are several recent examples of litigation charging groups of wholesale bakery firms with violation of Section 1 of the Sherman Anti-Trust Act. In 1957, four companies failed to contest federal grand jury charges of "illegal combination and conspiracy to fix and maintain prices at which white, rye, and whole wheat bread would be sold to wholesale accounts in Oklahoma, North Texas, South Kansas and Southwest Missouri" markets.[28] Fines were imposed totaling $25,500. Also in 1957, five companies were indicted by a federal grand jury for conspiracy to fix the wholesale price and terms of sale of bakery products in the Las Vegas, Nevada, market.[29]

26. *Report of the Attorney General's National Committee to Study the Antitrust Laws* (Washington, D.C.: Government Printing Office, 1955), p. 334.

27. M. A. Adelman, *A&P: A Study in Price-Cost Behavior and Public Policy* (Cambridge: Harvard University Press, 1959), p. 180.

28. *U.S. vs. General Baking Co., Continental Baking Co., Mead's Bakery, and Colonial Baking Co., a subsidiary of Campbell Taggart Associated Bakeries, et. al., Trade Regulation Reporter* (New York: Commerce Clearing House), par. 66,305.

29. *U.S. vs. Continental Baking Co., Phoenix Bakery, Fisher Bakery, et. al., Trade Regulation Reporter* (New York: Commerce Clearing House), par. 66,345.

In 1958, four companies with bakeries in Memphis, Tennessee, were found guilty by a U.S. district court of fixing the wholesale prices of bread, buns, and rolls, and policing the market ranging up to 150 miles from Memphis (with annual sales totaling $9 million) to insure adherence to such prices.[30] Fines were imposed totaling $113,500. The case has since been appealed to a higher court and found in favor of the defendants. The ultimate outcome of the case is not resolved.

Evidence submitted in the latter case suggests how enforcement of possibly collusive price agreements by major producers in large city markets may be applied to independent producers in outlying market areas.[31] With the widespread invasion of outlying areas of bread markets by major baking companies, some outlying independents come under considerable pressure to conform to the accepted price and nonprice competitive practices established in the large city areas of these markets. When price leadership in invaded areas proves ineffective, major companies *may* resort to collusive agreement to hold price at the desired level while competition for outlying market share proceeds on a nonprice basis.

Price Discrimination

While the oligopolistic structure of sellers in most wholesale bread markets results in group efforts to avoid the full impact of open price competition, individual firms sometimes attempt to capture increased market share through price discrimination. In recent years, the Federal Trade Commission has brought several cases against medium and large sized baking companies for price discrimination not justified by cost differentials. This practice has been held in violation of the Robinson-Patman Act.

One example of bread price discrimination appeared in a recent U.S. Supreme Court decision.[32] In September, 1948, a medium sized baking company with three plants cut its bread price in half (from 14 to 7 cents a pound) in Santa Rosa, New Mexico, but did not reduce its bread prices in any other town in which it operated. The "discriminatory" price was continued for several months and as a result a small local bakery was forced to go out of business. The Supreme Court held that Section 2(a) of the Clayton Antitrust

30. *U.S. vs. Continental Baking Co., American Baking Co., Colonial Baking Co., a subsidiary of Campbell Taggart Associated Bakeries, Hart's Bakery, et. al., Trade Regulation Reporter* (New York: Commerce Clearing House), par. 66,345.

31. From trial transcript as reported in *Report, op. cit.*, pp. 161–162.

32. *Moore vs. Mead's Fine Bread,* U.S. Supreme Court Decision, December 6, 1954, *1954 Trade Cases* (New York: Commerce Clearing House), par, 67,906.

Act and Section 3 of the Robinson Patman Act were violated and awarded treble damages amounting to $57,000.

In 1958, one of the largest eight wholesale baking companies was ordered by the Federal Trade Commission to discontinue making discriminatory 5 percent price discounts to certain favored customers not made on a proportionately equal basis to other competing customers.[33] This practice had been initiated in East Coast markets in 1955. The defendant admitted all the facts of the case and the practice was held in violation of Section 2(d) of the Clayton Act as amended by the Robinson-Patman Act. In the same year, one of the largest baking companies was charged by the Federal Trade Commission with giving discriminatory price discounts amounting to 10 percent of established wholesale prices.[34] The defendant also was accused of giving special promotional allowances of an additional 5 percent in a discriminatory manner. The Federal Trade Commission charged that neither of these discounts was made available to all competing customers on proportionately equal terms. There are several other Federal Trade Commission charges of price discrimination against wholesale baking firms that are still pending.[35]

Price Cutting - - Secondary and Private Label Bread

Most retail grocers who can buy in large quantities—i.e., chains and affiliated groups of independents—stock two lines of bread. One consists of several wholesaler brands selling at uniform prices, and the second is a lower-priced line, offered at 1–10 cents per pound less. Except for the type of wrapper or other superficial difference between them, the two lines of bread are essentially identical. In selling the standard or "primary" loaf, wholesale baking companies depend upon extensive advertising for consumer acceptance, and upon driver-salesmen services combined with higher net retail margins for shelf position in grocery stores. The selling of the other bread also depends upon the reputation of the label and on

33. *In the matter of Ward Baking Co.*, Docket No. 6833, U.S. Federal Trade Commission, December 30, 1958.

34. *In the matter of William Freihofer Baking Co., Philadelphia,* Federal Trade Commission Docket No. 7072, *1958 Trade Cases* (New York: Commerce Clearing House), par. 27,080.

35. For example see "FTC Charges Discount Deals Against Continental and Huber," *Bakers' Weekly* (November 9, 1959), p. 30; and, "Southern Bakeries Denies Charges of Price Discrimination by FTC," *Bakers' Weekly* (May 30, 1960), p. 16.

shelf location for consumer appeal, but has the added competitive advantage of a price differential.

This advantage originally arose through the vertical integration of chain grocers into the baking industry. By baking bread in their own plants for sale in their retail stores, they were able to effect cost savings, which were at least partially passed on to the consumer. The smaller independent grocers, at first unable to meet this price competition, eventually joined together into buying groups to match the chains' purchasing power. These groups of affiliated independents then proceeded to obtain their own line of bread in one of two ways. Either they owned and operated a bakery, thus directly emulating some of the chains, or else they bought bread on a bid or specification basis under contract from wholesale bakers. The bread thus bought was not the regular wholesaler brand but was purchased in quantities large enough to effect economies reflected in a lower price. It was also wrapped under the retailer's label, thus avoiding all the advertising and other selling costs associated with the wholesaler's own brand.

This "private label" bread has become increasingly popular in recent years. The proportion of total bread sales represented by standard wholesale brands has been on the decline in the post World War II period. In 1958, Slater[36] estimated that about 25 percent of total bread sales were private label, of which about two-fifths were produced in bread plants owned by vertically integrated grocery chains (according to the U.S. Bureau of the Census). In an attempt to regain some of these lost sales, many wholesalers have introduced a secondary brand which sells at a somewhat lower price than their regular brand, though usually not as low as that of private label bread. No estimate of its sales are available, but it is believed to be much less important than private label bread. A 1959 survey of 43 markets located primarily in the Eastern, Southern, and Central Regions of the U.S. reveals that 20 markets offer both types, 12 have one or more private label brands but no secondary wholesaler brands, nine markets have a secondary brand but no private label brands, and only two markets have neither.[37] A 1958 survey of 54 bakeries affiliated with a large management group found that half the companies were producing either a private label or secondary loaf of bread at prices averaging five cents

36. Slater, *op. cit.*, p. 23.

37. *Survey of Secondary and Private Label Bread—Selected Metropolitan Markets,* Bakery Products Division, Anheuser-Busch, Inc. (St. Louis, September 1, 1959).

below wholesale prices of the primary loaf, representing 24 percent of their volume.[38]

When, as repeatedly happened in the early stages of the development, the oligopoly group of baking companies in any given market area refuses to provide a secondary or private label bread at prices competitive with the large chain bread prices, grocery retailers frequently persuade a wholesale baking firm in an adjoining market to do so. The contracting bakeries can get into private label production primarily because of the decrease in average costs of production and distribution due to better utilization of facilities (see Chapters 3 and 4). A chain with five supermarkets in a city may have an annual bread account of over $200,000. A regional chain with 50 supermarkets could have an account of over $2,000,000. This is sufficient to entice bids from baking companies located up to 500 miles from the grocery stores. With the resulting decrease in average cost due to increased output, the baking company could, in theory, lower the price of all the bread it sells. This would, however, directly alert and mobilize its competitors and market shares would very likely stay the same. The firm would gain some additional sales in the private label market but would lose by virtue of the lower price in its primary market. However, by maintaining the prevailing price level in the primary market and defining the contract bread as the marginal product, the company can temporarily succeed in selling private label bread at a substantially lower price. This additional market can be held, however, only as long as the relevant competitors either remain unaware of it, as is quite unlikely, or are in no position to defend themselves through retaliation. Typically, once a contracting bakery is in a secondary loaf or private label operation, bakeries in the invaded market suffering decreased market share: (1) retaliate with a secondary loaf or private label bread of their own, (2) set up a retail store handling day-old products (dumping station), or (3) cut price in the primary market.

Price cutting by wholesale baking firms is perhaps the most important development that may follow the entry of one or more secondary or private label brands into a market at lower prices than those of the established wholesaler brands. When, for example, the Pan-O-Gold Bakery of Fort Dodge, Iowa, entered into private label contracts with the Hinky Dinky chain in Omaha and with the Super Valu Stores buyer group in Des Moines in 1958, it is reported that wholesale bakeries in the latter area, led by Campbell

38. *Hearings, op. cit.*, p. 6343.

Taggart and Continental, retaliated by reducing prices some four cents per pound on their standard or primary loaves in both the Des Moines and Fort Dodge areas.[39] Of course, not all baking firms in both markets were fortunate enough to gain supplemental volume. Some lost a significant amount of market share, and their average unit costs of production and distribution increased. Aside from the possibility that some independents may quit the game via the merger route, this kind of situation is ripe for a general price increase for primary wholesaler brands in both areas to cover the higher unit costs of lower volume operation. In fact, by 1960, primary wholesale bread prices in these markets had risen to former levels and even higher.[40]

Grocery Chain Bread Pricing Behavior

Grocery chain bread pricing policy is a very important part of bread market behavior. The private label price policy of grocery chains affects the market structure and behavior of wholesale bread producers in two ways. First, the bakers have few alternatives to marketing an increasing share of their production through the grocery chains, many of which are integrated into bread production. By 1958, the ten largest grocery chains had about 27 percent of total retail food store sales. All were integrated into bread production and, on the average, their private brands represented about 40 percent of total bakery product sales in their stores.[41] Second, there is a differential impact of vertical integration by grocery chains upon large *vs.* small wholesale baking companies.

Grocery chains, in general, are accustomed to oligopolistic pricing in their relationship to other grocery chains and, hence, tend nearly to conform with the price policies of the wholesale bakery oligopoly core. Of course, they are not subject to encroachment on their market share by wholesale bakers; their bread sales will expand naturally owing to the growth in chain store merchandising of all foods. Thus grocery chain firms generally do not need to price significantly below the major wholesale baking companies. They can increase market share over time and make substantial profits by keeping their prices close to wholesale bread prices in their markets. There are, however, important exceptions to the general case of price following, especially in the establishment of new stores,

39. *Ibid.*, p. 6127; also, *Report, op. cit.*, pp. 65–66.

40. *National Bread Price Survey*, Bakery Products Division, Anheuser-Busch, Inc. (St. Louis, September 1, 1960), p. 18.

41. Calculated from sales data in *Report, op. cit.*, p. 103; and *Economic Inquiry into Food Marketing, op. cit.*, p. 30.

in the entry of grocery chains into new market areas, and less frequently, in competition among grocery chains.

Recent bread market behavior of grocery chains is based on their ability to exploit opportunities for technological and organizational changes in bread distribution. Shortly after World War I, the fast-growing grocery chains sought to secure quantity discount prices from wholesale baking companies consistent with the economies of large-volume deliveries and the elimination of special services to smaller stores. Also, in this period of rapid chain growth, many chains failed to follow the resale price maintenance policy of wholesale baking companies and used bread as a "price leader." By and large, bakers refused to sell to chains under such conditions. They were under pressure from non-chain grocers not to do so, and they faced the possibility that chain control of retail bread prices would tend to "weaken the wholesale price for bread."[42] As a result, most large grocery chains integrated vertically into bread production.

Two distinct bread marketing practices have emerged: (1) the curtailment and simplification of service associated with chain label bread, and (2) the policy of selling at lower prices than primary wholesale brands, thus allowing consumers some price-product alternative. These principal aspects of grocery chain price policy allow some variety with respect to marketing strategy such as utilizing bread as a promotional item or the establishment of a grocery chain as a price leader.

In most markets, integrated grocery chains establish private label bread prices below prices of wholesale brands. Company replies to a U.S. Senate investigation questionnaire regarding 1958 bread prices in cities where one or more of the largest seven wholesale baking companies have plants show that integrated chain bread was generally retailed at prices of 15, 16, or 17 cents a pound.[43] This was usually from two to five cents less than prevailing retail prices for wholesale brands. The differential ranged from 0.5 cents to 7.2 cents per pound. Census data show the average difference between prices of integrated grocery and wholesale bakery brands in 1958 was 3.3 cents per pound, or 17 percent, for the nation as a whole (Table 22).

For representative markets, the price differential tends to be greatest in the Central and Northeastern U.S., and least in the

42. A. C. Hoffman, *Large-Scale Organization in the Food Industries*, Monograph No. 35, Temporary National Economic Committee, 76th Congress, 3rd Session (Washington, D.C.: Government Printing Office, 1940), p. 47.

43. *Report, op. cit.*, p. 108.

South and West where the price of private label bread "follows" very closely price levels for wholesaler brands. "For the nation as a whole, the chainstore price is not the determinant price. The most that may be said is that the private label prices charged by grocery chains tend to establish a floor below which retail prices for the wholesalers' products, with some exceptions, do not fall. In the vast majority of markets, however, the retail prices of the principal wholesale bakers are primarily determined by factors other than chainstore private label price."[44] The inference may be made that as long as only a few of the largest chains integrate into baking, a price differential of 3.3 cents per pound has little or no noticeable effect on wholesale bread prices nationally. Of course, for individual markets, and for greater differential prices, the effect may be significant indeed, as will be discussed below.

Price differentials of a few cents may be sufficient to achieve consumer acceptance of private label brands because wholesale bakeries have no alternative but to supply integrated grocery stores with wholesale brands under nonprice terms that are relatively unfavorable. These include adverse shelf location, stacking, and size of display, all of which tend to limit the sales of wholesale bakery brands in large chain stores. The extent of this exclusion varies considerably. For example, in 1958, A&P private label bread products represented 80–90 percent of total bread product sales in A&P stores.[45] But this is a unique case. A&P is the second largest producer of bakery products as well as the largest food retailer.

44. *Ibid.*

45. These estimates are based on tabulation of value shipments by the bakery plants of the ten largest grocery chains, to which is added an average store markup of 17 percent; these are then compared with the 4–5 percent of total chain sales that are bakery products. The basic data are as follows:

	Value Shipments, Private Label Bread	Total Sales, All Products
	(In millions of dollars)	
Great Atlantic & Pacific Tea Co.	$180.5	$ 5,095
Safeway Stores, Inc.	33.9	2,225
Kroger Co.	43.7	1,776
American Stores	19.7	875
National Tea	8.5	794
Food Fair	2.1	734
Winn Dixie Stores, Inc.	8.1	666
First National Stores	15.3	532
Grand Union	0.7	504
Colonial Stores	8.6	437
Total	$321.1	$13,638

Value shipments of private label bread from *ibid.*, p. 103; total sales of grocery chain companies from Federal Trade Commission, *op cit.*, p. 76.

Safeway Stores and National Tea are more typical of the ten largest grocery chains, as a whole, in that private label products are about 40 percent and 25 percent, respectively, of total bread product sales in their stores.

Table 5 compares the percentage of consumers who buy brands of the major wholesale baking companies with the percentage who buy brands of grocery chains in 27 large city markets. In over three-fourths of the markets, chainstore brands account for less than 10 percent of consumer preferences.[46] There are indications that several of the largest grocery chains may have reached the upper limit to the restriction of wholesale brands from sales in their stores. With wholesale brands in their stores, they can off-load some of the inventory and production problem associated with heavy week-end demand onto wholesale baking companies. Moreover, through the acquisition and construction of new stores, they have gained a greater share of total grocery sales, including bread, and have thus achieved fuller utilization of existing plants.

On occasion, integrated grocery chains have temporarily set their private label bread prices at a level far below those of wholesaler brands, resulting in a differential much wider than normal. Company replies to a U.S. Senate investigation of retail bread prices by the ten largest grocery chains between July 1, 1958, and June 30, 1959, revealed 290 cases of special sales in one or more stores at prices of ten cents or less.[47]

In order of size of grocery sales, the ten largest grocery chains reported the following number of bread sales at ten cents per pound or less: A&P, 60; Safeway, 76; Kroger, 104; American Stores, none; National Tea, 5; Food Fair, none; Winn-Dixie, 28; First National, none; Colonial Stores, 4; and Grand Union, 3. These promotional prices were usually less than half the prevailing retail price of wholesale brands in the market areas involved. They were usually continued for three to six days and were confined to chain stores located in one or two cities at a time.

Cut-rate bread sales in some markets, however, continued for nine months and one large chain held simultaneous sales through-

46. In none of the 27 areas did market share of all reported chain store brands equal the preference for the brands produced by the single leading major wholesale baking company. In only one city was the leading grocery chain bread preferred by half as many consumers as the brands produced by the leading wholesale baking company. In 19 of the 27 communities, at least five times as many consumers preferred the leading wholesale company's bread to the leading chain store brand. *Ibid.*, pp. 105–107.

47. *Ibid.*, pp. 115–118.

out all its stores. Three of the ten largest grocery chains reported no instances of bread sales of ten cents per pound or less, and 279 of the cases were reported by four chains including the three largest, A&P, Safeway and Kroger, and one of the fastest growing, now seventh largest chain, Winn-Dixie. The latter four companies have used "price leader" bread sales regularly to build store traffic in those areas in which much of their recent expansion has taken place. However, no bread sales of ten cents per pound or less were reported in regions west of the Rocky Mountains.

As long as this practice occurs infrequently and briefly and is restricted to a few markets, its effects on major wholesale bakers with plants in a number of states may not be severe. The large multi-plant wholesalers apparently can absorb temporary losses in markets affected by these promotions by offsetting them with profits in other markets where chains abstain from such practices. An important point is that integrated grocery chains *can* set bread prices relative to input costs such that single-market wholesale baking companies are squeezed and will operate with a minimal profit or a loss, while the integrated, multi-market grocery chains, who produce and deliver their own private label bread at average costs below those of the non-integrated firms, can at the same time prosper.

Non-Price Competition in Bread Markets

The primary competition between wholesale baking companies distributing bread to grocery stores is on a nonprice basis. Instead of price competition, the usual market conduct pattern seeks improvement in the consumer franchise of individual wholesale brands by preferential product display in retail outlets, product advertising and promotion, and variation in product. In contrast to their pricing behavior, these oligopolists apparently do not achieve spontaneous coordination of their nonprice practices.[48] Independent action is preferred if it is expected to achieve advantages that are unlikely to be matched in the short run, if at all, by other wholesale baking companies. Thus, the nonprice conduct of firms in bread markets closely conforms to the theory of monopolistic competition.[49] These nonprice practices have two principal results: (1) they alter the relative competitive strength of small and large baking companies, and (2) they create a cost-push effect on prices. The

48. Weston, *op. cit.*, p. 109; also Fellner, *op. cit.*, p. vi.

49. Edward H. Chamberlin, *The Theory of Monopolistic Competition* (Cambridge: Harvard University Press, 1956).

concept of "cost push" as used here refers to the tendency toward rising costs resulting from the various nonprice practices in distribution and selling, as well as from capital investment in new equipment, which is not used efficiently. These rising costs can be tolerated under the protective cover of cost barometric price leadership in bread markets, discussed above. The basic factors contributing to rising costs and prices in bread markets are very difficult for any one firm to control, but it should be noted that they are primarily endogenous to the industry.

Product Display

Perhaps the most widely used and significant nonprice practices in wholesale bread markets in the postwar years have been the various tactics of firms to win favored display positions for their brands in retail outlets. Under the umbrella of cost barometric pricing, firms resort to the purchase of rack position with cash,[50] or in lieu of cash give free bread, building improvements (such as display racks, counters, signs, new floors, paint, etc.), special entertainment (such as travel and tickets for shows and sports events), and management service (such as consultation on store layout, accounting, tax study and so forth). They also try to dominate display shelves with "massed displays."[51] The term "massed display" is defined as the overloading of display space in retail outlets beyond expected sales. Its purpose is to appeal to consumers through what has been colorfully termed "pile psychology."[52] It is utilized for this purpose by grocery chains with private label bread, and by driver-salesmen with wholesaler brands, to gain or maintain preferential shelf space in retail outlets.

The bread industry came out of World War II with government controls over some market practices. Under the War Food Administration the consignment of bakery products to grocery stores and the removal of day-old products were prohibited. With the end of

50. An example of buying out distributive shelf display is provided by the president of an independent bakery in Lincoln, Nebraska, who submitted a sworn affidavit to the House Committee on Small Business dated November 3, 1955. Affiant stated that at Sutton, Nebr., in October, 1955, Colonial Baking Co. of Des Moines, Iowa (an affiliate of Campbell Taggart), paid Oscar Griess Grocery Store $50 worth of bread free and as a result Wendelin Baking Co. was eliminated as a seller of bread in the store. House Committee on Small Business, *Price Discrimination, The Robinson-Patman Act and Related Matters,* Part 1, 84th Congress, 1st Session (Washington, D.C.: Government Printing Office, 1956), p. 370.

51. For a discussion of other similar practices, see *Report, op. cit.,* pp. 67–84.

52. *Ibid.,* p. 69.

controls in 1946, consignment selling was again introduced by wholesale bread producers. Consignment selling facilitates the domination of distribution outlets by firms who overload limited display shelves with their bread, and thus force competitors to accept disadvantageous display space. Largely as a result of this form of nonprice competition, average costs of "stale return" loss increased from 1947-58 at a rate second only to distribution labor costs (see Chapter 4). The percentage of bread returns to route sales increased from 1.3 percent in 1947 to 7.4 percent in 1958, for a sample of 105 baking companies affiliated with a management cooperative. Even though a small part of this was recovered through sales of "day old" product, the remaining loss rose from 1.1 percent of sales in 1947 to 4.8 percent of sales in 1958.[53]

This experience is typical of the industry as a whole. Moreover, in a specific case of retaliatory overloading of grocery bread display in a single midwestern market, "stale return" loss of a medium-large single-plant baking company almost doubled in four years, increasing from 4.9 percent of sales in 1954 to 9.5 percent of sales in 1957.[54] A careful study of the stale bread problem in the baking industry estimated that net loss from stale bread in the 1920's averaged about 2.5 to 3 percent of sales.[55] It concluded that a stale loss not in excess of 0.5 to 1 percent of production is an attainable standard in wholesale bread markets.

When effective, these nonprice competitive tactics can result in making grocery outlets no longer available on equal terms to all wholesale baking firms in a market. When nonprice concessions are given in the form of merchandise and services which have indefinite value, it is difficult for grocers and competing bakers to tell which company is offering the best deal. This tends to facilitate the intended result of dominating distributive outlets. However, while various nonprice tactics may be introduced by one firm as offense weapons, they are almost invariably adopted by others as defense weapons.

The introduction of one or more of these tactics into a market rarely goes unnoticed by competitors but is adopted or matched in value by all. When this happens they typically neutralize each other and no single firm is better off than before, while all have experienced increased costs. Higher costs may be more difficult to

53. *Hearings, op. cit.*, p. 6593.

54. *Report, op. cit.*, p. 71.

55. J. S. Davis and Wilfred Eldred, *Stale Bread Loss as a Problem of the Baking Industry*, Publication No. 1, Food Research Institute, Stanford University (California, February, 1923), p. 7.

bear for independent firms in competition with one or more large firms in the outlying area of a market. Moreover, by their nature, some nonprice tactics, e.g., buying up shelf space, foreclose the possibility of adoption by rivals. Thus, nonprice practices as well as overt price policies are effective in the extension into outlying markets by large companies and the corollary demise of smaller firms.

Advertising

Among the food industries, baking was one of the first,[56] and is today one of the foremost, users of advertising. In the postwar years, the ratio of advertising to sales has been about a third higher for baking corporations than for all corporate manufacturers of food products. In absolute terms, bakery corporations' advertising expenditures have been increasing faster than those of all food corporations but their sales have not responded in kind, so that relative to sales, the increase has been roughly the same for both. According to the U.S. Internal Revenue Service, corporate food processors spent 1.1 percent of their sales on advertising in 1947 and 2.0 percent in 1957. By comparison, advertising expenses of bakery corporations represented 1.6 percent of their sales in 1947 and 2.8 percent in 1957. Or, to look at it another way, the bakers' share of all food corporation advertising rose from 12.1 percent to 14.6 percent in the ten-year period.[57] Since food processors are generally heavier advertisers than other manufacturers, these results would be even more dramatic were the comparison drawn between bakery advertising and that of non-food manufacturers.

Wholesale bakers do virtually all the advertising in the bakery industry. Among these companies, the ratio of advertising to sales varies considerably and is inversely associated with size of firm.[58] In 1958, the four largest bakers spent $32.8 million on advertising, or about 4 percent of their sales, a ratio more than two-thirds higher than the industry average. By comparison, independent wholesale

56. E. J. Sperry, "65 Years of Bakery Advertising," *Baking Industry Magazine* (April 12, 1952), pp. 149–150.

57. Data for food firms from U.S. Internal Revenue Service, *Statistics of Income, Corporation Income Tax Returns,* 1947–58 and 1957–58. Data for bakery firms from U.S. Agricultural Marketing Service, AMS 399, *Advertising Expenditures by Food Manufacturing Corporations, 1947–57,* by Roberta Lamb (reprinted from *The Marketing and Transportation Situation,* July, 1960).

58. There is one major exception: the largest wholesale baking company spent about 5 percent of sales on advertising; the remaining members of the big four and big eight wholesale bakery groups spent approximately 3 percent of their sales on advertising. *Hearings, op. cit.,* pp. 6055, 6062, 6580–6581.

bakeries affiliated with the three largest management cooperatives spent about $25 million, or 4.4 percent of sales. Although complete data on advertising expenditures by small unaffiliated wholesale bakeries are not available, one document indicates that, for a limited sample of such firms, they amount to about 5.2 percent of sales, or close to a third more than the big four.[59] These relationships suggest that media advertising is one form of competition where the larger firms can achieve economies of scale not likely to be matched in the short run, if at all, by smaller rivals. Of course, there are occasional exceptions to this rule where a smaller firm, in attempting to insulate its market from larger competitors, will engage in heavy advertising relative to its sales.

Since wholesale baking companies account for practically all advertising by the baking industry, it is clear that house-to-house and multi-unit retail baking companies use other means to isolate their markets. These include special service in the case of house-to-house delivery. Multi-unit retail bakeries use a differentiated product, location, and service. All of these involve selling costs which, as suggested by the theory of monopolistic competition, are incurred primarily to secure a degree of market isolation, i.e., protection from cross elasticity of demand.

Evidence of private label selling expenditures by the ten largest chain store bread producers indicates advertising expenditures in 1958 amounted to about $1.2 million or less than one percent (0.68) of their bread sales.[60] This ratio was one-fourth of the industry average, and about one-sixth of that of the largest four wholesale baking companies. Lower advertising expense for private label bread reflects, in part, lesser total advertising effort, in part economies of joint-product advertising of about 50 store items with bread in newspaper ads, and in part, the tendency to advertise the chain name rather than specific food items. Moreover, to the extent that conventional bread advertising is intended to influence the managers of grocery stores as well as consumers, advertising is of less importance to private label bread producers. Retailers of private label bread have complete control of their own shelf space and it is to their advantage to sell as much of their own label as possible. Hence, they need not be convinced through advertising by the contracting bakery company. As the baker of private label bread secures his retailer demand through contract, his selling costs, including advertising, are unnecessary.

59. *Ibid.*, p. 6092.
60. *Report, op. cit.*, pp. 113–114.

Advertising is one of the most obvious forms of bread promotion. It usually includes expenditures on television, radio, magazines, newspapers, and billboards. In addition to these, sales promotion policy may include: "consumer deals, premiums, coupon offers, menu-related item promotions, contests, sample and demonstration programs, special displays, various trade deals, and special promotion associated with the introduction of new products."[61] Estimates of the costs of non-advertising promotion practices are not available for the bakery industry. But it is not unreasonable to expect that for many large wholesale baking companies these costs are as great or greater than advertising expenses. To an increasing extent, subsidization of grocery store outlets with in-store facility and promotional allowances is becoming a major instrument of sales promotion policy. While costs of in-store facilities are usually hidden in broad ill-defined categories of a firm's operating statement, there is evidence that promotional allowances to chain stores amounting to 3–5 percent of sales are not uncommon.[62] Thus they frequently double the promotion expenditure on bread sold through these stores.

In its early days, advertising undoubtedly performed an informational function that helped to expand the market for bakery bread relative to that baked at home. Through advertising, consumers were made aware of the existence and the convenience of this new form of mass-produced, wrapped bread. By the end of World War II, however, commercially produced bread was an established and well known staple of the American diet. It is doubtful that bread advertising has contributed significantly to any further increase in the aggregate demand for bread.

In the postwar years, the purpose of bread advertising has shifted to influencing the distribution of total bread sales among wholesale baking companies. Bread advertising is increasingly aimed at persuading rather than informing the consumer. Criticism of recent advertising appeals to unreal or even harmful values has come from the Federal Trade Commission.[63] In 1954, the largest baking company was ordered to discontinue advertising:

> (1) that Wonder Bread restored normal growth processes in physically retarded children;

61. Sidney Hoos, "The Advertising and Promotion of Farm Products—Some Theoretical Issues," *Journal of Farm Economics* (May, 1959), p. 355.

62. *Hearings, op. cit.*, pp. 6344, 6641–6651.

63. *In the matter of Continental Baking Co., Inc.*, Stipulation No. 8553, U.S. Federal Trade Commission, October 5, 1954.

(2) that any amount of Wonder Bread consumed daily is a nutritional substitute for other foods having a greater total nutritional value;

(3) that Wonder Bread improves a child's appetite for other foods; etc.

In 1952 a West Coast baking company was ordered to stop advertising that its breads produced "better complexions or a smoother, more beautiful skin, or contributed to the health except to the extent that they may contribute to the prevention of the development of those conditions which may be due to deficiencies of vitamins and minerals."[64]

Numerous other examples of "misleading advertising" of bread are found in Federal Trade Commission actions. Perhaps the most frequent are stipulations and complaints against low-calorie bread promoters who say directly or by implication that as part of a diet this bread will enable the consumer to lose weight or will prevent the gaining of weight. Typical of such advertisements:

"When a woman's PANTHER SLIM
[picture of Elizabeth Taylor and panther
with basket of bread in his mouth]
. . . she's vital as well as slender. A good
figure is more than luck when a lady watches
her weight the famous HOLLYWOOD WAY. HOLLYWOOD
BREAD is high in protein, vitamins and minerals,
yet has only 46 calories per 18 gram slice."[65]

The Federal Trade Commission has brought complaints against scores of diet bread advertisers, and all except three have agreed to discontinue the low-calorie theme.[66] Lite Diet Bread (Bakers' Franchise Corporation), Hollywood Bread (National Bakers Service, Inc.), and Slender-Way (Safeway Stores) admit that, on an ingredient basis, the difference between diet bread and regular bread is not significant, but they argue that through thinner slices and smaller, lighter loaves, diet bread has fewer calories per slice. If the consumer is misled, they say, it is because of his long-standing misconception that regular bread is fattening.

Product Variation

There is considerable evidence that product variation policy is a significant aspect of firm behavior in bread markets, both in its

64. *In the matter of Silver Leaf Baking Co., Spokane, Washington,* Stipulation 8306, U.S. Federal Trade Commsision, August 26, 1952.

65. *In the matter of National Bakers Services, Inc.,* Docket No. 7480, U.S. Federal Trade Commission, April 30, 1959.

66. *Baking Industry Magazine* (August 6, 1960), p. 69.

impact on costs and on the competitive relationship between bakery firms. Product variation can be defined as the "periodic alteration of products, of the sort not necessarily identifiable as improvements, in order to stimulate a consumer demand."[67]

The regular introduction of superficial product and packaging changes in variety breads, or diet breads, or of "new" loaves of white bread exemplify this policy. On the individual firm level, product variation has a rational basis in recent studies of consumer behavior. Engle, for example, found that bread consumers tend to shift their brand or product loyalties every three to five years, reflecting a sense of monotony and a desire for something new or different.[68] He urged baking companies, as a matter of policy, to adopt rates of product variation and selling outlays consistent with the noted consumer turnover cycle. Product variation by baking companies generally has taken three forms, usually not associated with significant improvements in bread quality. In the postwar years, firms have periodically introduced one or more selling "features" such as variation in size of loaf, texture, and wrapper.

Variation in Pan Size, Shape, and Type

Many baking companies, seeking to broaden the appeal of bread to buyers who have not previously been important bread consumers, have added a "low calorie" loaf by using smaller pans and thinner slices. Others have added a "high nutrient" loaf by using larger pans and thicker slices.[69] Many, in addition, cater to the sandwich trade with a larger number of uniform square slices by using longer pans with lids. These are examples of many product variations that have increased the obsolescence cost of pans. A president of a large baking company testified that largely as a result of the multiplication of superficial changes in loaf sizes, their pan expenses increased "about 400-fold" between 1947 and 1958.[70] Independent decisions by firms to change pan sizes may not be matched by rival firms in the short run owing to a lag of several weeks for delivery from pan manufacturers. Meanwhile the leader may gain some market share at the expense of rivals.

Changes in Bread Texture

Several firms have introduced "new" loaves of white bread in

67. Bain, *op. cit.*, p. 323.

68. Engle, *op. cit.*, p. 195.

69. In 1958, a large baking company advertised "10 percent more food value in every slice of big new Wonder bread." Testimony was given that the only significant change was to enlarge loaf and slice size by approximately 10 percent. *Report, op. cit.*, p. 89; *Hearings, op. cit.*, p. 6673.

70. *Ibid.*, p. 6113.

recent years having unique textural characteristics, but otherwise not significantly changed. The most notable example is the uniform small-hole texture achieved by chemical action in the continuous-mix production process. The process is complicated and expensive; equipment investment costs may be increased by $150,000 for the adopting firm. In the short run, this innovation has not usually been matched by all rivals in any given market area. The manufacturer of the equipment has reported that firms adopting this process in the latter 1950's experienced short-run increased sales of 10–40 percent.[71] In this case, independent action may tend to bring about a short-run redistribution of market shares.

Another product variation of this general type is to divide and twist the dough as it is placed in the pan. This results in a distinctive indention in the loaf crust clearly visible to consumers through a cellophane wrapper. The fact that rival firms in many cases do not adopt the twisting process, however, is an indication that twisted bread is a relatively ineffective tactic in gaining market share. Apparently the effect upon share is small enough so that rival firms are not compelled to adopt twisting in defense. The process is easily accomplished; two unskilled employees or a $20,000 machine adds only a small amount to production costs of "twisted bread."

New and Fresh Packaging

Since World War II, most bakeries have shifted from wax paper to cellophane, and recently some have tried polyethylene bread-wrapping materials. Wax paper is the cheapest of the three and has the advantage of color, so it is frequently used to wrap the most expensive loaves of bread. Although higher in price, cellophane is the most widely used today. It is suited to handling by high speed machinery, and facilitates visible inspection of bread by the consumer, but also tears easily when opened. A few firms have recently perfected new wrapping machines to handle polyethylene, which is preferable to either wax paper or cellophane for home storage of bread by the consumer. At this time, independent decisions by some firms to adopt polyethylene wrap have not been matched by all rival firms in the short run, primarily because of technical complications. Thus, the innovator of new and fresh packaging may possibly gain market share from rival firms in the short run.

71. *Dough-maker Continuous Dough Mixing,* undated publication by Wallace & Tiernan, Inc., Belleville, N.J.

6 / Industrial Performance

Performance refers to the economic effects on the general welfare of market adjustments made by buyers and sellers.[1] There are various performance criteria which, to different observers, may be considered crucial indicators of how well the market activity of baking companies contributes to public welfare. The evaluation of market performance presented here considers: the level of profits relative to long-run interest rates and to those of comparable industries; the progressiveness of firms in improving product quality; and the changes in price relative to average costs, to the price of similar products and to the cyclical problem. Nor are these criteria alone enough to characterize the *net* performance of bread markets. We must also measure the economic costs to society of less-than-optimum performance with respect to:

(1) production efficiency—the rate at which firms adopt available technology and techniques of production to bring individual plant cost curves down to the long-run industry cost curve; the size of plants and firms relative to optimum scale; and the under-utilization of production facilities;

(2) distribution efficiency—the rate at which firms facilitate labor specialization and other economies to bring individual distribution cost curves down to the long-run industry cost curve; the size of delivery and routes relative to optimum scale; and the under-utilization of distribution facilities;

(3) the aggregate selling or sales promotion costs relative to consumer benefits.

A comparison of the existing organization of bread markets with a model of optimum system suggests the relative importance of these various performance criteria, and *hence the direction of possible adjustment or remedy.*

Only a few decades ago concepts of perfect competition and monopoly were thought sufficient to treat economic problems. Econ-

1. Bain, *op. cit.*, p. 11.

omists had derived theorems about the socially desirable performance of markets characterized by large numbers of small firms, homogeneous product, and free entry and exit, at one end of the scale, and of single-firm monopoly at the other.

During the past 30 years, however, students of market structure and industrial organization have found that *concepts of perfect competition and monopoly are not sufficiently adequate bases for the normative appraisal of individual capitalistic markets,*[2] and have attempted to formulate explicit criteria of adequate and optimum market performance under various intermediate graduations of oligopoly or imperfect market structure. Thus, if a reduction (or an increase) in a market's concentration would improve market performance, it is better to say so directly, not to suggest that the conclusion follows from an ideal of perfect competition.[3] The traditional "monopoly problem," associated with the evils of high concentration, is *not a very useful concept in appraising actual market performance.* In its stead, we shall consider the whole problem of achieving "optimum levels of market performance" in individual capitalistic markets, from the public viewpoint.

While these judgments *are necessarily tentative,* we can minimize the range of possible dispute about the relationship between the performance criteria selected and the more basic aims of a democratic society by reference to the enabling legislation under which this study was made. The Congress of the United States in 1946 specified that the primary objective of publicly supported research into the economic problems of marketing agricultural products is to *improve the efficiency of marketing methods and facilities and to reduce distribution costs.*[4] Congress declared that "an efficient marketing system to distribute in an economical and orderly manner that which is produced" by agriculture is indispensable to "the welfare, prosperity, and health of the nation."[5] As applied in this case, Congress has established efficiency as a norm or criterion of bread market performance and has tied market efficiency to the public welfare.

For purposes of this analysis, a bread market would be defined as "adequate" if its actual performance were not extremely detrimental to the public welfare with respect to any single criterion nor moderately detrimental with respect to several. A bread market

2. Sosnick, *op. cit.,* pp. 383–384.
3. *Ibid.,* p. 385.
4. 7 U.S.C. 1621 (Public Law 733, 79th Congress, Title II, Sec. 202).
5. H. Rep. 2458, 79th Congress, 2nd Session, July 8, 1946.

would be defined as "optimum" if its actual performance were as favorable in all respects as unavoidable circumstances permit.[6] Thus, the *level of performance attainable in bread markets depends, in part, on the limiting circumstances of the environment.* Important limitations to the improvement of any market's performance include: the nature of the product, consumer demand, and capital equipment.

Bread products are largely staple food, with general uniformity of quality between producers within a market. Because bread products are consumed fresh and have a high bulk-to-value ratio, spatial conditions of bread markets restrict a firm's ability to improve performance. Consumer demand for bread products is price inelastic and negatively income elastic and is limited by population location and growth. The purchasing pattern for bread is largely set by the purchase of other foods. Capital equipment in bread plants has a single use and, once adopted, represents a fixed input in the short run.

Price, Profit, and Product Performance

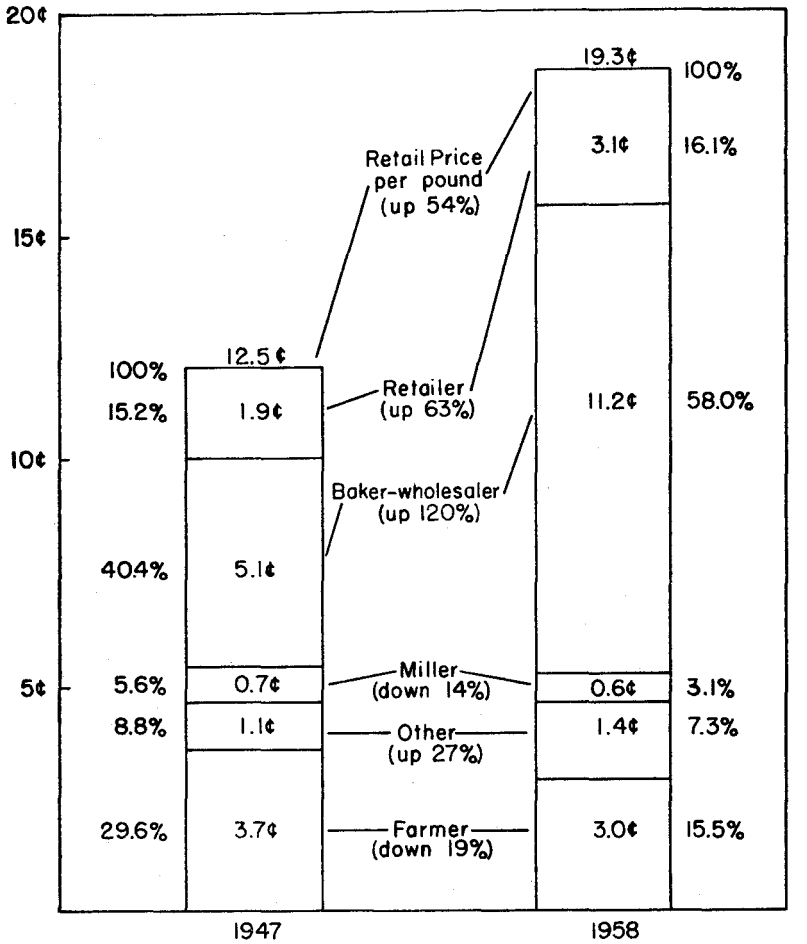
Market Price Performance

Generally speaking, bread markets have performed somewhat inadequately in product price behavior. Price increases in *bread products have tended to lead the business cycle during the postwar period.* The average U.S. price of white bread has risen more than twice as fast as prices of all consumer goods, according to reports of the Bureau of Labor Statistics. Between 1947 and 1958, the average retail price of all food products increased about 24 percent and the price index of consumer products rose about 26 percent, while the average retail price of white bread increased from 12.5 cents to 19.3 cents per pound, *a rise of 54 percent.* Figure 9 shows that most of this 6.8 cent increase in average retail bread prices represents larger payments to the baking industry. Payments to farmers for ingredients used in baking bread dropped from 3.7 cents per pound in 1947 to 3.0 cents in 1958, or about 20 percent. In addition to their larger payments to bakeries, consumers paid more for bread to retail grocers, from 1.9 cents per pound in 1947 to about 3.1 cents per pound in 1958, up about two-thirds. Thus, wholesale prices of bread did not increase quite as fast as retail bread prices during this postwar period (Table 8).

Exclusive of the cost of ingredients, however, payments for the

6. Sosnick, *op. cit.*, pp. 410–411.

bread baking and wholesaling functions increased from 5.1 cents per pound in 1947 to 11.2 cents in 1958, an increase of 120 percent! Clearly, had the postwar increase in payments for bread baking and wholesaling increased only at a rate equal to the increase in price



SOURCE: U.S. Agricultural Marketing Service, *Marketing Margins in White Bread,* Miscellaneous Bulletin No. 712 (Washington, D.C., 1959), pp. 8–9.

FIG. 9.—Estimated average retail and wholesale prices, gross margins of retailer, baker and miller, value of farm ingredients, pound loaf of white pan bread, United States, 1947 and 1958.

of all foods, the rise in average wholesale and retail bread prices would have been less than the price rise for all food, because cost of ingredients dropped. This does not imply that increases in bread

prices should have been held to those of all food, *because technological changes have occurred in food industries, altering the underlying production functions,* an aspect of bread market performance discussed later in this chapter. This reservation about price comparisons should be kept in mind when taking an overall view of these price changes.

The above account of price increases is based on average retail prices in 48 urban areas reported by the Bureau of Labor Statistics. This is the most general and relevant measure of average U.S. bread price levels because we are rapidly becoming a nation of city and suburban dwellers (estimated at 70 percent of total population in 1960). But those remaining in small towns and rural areas tend to pay lower prices for bread.

Although it is impossible to measure the proportion of total bread consumption involved, it may be estimated roughly at 30 percent. It was demonstrated in Chapter 5 that consumers in metropolitan area markets tend to pay an average of two to five cents per pound more for white bread than those living within a 150-mile radius in outlying small towns and rural areas, despite additional transportation costs of about one-half cent per pound for every 50 miles bread is shipped (as for example, by common carrier). These average price differentials are hidden within the average prices reported to the Census Bureau by wholesale baking companies, as shown in Table 19. It is also important to note that the lower

TABLE 19

COMPARISON OF THE AVERAGE TRANSFER PRICE PER POUND OF WHITE PAN BREAD AMONG SEGMENTS OF THE BAKERY INDUSTRY, UNITED STATES, 1947, 1954, AND 1958

Segment of Bakery Industry	Share of Total Pounds Shipped, 1958	Average Transfer Price			Change in Average Transfer Price			
		Year			1947-1954		1947-1958	
		1947	1954	1958				
	Percent	*Cents*	*Cents*	*Cents*	*Cents*	*Percent*	*Cents*	*Percent*
Wholesale	79	10.9	15.2	16.0	4.3	40	5.1	47
Integrated grocery chain	11	9.7	11.4	13.3	1.7	17	3.6	37
Home service	9	12.5	17.4	18.6	4.9	39	6.1	49
Multi-unit retail	1	11.3	14.6	18.9	3.3	30	7.6	67
Bakery industry, total	100.0	11.0	15.1	16.0	3.9	35	5.0	45

SOURCE: Average prices for segments of the industry were computed from reports of value of shipment and total pounds shipped data given in: U.S. Bureau of the Census, *U.S. Census of Manufactures,* 1947, 1954, 1958, *op. cit.*

average prices in non-metropolitan areas are gross estimates and only indicative of a tendency. Evidence of prices paid in a large

number of non-metropolitan markets shows that in many cases average prices are higher than in metropolitan areas of the same markets. This is an illustration of the pricing pattern explained in Chapter 5 in which a large city baking company maintains a lower price in an outlying area until its entry is firmly established. In the short run, consumers in the area benefit by a lower price. In the long run, however, there are instances where bread prices have then been raised to cover average total unit costs, including costs of common carrier shipment to the outlying area.

Postwar increases in retail bread prices have not been uniform for all bread. Some consumers have bought bread made by retail grocers under their own private labels; others have chosen brands of wholesale baking companies; and still others have used the products of bakers offering home delivery or have bought bread in specialty bakery stores.

Average price data prepared from Census Bureau reports and presented in Table 19 show that from 1947 to 1954 the average differential between the transfer or wholesale price of private label and wholesaler brands widened from 1.2 cents per pound to 3.8 cents per pound. Although this is admittedly a gross figure, it suggests that integrated grocery chains pursued a pricing policy on private label bread that increasingly enhanced the material welfare of consumers during this period. Since 1954, however, this price differential has tended to narrow and by 1958 had fallen to 2.7 cents per pound. The price and profit performance of integrated grocery chains varies significantly between market areas, as will be shown in a subsequent section of this chapter.

Estimates by the industry place the proportion of private label bread sales to total industry sales at about 25 percent.[7] As shown in Table 18, 11 percent of the industry's total bread output is baked in plants owned by integrated grocery chains. Although the balance of private label bread consumption cannot be estimated with any precision, evidence presented in Chapter 5 demonstrates that it is a significant aspect of production in many wholesale bakeries. Table 19 suggests that multi-unit retail baking companies charge higher prices for white bread in their specialty stores than either wholesale brands or private label brands distributed through grocery stores. In making this comparison, one must add an average retail grocery store margin for bread estimated at 17 percent to the wholesale and private label brand transfer prices shown in the table.

The discussion of market price performance has thus far been

7. Slater, *op. cit.*, p. 23.

confined to the price of white bread. Table 20 shows the average price increase of all important bakery products in the postwar years. The percentage price rise of non-bread products has been about half that of bread and bread type rolls during this period, but the non-bread products were the higher priced ones in 1947. In the case of cakes, pies, and handmade cookies, superior price performance from the consumers' point of view may reflect the competition of substitute products such as cake mix, frozen pies, and machine-made cookies. Census data show that output of these three bakery products has decreased in the postwar years, while output of their

TABLE 20

AVERAGE TRANSFER PRICE PER POUND, VARIOUS BAKERY PRODUCTS, TOTAL INDUSTRIAL PRODUCTION, UNITED STATES, 1947, 1954, AND 1958

Bakery Product	Average Transfer Price per Pound			
	1947	1954	1958	Change 1947–1958
	Cents	*Cents*	*Cents*	*Percent*
Bakery products, total[a]	15.2	19.0	21.0	38.2
White pan bread	11.0	15.1	16.0	45
White hearth bread	12.3	15.4	18.6	51
Wheat bread	11.8	16.0	18.1	53
Rye bread	12.7	16.2	18.4	45
Specialty breads	14.5	17.6	19.9	37
Rolls, bread type	16.2	20.1	23.4	44
Sweet yeast goods	29.8	37.1	36.8	23
Soft cakes	32.3	35.3	38.4	19
Pies	24.4	25.7	29.1	19
Cookies, handmade	31.2	37.1	36.8	18
Doughnuts (doz.)	25.9	30.1	35.2	36

SOURCE: U.S. Bureau of the Census, *Census of Manufactures*, 1947, 1954, 1958, *op. cit.*

[a] Average price per pound for total shipments for which poundage and value were reported. Does not include some pastries and unspecified items.

substitutes has increased.[8] This represents a net loss to the baking industry since these substitutes are produced by other food industries. An even larger share of cake sales is in the form of semi-prepared cake mix, manufactured by the milling industry, while more pies are produced by the frozen foods industry, and machine-made cookies classified in the cracker industry.

8. From 1947 to 1954, production of soft cakes in the baking industry declined from 1,200 million pounds to 1,047 million pounds, or about 13 percent. For the same period, output of cake mix, a substitute product produced in another industry, increased from 605 million pounds of soft cake equivalent to 795 million pounds, or about 31 percent. "1954 Census of Manufactures," *op. cit.* It is estimated that output of frozen pies and other frozen bakery products has increased rapidly in recent years and by 1958, accounted for 17 percent of total output of the frozen prepared foods industry. W. G. Gechtel, "The Future of Frozen Bakery Products," *Bakers' Weekly* (May 18, 1959), p. 39.

Profit Criteria of Bread Market Performance

Market performance is often assessed in terms of the profits-to-sales ratio or the rate of return on net investment after payment of federal income taxes. One authority suggests that a standard profit rate of *4 percent of net investment* after taxes may be considered as a "normal" or target rate of return in the 1940's and 1950's.[9] Of course, reported profits are not divided on company income statements between imputed interest on capital, return for innovations, frictional gains or losses, and rent on scarce capital resources or monopoly returns. The implications of this view, however, are that since most baking innovations are developed by baking equipment manufacturers, most innovation costs are paid for through the purchase of equipment, and since frictional losses tend to offset frictional gains, the remaining elements of profit above 4 percent can be attributed to "economic rent," or "above normal returns." This argument, rigorously applied to the baking industry, would suggest that average rates of return above 4 percent on net investment after taxes are more than are necessary to attract an efficient level of capitalization and tend to encourage an inefficient distribution of resources at least in the short run. Thus, the average return on investment of wholesale baking companies of 10–12 percent in 1958 indicates an excess profit rate of about 6–8 percent or one and one-half to two times the standard of optimum performance posited above (Table 21). But the application of this standard of optimum performance is not sufficient for analysis.

In the first place, although above normal profits of wholesale baking companies are sizable, their complete elimination would result in little change in the price of bread products. For the period 1947–58, such profits amounted to roughly two-thirds of total profits of wholesale baking companies, or approximately $45 million per year. This amounts to only about 1.7 percent, however, of the total $2.8 billion sales of wholesale baking companies in 1958. At most, such above normal profits account for approximately 2 percent of the consumer's bread dollar.

In the second place, a study of costs indicates that *factors other than profit explain the postwar increase* in bakery margins and bread prices. In 1958, the average net profit of wholesale baking companies after taxes was approximately 3.2 percent of dollar sales,

9. Bain, *op. cit.*, p. 383; this compares with a 1953–59 average of about 3.5 percent interest rate on prime commercial paper. *Monthly Letter,* New York City Bank (June, 1959).

TABLE 21

PROFITS (AFTER TAXES) AS A PERCENTAGE OF STOCKHOLDERS' EQUITY, SELECTED BAKING FIRMS, FOOD FIRMS, AND MANUFACTURING FIRMS, UNITED STATES, 1940 AND 1947–58

Baking Company or Industrial Group	1940	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
Continental	8.0	17.0	22.7	15.7	14.8	11.4	11.6	12.8	12.2	16.0	15.1	14.1	13.4
General	8.9	10.2	16.7	10.3	10.2	8.2	8.8	6.7	6.8	6.3	7.2	7.7	7.7
Campbell Taggart		33.0	40.6	32.4	26.0	20.1	18.9	16.8	20.2	20.8	19.9	19.6	18.7
American	6.5	18.9	20.8	14.4	13.6	12.0	11.7	12.7	12.2	14.4	14.9	14.1	12.1
Interstate	7.5	25.0	33.2	26.5	24.3	16.4	18.1	17.5	20.4	19.4	17.9	18.4	15.0
Ward	.2	17.6	22.6	17.3	16.2	11.2	10.9	13.6	7.4	7.3	6.2	7.4	5.6
Langendorf									13.8	17.9	15.0	19.0	15.7
Southern									8.9	6.5	13.4	13.7	13.4
Largest four[a]	7.9	15.8	21.2	14.7	14.1	11.1	11.6	11.7	11.9	13.7	13.6	14.2	13.4
Eighteen multi-plant baking firms[b]					15.1	11.7	11.9	13.2	11.9	12.0		12.5[c]	11.7[c]
Eighteen single-plant baking firms[b]					15.7	11.4	10.5	8.9	8.7	7.9			
All food processing[d]	8.3	19.4	16.6	10.6	13.9	11.0	8.9	9.2	9.0	9.7	10.0	9.9	9.6
All manufacturing[d]	8.8	17.0	18.9	13.8	17.1	14.4	12.3	12.5	12.4	15.0	13.8	12.9	9.8

[a] Federal Trade Commission, as reported in *Hearings, op. cit.*, p. 6138.

[b] *Cost and Margin Trends in the Baking Industry, op. cit.*

[c] Compiled from *Moody's* industrial manual and annual reports.

[d] *Statistics of Income*, U.S. Treasury Department, Internal Revenue Service, various years. These data are for corporation food manufacturers and all manufacturers filing corporate income tax returns.

or slightly more than one-half cent per pound (0.512 cents).[10] This is slightly lower than the average net profit of 5.8 percent or 0.638 cents per pound reported by wholesale baking companies for 1946–47. In recent years, falling average profit rates of wholesale baking companies have been associated with rising consumer prices for bread.

In the third place, although average profit levels of wholesale baking companies have been consistently higher than those of food processing and manufacturing industries throughout the postwar period, the three profit series have tended to move together. The Federal Trade Commission publishes rates of return on net investment after taxes of 421 identical companies in 24 selected industries for the prewar year of 1940 and the postwar period. Between 1940 and 1958, the group of 14 reporting baking companies showed the greatest increase in rates of return of reporting companies in 24 industries.[11]

In part, this is because the baking companies started from a lower base, but their profits also rose to higher levels in the postwar years. In 1940, all manufacturing industries sampled earned 8.8 percent on net investment as compared with 7.4 percent for the baking companies. By 1958, all manufacturing industries earned 9.8 percent as compared with 10.1 percent for the baking companies. The four largest baking companies reported profits of 13.4 percent in 1958, as compared with 7.9 percent in 1940 (Table 20). The average rate of return on net investment for the four largest baking companies was at a postwar high of 21.2 percent in 1948, almost three times the prewar level, but not much greater than profits reported for food processing and manufacturing industries at that time. By 1954, the average rate of return reported by the four largest baking companies had fallen to 11.9 percent as compared with 9.0 percent for all food processing and 12.4 percent for all manufacturing industries.

Large multi-plant baking companies tend to earn higher rates of return than smaller single-plant companies in recent years, while, in 1950 and 1951, average profits for the two groups of firms were nearly the same (Table 21). By 1955, profits of single-plant

10. *Hearings, op. cit.*, p. 6579. This is the reported earnings of the four largest baking companies on sales of white bread. This compares with profits of 2.92 percent on sales of all products including bread.

11. The industries sampled included more than 50 percent of total assets of all manufacturing industries. Federal Trade Commission, *Rates of Return For Identical Companies in Selected Manufacturing Industries, 1940, 1947–58,* Department of Justice (Washington, D.C., 1960), p. 10.

companies averaged about one-third less than profits of multi-plant companies. Indications are that this trend has continued since 1955, with one important exception. Single-plant baking companies affiliated with bakery management groups apparently have earned considerably higher returns than nonaffiliated companies. In 1958, the eight largest wholesale baking companies reported accounting profits of $32.8 million or about 3 percent (2.92) on sales of $1,125 million. The 123 plants operated by predominantly single-plant firms affiliated with Quality Bakers of America management group had profits of $12.2 million, or 4.35 percent of reported sales of $280 million.[12]

Price and Profit Performance of Integrated Grocery Chains

Thus far the discussion of the profit criteria has dealt primarily with profits reported by selected wholesale baking companies. These have been such as to have little appreciable impact on bread prices. Some additional evidence is available on the profits earned by the bakery divisions of integrated grocery chain companies.

Table 22 shows the bakery profit experience of the A&P grocery chain from 1924 to 1939. The company is, and was during this

TABLE 22

BAKERY SALES, INVESTMENT, AND PROFITS—A&P BAKERY DIVISION—1924–1939

Year	Retail Sales (thousand dollars)	Investment in Bakery Plant and Equipment (thousand dollars)	Unadjusted Profit (thousand dollars)	Unadjusted Rate of Return on Investment (percent)	Adjusted* Profit (thousand dollars)	Adjusted* Rate of Return on Investment (percent)
1924	$ 9,162	$2,569	$ 440	17.1	$ 120	4.5
1925	15,174	3,086	407	13.1	−53	−1.7
1926	21,913	3,288	1,998	60.8	1,384	42.2
1927	29,646	3,668	2,585	70.8	1,840	55.8
1928	34,627	4,268	3,540	82.9	2,539	59.3
1929	36,451	4,698	3,855	82.0	2,796	59.2
1930	38,752	4,871	5,464	112.2	4,224	86.8
1931	37,824	4,951	4,621	93.3	3,391	68.4
1932	32,413	4,859	3,885	80.0	3,303	67.9
1933	34,391	4,373	2,942	67.3	1,703	39.1
1934	38,126	4,014	3,176	79.1	1,956	48.6
1935	41,027	3,681	3,156	85.7	2,374	64.6
1936	42,183	3,461	2,784	80.4	1,898	55.0
1937	41,793	3,313	2,956	89.2	2,538	76.7
1938	40,853	3,035	5,191	171.1	4.333	142.0
Av. 1924–39				81.6		59.1

SOURCE: From company records in trial transcript quoted by Adelman, M. A., *A&P, A Study in Price-Cost Behavior and Public Policy*, (Cambridge: Harvard University Press, 1959), p. 254.

* Adjusted bakery profits estimated as follows: bakery sales are multiplied by the retail net profit rate for the year, yielding the estimated retail profit on bakery goods. This is subtracted from the unadjusted profit, and a rate of return calculated on the same investment base.

12. *Hearings, op. cit.*, p. 6088.

period, the largest retailer of food in the United States and also the largest producer of private label bakery products. The average unadjusted rate of return on net investment in its bakery division was 81.6 percent during this 15 year prewar period. This was several times the average rate of return after taxes reported by wholesale baking companies in 1940, and suggests that grocery chains may have had a considerable incentive to enter the baking industry because of the potential improvement in their profit positions.

There is some evidence on the extent to which more recent grocery chain integration affects the performance of bread markets with respect to profits and prices. Indications are that as long as only a few of the largest grocery chains integrate into baking (they accounted for about 11 percent of total U.S. bread output in 1958), price differentials between private label and wholesaler brands probably do not appreciably affect the price behavior of wholesale baking companies on their own brands. Analysis of private label and wholesaler brand prices in a large number of bread markets has shown that no consistent relationship exists between the two. This finding lends support to the view that the lower average prices paid by consumers of private label brands are unrelated to prices of wholesaler brands. Integrated grocery chains deliver their private label bread at costs much below those of the nonintegrated firms, and pass part of this differential forward to consumers of private label bread.

Table 23 presents evidence from various sources which indicates that, for the U.S. as a whole, in 1958 consumers paid an estimated 3.3 cents per pound, or 17 percent, less for private label bread than for wholesale brands.

The data suggest that the five largest integrated grocery chains received approximately 1.5 cents per pound profits on their bakery divisions. After provision for corporate income taxes, this is estimated at about a 30–35 percent return on net investment (less depreciation of plant and equipment) of their bakery divisions.[13]

While this is two or three times the rate of return on net investment by wholesale baking companies (also after corporate income taxes) in 1958, it has very little effect on consumer bread prices. Assuming that grocery chains integrated into private label bread production charge themselves the same gross store margins per dollar

13. Net investment estimated on the basis of reported depreciation allowance of 35 cents per hundred pounds of bread produced by the largest four wholesale baking companies and 17 cents for the five largest integrated grocery chain bakeries, depreciation at 15 years in 1958. *Report, op. cit.*, p. 113.

TABLE 23

ESTIMATED AVERAGE WHOLESALE BAKERY AND INTEGRATED GROCERY CHAIN BREAD COSTS, PRICES, AND PROFIT MARGINS, BY REGION, UNITED STATES, 1958

Region[a] and Brand	Average Cost of Bread Production and Wholesale Distribution[b]	Prevailing Wholesale (or Transfer Price)[c]	Estimated Bakery Profits (Before Taxes)[d]	Retail Grocery Store Margin[e]		Prevailing Consumer Retail Price[f]
	Cents	*Cents*	*Cents*	*Cents*	*Percent*	*Cents*
WESTERN REGION						
Wholesaler brands	15.7	17.9	2.2	5.1	22.2	23.0
Grocery chain brands	12.4	17.0	4.6	5.0	(22.3)	22.0
Chain differential	−3.3	−0.9	+2.4			−1.0
NORTHEAST REGION						
Wholesaler brands	15.1	17.5	2.4	3.3	15.9	20.8
Grocery chain brands	11.8	14.3	2.5	2.7	(15.9)	17.0
Chain differential	−3.3	−3.2	+0.1	−0.6		−3.8
CENTRAL REGION						
Wholesaler brands	15.5	16.0	0.5	3.2	16.7	19.2
Grocery chain brands	12.2	12.5	0.3	2.5	(16.7)	15.0
Chain differential	−3.3	−3.5	−0.2	−0.7		−4.2
SOUTHERN REGION						
Wholesaler brands	14.5	15.4	0.9	2.2	12.5	17.6
Grocery chain brands	11.2	14.9	3.7	2.1	(12.5)	17.0
Chain differential	−3.3	−0.5	+2.8	−0.1		−0.6
AVERAGE, U.S.						
Wholesaler brands	15.1	16.0	0.9	3.3	17.1	19.3
Grocery chain brands	11.8	13.3	1.5	2.7	(17.1)	16.0
Chain differential	−3.3	−2.7	+0.6	−0.6		−3.3

[a] Representative bread markets were selected in each of four regions: Sacramento, California, in the Western region; Brooklyn, New York, in the Northeast region; Chicago, Illinois, in the Central region; and San Antonio, Texas, in the Southern region.

[b] Average U.S. costs per pound, white pan bread, 1958, from reports by the four largest wholesale baking companies and five major grocery chains' integrated bakeries, filed with the U.S. Senate Subcommittee on Antitrust and Monopoly, and printed in, *Report, op. cit.*, p. 113. Variation in costs by region based on regional cost variation reported on 123 medium to large-sized bread plants. *Ibid.*, p. 31.

[c] Western regional average wholesale or transfer prices from a special tabulation of U.S. Census data. Average U.S. wholesale price or transfer price of white pan bread from, *1958 Census of Manufactures, op. cit.*, pp.12-13. For other regions, prevailing price of wholesale brands at wholesale from reports by the seven largest wholesale baking companies to the U.S. Senate Subcommittee on Antitrust and Monopoly, and prevailing chain store brand transfer prices computed from, *National Bread Price Survey*, Anheuser-Busch, St. Louis, (September, 1958).

[d] Profits of the bread bakery division of wholesaler and grocery chain bakeries is a residual estimate, i.e., col. 2-col. 1.

[e] Retail grocery store margins on wholesaler brands of white bread computed on a pound basis from reports on these markets from Anheuser-Busch, *ibid.* Store margins on grocery chain brands of white bread assumed as the same percentage per dollar sales as on wholesaler brands. This is a reasonable assumption based on prevailing practice of chain stores.

[f] Prevailing consumer retail price of wholesaler brands of white pan bread in 1958 from U.S. Bureau of Labor Statistics, *Development in Marketing Spreads for Agricultural Products*, 1958, *op. cit.*, p. 11. Regional data from reports by major companies, *Report, op. cit.*, pp. 191–194. Prevailing consumer retail price of grocery chain brands, average U.S., calculated by adding the average grocery store margin to the average transfer price of grocery chain bakeries, as reported by U.S. Census. Prevailing consumer retail price of grocery chain brands by regions from reports on these markets in Anheuser-Busch, *op. cit.*

sales as they receive on wholesaler brands, the chain bakery divisions captured only about 0.6 cents per pound (before corporate income

taxes or about 0.3 cents per pound after taxes) more in profits than the four largest wholesale baking companies. Were this amount (0.6 cents) passed forward to the consumer along with the 3.3 cents per pound he currently receives, it would exert very little marginal effect. It would add about $8 million to the $112.5 million saved by the 25 percent of U.S. consumers buying private label bread in 1958. Thus the inference seems justified that the benefits to the consumer in the form of lower private label bread prices resulting from vertical integration by grocery chains into the baking industry far outweigh the costs of this integration in the form of excess profits in 1958.

There are some notable exceptions to this generalization. In many markets, integrated grocery chains have been content to follow the price leadership of wholesaler brands. A good example of this sort of price conduct is shown in Table 23. Average retail price of chain store bread in most Western markets was 22 cents per pound compared with average retail prices of wholesaler brands of 23 cents per pound, or a one cent differential in 1958. However, average costs of production and distribution in Western markets are estimated at only about 12.4 cents per pound for chain brands, as compared with 15.7 cents per pound for wholesale brands, or a cost difference of 3.3 cents. Assuming the same gross store margins per dollar sales for both brands, the chain bakery divisions captured 2.4 cents per pound more than wholesale baking companies in profits (before corporate income taxes). The inference seems justified that the western consumer benefits very little from the vertical integration by grocery chains into the baking industry. In some markets the costs to consumers of profits by the bakery divisions of integrated grocery chains apparently far outweigh the benefits of lower private label bread prices. Table 23 also illustrates that, in other regions where the differential between private label and wholesale label bread is greater than the national average, the effect is that most or all of the potential integrated grocery chain profits are passed forward to the consumer.

Data on price and profit levels are not sufficient to explain the net effect of chain integration on performance in bread markets. Price and profit measures show only part of the effects. Consideration of the impact on efficiency and the cost of nonprice competition must await analysis of technological and costs data in a later section of this chapter.

Product Quality Criteria of Market Performance

A known set of quality alternatives would provide a reasonably

clear test of market performance. Theoretically, firms should enhance product quality as long as the marginal cost of improvement is outweighed by the additional price that consumers are willing to pay.[14] In real life, however, such quality determinants are difficult to evaluate, and nowhere more so than in judging bread. Possible variations in texture and taste have important technical limits. Nor can the nutritional quality of bread be wholly determined by the consumer. The usual test of softness is more nearly a test of water and air content than quality. Thus, it is extremely difficult for consumers to express accurate quality-price preferences for bread. Also some aspects of bread quality are related to costs only tenuously if at all.[15] Beyond the problems faced by the individual firm in determining cost-quality relationships lies the more difficult evaluation of market performance with respect to quality under conditions of interdependence among firms in a market area.

Even though the relatively inelastic demand for bread with respect to price indicates that consumers would pay for quality improvement, the oligopolistic structure of the bread market tends to preclude it. As we saw in Chapter 2, except for nutritional requirements originally imposed by federal standards, most white pan bread is probably not appreciably superior in quality to that produced in the early stages of commercial mechanized production. There are minor exceptions to this generalization. Some improvement in texture of bread resulted from the continuous dough-mix production process introduced during the past decade, but this accounts for less than 5 percent of total bread output. Moreover, per capita production of non-white bread (wheat, rye, raisin, and specialty breads) has declined in the postwar years, although not as fast as white bread. Most bread remains plain white bread.

Due to the virtual homogeneity of product and the difficulty of consumer quality-price evaluation, costs incurred by any one firm as a result of quality improvement are difficult to recoup by increased prices. With the exception of some notable success with a dense frozen loaf in recent years (probably less than 1 percent of total bread output), no single firm has been able to isolate its demand from that of other firms in the market.

Necessary costs of information and production connected with

14. Bain, *op. cit.*, p. 398.

15. Interviews with bakery operators suggest that change to a more nutritious and firmer loaf could be achieved with practically no increase in cost. This is especially true if frozen storage becomes practical so that factors now conducive to spoilage can be controlled without eliminating them from the bread. Also, frozen bread would not be subject to the squeeze test for freshness.

the introduction of an improved product are not usually offset by future returns to a single firm. If the quality change is successful, it is rapidly imitated by other firms in an oligopoly market situation with inelastic demand.[16] No one firm can elevate quality above or below that of other firms for long in an oligopoly situation. If quality improvement should occur, it would be based on leadership within an oligopoly market group similar to price leadership. Otherwise the innovator risks loss of consumer acceptance and of shelf space in grocery stores. In the case of price leadership, the impetus for change stems from cost increases experienced by the market group in general. In the case of bread quality there has been no comparable signal. The net result is that real bread quality improvement has not been an important competitive variable in the postwar years.

Efficiency of Bread Production and Wholesale Bread Markets

Least-Cost Bread Production*

Primary emphasis in Chapter 3 was on the synthesis of short-run and long-run cost functions for bread baking from engineering-economic data. These functions represent the cost of production with least-cost combinations of technologies and with reasonably efficient management and worker performance. Few bread companies have achieved or may be expected to achieve this degree of production efficiency. A comparison of actual with hypothetical production systems suggests relative weights to attach to various factors being used inefficiently, and hence points in the direction of possible improvement.

There are three major types of adjustments which may lead

* Use of the word "potential" throughout this section, when referring to the difference between existing and least-cost bread production, is not meant to imply that removal of the disparity would be desirable or possible in all markets.

16. A vice-president of Campbell Taggart Associated Bakeries, Inc. (second largest in the U.S.) reports that "when the really soft breads started coming on the market about 1947," it was determined that Campbell Taggart would not use chemical bread softeners to make bread softer than it already was. "We felt certain that the consumers would soon tire of bread with a softener added, and that our competitors would suffer. We soon found ourselves in the position of any other businessman who guessed wrong. We lost business. It took us as long as seven years in some locations to regain the business we had lost." Steve Vesecky, "Where's the Good Bread that Grandma Baked?", *Co-op Grain Quarterly* (May 1958), p. 60.

to sizable cost reductions (Table 24). These are: (1) adoption of efficient technology and techniques of production which would bring individual plant cost curves down to the long-run cost curve; (2) movement along the short-run plant cost curve by increased hours of operation to three-shift levels; and (3) movement along the long-run cost curve by increasing size of plant to *optimum scale.* Potential long-run industrial savings are estimated to be about $183 million per year for the first step, $187 million per year for the second step, and $150 million per year for the third step. This amounts to more than one-half billion dollars per year in potential production cost reductions, or about 23 percent of net bakery sales of bread and bread type rolls in 1958 (excluding retail margins).

In addition to the specific results, the cost functions provide the basis for reorganization of production in particular market situations. While there is evidence that bread market conditions differ very little throughout the United States, certainly there are pronounced differences in wage rates and ingredient costs. Such changes in the economic relationships can be incorporated into the basic production functions, and the revised functions used to make meaningful estimates of the costs and savings that could be expected from reorganization in particular geographic and historical situations.

A full evaluation of the potential cost reductions presented as Table 23 would require consideration of costs of delivery as well. However, since most plants tend to be closely located within metropolitan area markets, a considerable amount of plant reorganization could be accomplished without materially increasing delivery costs. As shown in Chapter 4, delivery costs could be substantially reduced through economies associated with size of delivery, volume of delivery vehicle, and specialization of delivery labor.

An important constraint to improving production cost performance in bread markets is the under-utilization of plant resulting from the daily variation in bread market sales. DeLoach reports that grocery stores have made little headway in efforts to equalize sales between days of the week, and that, as a result of consumer shopping habits, about 70 percent of food sales are on Thursday, Friday, and Saturday.[17] When an allowance is made for the daily variation in consumer buying habits within the week, presented as

17. D. B. DeLoach, *Changes in Food Retailing—Causes, Effects,* Washington State University Agricultural Experiment Station Bulletin No. 619 (Pullman, October, 1960), p. 23.

TABLE 24

ESTIMATED POTENTIAL PRODUCTION COST REDUCTIONS THAT WOULD RESULT FROM POSSIBLE ALTERNATIVE INDUSTRY ORGANIZATION, BREAD AND BREAD TYPE ROLLS, BY SIZE OF PLANT, UNITED STATES, 1958

Size of Plant	Production Cost Reductions by Specified Alternative Industry Organization											
	Total		Under Optimum Utilization of Plants						Under Introduction of Optimum-Sized Plants[c]		Under Adoption of Automatic Continuous-Mix Machinery[d]	
			Total		With Weekly Variation in Consumer Buying Pattern[a]		Without Weekly Variation in Consumer Buying Pattern[b]					
	Cents per lb.	*Million dollars*	*Cents per lb.*	*Million dollars*	*Cents per lb.*	*Million dollars*	*Cents per lb.*	*Million dollars*	*Cents per lb.*	*Million dollars*	*Cents per lb.*	*Million dollars*
Total	4.0	521.5	1.4	187.9	0.9	125.8	0.5	62.1	1.2	150.4	1.4	183.2
2000 lbs. per hr.	5.4	287.9	1.7	90.7	1.2	64.0	0.5	26.7	2.0	106.6	1.7	90.6
4000 lbs. per hr.	4.0	158.4	1.6	64.5	0.9	36.3	0.7	28.2	1.0	40.3	1.4	53.6
6000 lbs. per hr.	2.2	52.1	0.9	22.2	0.7	17.3	0.2	4.9	0.14	3.5	1.1	26.4
8000 lbs. per hr.	2.0	23.1	0.9	10.5	0.7	8.2	0.2	2.3	0		1.1	12.6

SOURCE: Calculated from the engineering-based short- and long-run cost curves presented as Figures 1 and 2. Census reports sales of 13 billion pounds of bread and bread type rolls in 1958, valued at 17.3 cents per pound or $2,262 million. This assumes that the size distribution of bread plants is the same as the size distribution of all plants classified by Census in the industry. See Table 4.

[a] Difference between an estimated average rate of bread plant utilization in 1958 of 54 hours per week and practical plant capacity of 108 hours per week, given the external limitation of consumer purchasing habits.

[b] Difference between average plant utilization of 108 hours per week and 144 hours per week, or 24 hours per day, 6 days per week.

[c] With 8,000 pounds per hour capacity.

[d] With automatic final proofer, automatic depanner, pan stacker and unstacker, cooler, and continuous dough mix equipment.

Table 16, bread plant capacity is adjusted downward from 144 hours per week to 108 hours per week. Table 24 shows that only a small part of the costs of under-utilization of bread plants is associated with consumer buying habits, or about $62 million of the aggregate cost of under-utilization estimated at $188 million.

It should be noted that these calculations of cost-saving alternatives available to the baking industry abstract from the problem of multi-product plants. This serves the intended purpose of simplifying the analysis to manageable proportions, and white bread represents about 60 percent of the total product of the industry. It may have the additional effect of slightly overstating the case for optimum plant reorganization presented here. Most bread plants have multi-product outputs. But bread and bread type rolls are the most important and represent 75.3 pounds of the 92.4 pound total annual per capita consumption of the industry's total production in 1958. The cost analysis here abstracts from the problem of producing the remaining 17.1 pounds, which is made up of sweet rolls, cakes, pies, cookies and doughnuts.

Although not tested here, one implication is that similarly shaped cost functions may be found for many of these specialty bakery products. Within the bread and bread type roll category, some limitations arise when, for example, some specialty breads require more expensive ingredients or a minimum amount of additional equipment to that posited here for white bread plants. These possible limitations were not measured in this study, but other sources lead the authors to conclude that in the aggregate, differences in total production cost per pound are probably not greater than 5 percent.[18]

The achievement of optimum performance in bread and bread type roll markets would reduce the aggregate investment in plant and equipment by an estimated $200 million—from about $550 million to about $350 million. As a rough estimate, investment (less depreciation) in inefficient bread plants in 1958 was between $300 million and $400 million, based on a ratio of sales to investment of four or five times.[19]

In theory, the inefficient plants of 2,000 and 4,000 pounds per hour capacities could be closed and their owners compensated in a single year, out of a *hypothetical* $500 million fund created by

18. See for example, Evert Kindstrand, "Mechanization of Roll and Bun Operations," *The Bakers' Digest* (April, 1958), pp. 68–71.

19. Calculated from data presented in *Cost and Margin Trends in the Baking Industry, op. cit.*, pp. 6–7; and Chapter 3 of this report.

shifting the production of bread and bread type rolls to 225 least-cost plants.[20] This assumes the estimated investment (less depreciation) of $100 million in plants with near-optimum capacities of 6,000 pounds per hour would not be wholly lost, nor would the investment of about $50 million in plants with capacities of 8,000 pounds per hour.

New investment of approximately $200 million would be required to construct 52 new least-cost plants, to expand the capacity of existing plants with capacities of 6,000 pounds per hour in 1958 to 8,000 pounds per hour, and to install efficient equipment in the plants currently with output capacity of approximately 8,000 pounds per hour in 1958. Such investment is compensated at a rate of 10 percent annually in the synthesis of least-cost operations used to estimate potential cost reductions shown in Table 24. Capital should be readily forthcoming at this rate. If not, profit levels could be doubled under optimum bread plant organization to 20 percent annually at a cost to consumers of only 17/100 of a cent per pound of bread produced.

Taking advantage of potential reductions in costs of producing bread and bread type rolls would have substantial effects on market structure and industrial concentration levels. If, as hypothesized, 42 bread plants with output of 8,000 pounds per hour were modernized and kept in operation, the eight largest baking companies would operate exactly half of these, or 21 plants (Table 4). If in addition, the 131 bread plants with output of 6,000 pounds per hour were modernized and expanded to a size of 8,000 pounds per hour, the largest eight baking companies would operate slightly fewer than half, or 64 plants. This would represent a sizable increase of about 32 percent over their share of national output in 1958, as measured by both bakery sales and plant capacities. Moreover, while the eight largest grocery chains integrated into bread production in 1958 owned only 8 percent of bread plant capacity, this would be increased to about 12 percent if only 6,000

20. Although economic forces tend to lead in this direction in the long run, this estimate should not be interpreted as a precise measure in the short run of the ideal number of needed bread plants in a privately operated bread marketing system. In reality we would expect that there would be many practical reasons why, in particular cases, such size plants as this smaller number contemplates would not necessarily be the optimum type today and certainly not in the future. Of the more than $520 million potential production cost reductions, about $400 million could be realized by maintaining in operation most plants of 4,000 pounds per hour capacity and above, by adopting automatic continuous-mix machinery, and by operating at practical capacity of about 108 hours per week.

and 8,000 pound per hour plants were retained. This would leave all other owners of bread plants with about 39 percent of plant capacity retained and modernized in 68 plants.

It is readily apparent that the critical question of whether concentration at the national level would be increased would depend upon who builds the 52 new bread plants each with output of 8,000 pounds per hour. If small baking companies were to construct these 52 plants, the structure of the industry nationally would not be greatly changed at the eight-firm level. Concentration among the eight largest baking companies would be increased from approximately 32 percent in 1958 to 38 percent of total bread sales, and the share of integrated grocery chains in the baking industry would decline only slightly, from 11 percent of bread sales in 1958 to 9 percent. Another important implication for market structure and industrial organization is that while concentration in certain bread markets would be appreciably increased by reorganization to achieve least-cost production in bread plants, *concentration at the national level could be substantially lower than 1958 levels without adverse effects on efficient bread production,* at the plant level. Also, testimony before the Senate subcommittee indicates that managerial economies that may accrue from multi-plant organization under a single management are as readily achievable through voluntary association of independent operations as through multi-plant ownership. There is little or no evidence that large corporations have appreciable advantage over cooperative and voluntary management groups in the baking industry.

Census reports that the 1,353 bakeries with 90 percent or more specialization in bread and bread type rolls employed 38,194 production workers in 1958. These plants had sales of $1,452 million, practically all of which was for bread and bread type rolls. Total sales of bread and bread type rolls are reported as $2,262 million in 1958.

If we assume that production labor imputed to bread and bread type roll production in plants with less than 90 percent specialization is the same as in specialized bread plants, we can estimate total production labor for bread and bread type rolls in 1958 as about 60,000 workers. Reorganization of bread and bread type roll plants to achieve least-cost production in 8,000 pound per hour plants would displace an estimated 43,000 workers, in both direct and indirect production jobs. Such a change would require retraining of displaced bakery production workers, and moving them out of the baking industry into other industries where rapid growth in labor

requirements develops. A fund of $100 million annually could be partially devoted to the task. This amount is the balance of the hypothetical $500 million fund created by shifting the production of bread and bread type rolls to 225 least-cost plants after $400 million is set aside to compensate owners of inefficient plants.

With the many institutional barriers to change that exist in bread markets, it is doubtful that more than a few of these adjustments and consequent savings can be actually achieved in the short run. However, the material that has been presented should provide useful guides for bread plant operators interested in planning new facilities, for groups of plant operators contemplating reorganization, and for agencies planning labor retraining programs.

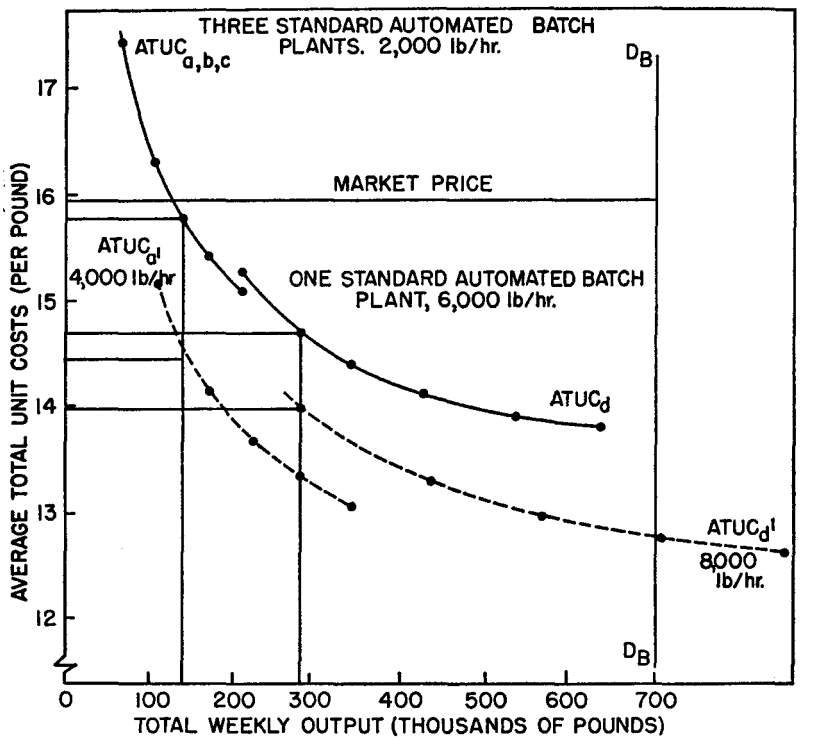
Barriers to Achieving Production Efficiency in Oligopolistic Bread Markets

While the progressiveness of firms in adopting new machines and techniques of production in bread markets is less than optimum, it perhaps approaches adequacy relative to the costs of progress, especially when compared with evidently attainable rates (Tables 12 and 13). Baking companies are reasonably quick to adopt many new machines that increase efficiency and productive capacity. In some cases, the adoption of machines such as the twister is an attempt to differentiate the product and thus to compete on nonprice terms. But the usual reason for adopting new machines is to achieve production efficiency. In concrete terms, this is measured by the pay-out period in terms of labor cost saving, as illustrated earlier in this report. Average production labor costs to the industry have increased from $1.07 per hour in 1947 to $1.97 cents per hour in 1958, a development that makes potential savings on labor costs attractive. That labor displacement has taken place is suggested by the fact that the total number of industry production laborers has declined from 189,000 in 1947 to 145,000 in 1958 while output increased slightly. In general, firms in the industry consider short machine pay-out periods as the relevant horizon because of the insecurity of their market shares and because of the single-use aspect of most bakery machinery.

Much bakery machinery is purchased on the basis of a two to four year pay-out period (Table 13). This evidence refutes the usual assumption that high profit levels are necessary for capital equipment adoption. The findings in bakery equipment markets is consistent with the assumption that firms could experience zero returns at the time the adoption decision is made without reducing their

incentive to adopt new machines and techniques of production. What is economic for the plant or firm, however, may not necessarily represent efficient performance for the market or industry.

This type of market situation is synthesized in Figure 10. The situation shown in the figure is one of a wholesale market for standard wholesaler brands of bread. The demand curve D_BD_B shows the quantity of these brands that can be sold at varying prices in the market area. We assume, for purposes of illustration, that four wholesale baking companies are operating in this market. Three are small-scale, relatively high-cost firms, and one is a larger-scale relatively low-cost firm. The different firm cost conditions are shown graphically in Figure 10. The average total unit cost structures refer only to the cost of producing and distributing bread, not to other perishable bakery products that may be sold by the wholesale baking plants. The slope of the curve reflects the plant production-



SOURCE: Production cost functions from Figure 2; distribution costs assumed constant at approximately six cents per pound.

FIG. 10.—Average total unit costs before and after introduction of new production technology into a bread market.

cost functions, as average total unit costs of delivery and selling are assumed constant for purposes of this illustration. We have no problem of determining the price at which wholesale bread is to sell. It was established by the price leadership of one of the small-scale, high-cost firms at 16 cents per pound to cover his average total unit costs of 15.8 cents per pound on sales of 140,000 pounds per week.

Assume first that firm A adopts output-increasing and cost-reducing equipment and/or techniques of production which nearly double its production capacity and allow a considerable profit (1.5 cents per pound) over production and selling costs with no change in output. This shift in its short-run cost structure down and to the right is suggested by the dotted cost structure, $ATUC_a$, shown in Figure 10. Although the dominant firm D is making a good profit (1.3 cents per pound) on sales of 280,000 pounds per week and might be happy to leave things as they are, firm A has reduced its costs below those of D. The prospect of greater profits may induce firm D to adopt output-increasing and cost-reducing equipment and/or techniques that have similar effects on productive capacity. This shift in its short-run cost structure down and to the right is suggested by the dotted cost structure, $ATUC_d$, shown in Figure 10.

Excess productive capacity (over and above the 700,000 weekly consumption in the market), which was formerly about 600,000 pounds per week, now rises to 900,000 pounds per week after the technological changes introduced by two of the four firms in the market.

Perhaps more important is recognition of the fact that the price-quantity solution in this type of market is made more unstable by technological change. Observers have recognized that "a composite of local market oligopoly, of an outmoded distribution method, and of union influence on wholesale distribution costs"[21] provides a strong incentive for vertical integration of grocery chains into bread baking and delivery to their own stores in efficient semi-trailer volumes. What has been little recognized is that a grocery chain with sales of 350,000 pounds of bread per week, in a market with similar conditions to those hypothesized in the model, may be attracted to the production of bread through construction of new, efficient bread plants.

Such a chain could operate a 4,000 pound per hour automatic

21. Richard B. Heflebower, "Mass Distribution: A Phase of Bilateral Oligopoly or of Competition?" *American Economic Review* (May, 1957), p. 280.

continuous-mix plant at practical capacity of 108 hours per week (similar to $ATUC_a$, shown in Figure 10) at a saving in production costs of about three cents per pound below the wholesale price of 16 cents. Since the total quantity of bread sold in the market remains almost static, the new firm's sales will cut into those of the wholesale baking companies in the market by about 350,000 pounds per week. All are producing at a smaller volume than before at lower levels of plant utilization and at higher total unit costs. As small-scale and high-cost firms B and C sell less, they are forced to operate in the area upwards and to the left of the point of operation shown in Figure 10 and suffer losses at existing prices.

One of the small-scale high-cost firms becomes a price leader, and market price of wholesale brands is increased to cover the higher-cost operations at lower levels of plant capacity. In most cases, large-scale lower-cost firms follow price increases to keep most of the small-scale members of the oligopoly group in business and avoid aggressive price cutting.

The historic result in most bread markets is that consumers have realized little or no benefit from the progressive adoption of more efficient bread production technology. There is a strong tendency toward *chronic* underemployment of capital equipment in the bakery industry. This stems primarily from the adoption of new output-increasing equipment and/or techniques by bakery firms in spite of an almost static demand for bread. Adoption of new capital equipment is transformed into higher fixed costs and higher market prices because, even if some firms increase their efficiency or gain fuller plant utilization, their success tends to spread the excess capacity over the other competitors in the market.

Excess capacity persists owing to the acquiescence of an oligopolistic market structure. Market organization is characterized by the dominance of an interdependent group of sellers whose costs of operating old and new equipment at less than full capacity are protected by price leadership. The tendency toward chronic excess capacity is a long way from being offset by merger and failure which result in scrapping of some plant equipment.

In fact, it has been demonstrated that although the industry includes more than 5,000 firms, the plant capacity reported by the eight largest baking companies in 1958 combined with the bakery plant capacity owned by the eight largest grocery chains is about sufficient to supply current consumption levels of bread and bread type rolls. Excess investment (less depreciation) in bakery plant and equipment has been estimated as $300 to $400 million.

Potential Reduction in Distribution Costs

Primary emphasis in Chapter 4 was on the development of short-run distribution cost curves from survey data. These observations have the limitation of the survey technique in that they fail to reflect optimum operation of the bread delivery system at minimum cost levels. However, the relative efficiency of the wholesale driver-salesman route delivery system can be estimated by comparing it with a semi-trailer dock delivery system utilized by some retail grocery chains to deliver private label bread to their own stores, by some wholesale baking companies, and by common carrier trucking firms. Although no evidence is developed on least-cost organization of semi-trailer dock delivery to grocery stores, the system does represent a practical alternative to the driver-salesman system and average cost studies suggest sizable potential reductions in bread distribution costs (Table 25).

There are two important areas of potential adjustment in bread distribution which will be discussed here and which may lead to sizable cost reductions. These are: (1) adoption of a distribution organization which would facilitate the specialization of delivery, display, and billing labor by function; instore disposal of day-old bread; and newspaper advertisement of bread prices; which would bring individual distribution cost curves down to the long-run cost curve, and (2) movement along the long-run distribution cost curve by increasing size of the delivery vehicle.

Potential long-run industrial savings are estimated to be about $270 million per year for the specialization of delivery, display, and billing labor by function, $63 million per year for instore disposal of day-old bread, $92 million for exclusive use of newspaper general food advertisement, $30 million for increasing the size of delivery vehicle, and $75 million for associated miscellaneous savings in sales supervision, etc. This amounts to more than one-half billion dollars per year in potential distribution cost reductions, or about 30 percent of bread and bread type roll sales by wholesale baking companies in 1958 (excluding retail margins).

These considerations do not exhaust the possibilities for improved efficiency and economy in bread distribution. For example, the assumption is made that bread will be delivered fresh within 24 hours after baking. But bread might be distributed in frozen form within the established frozen food channels. Preliminary reports by the U.S. Department of Agriculture indicate that frozen bread distribution could result in a cost reduction of about 2 cents per pound

below distribution costs via the existing system of wholesale driver-salesmen delivery and selling.[22]

A comparison of the driver-salesman system with the grocery dock delivery system suggests the relative weights to attach to various bread distribution factors now used inefficiently, and hence the direction of possible remedy. In addition to the specific results presented in Table 25, the relationships provide a basis for reorganization of distribution in particular market situations. While the

TABLE 25

ESTIMATED DISTRIBUTION COST REDUCTIONS THAT WOULD RESULT FROM POSSIBLE ALTERNATIVE INDUSTRY ORGANIZATION, BREAD AND BREAD TYPE ROLLS DISTRIBUTED WHOLESALE THROUGH GROCERY STORES, UNITED STATES, 1958

Alternative Organization	Average Costs per Pound of Net Bakery Sales		Cost Reduction per Pound of Net Bakery Sales (cents)	Estimated Total Cost Reduction, U. S., 1958[f] (million dollars)
	Wholesale Driver-Salesman System (cents)	Semi-Trailer Dock Delivery System (cents)		
Instore disposal of surplus product[a]	0.80	0.17	0.63	$ 63
Semi-trailer delivery vehicle[b]	1.00	0.70	0.30	$ 30
Specialization of labor delivery[c]	3.00	0.30	2.70	$270
Joint food newspaper advertising[d]	1.00	0.08	0.92	$ 92
Associated miscellaneous saving[e]	1.00	0.25	0.75	$ 75
Aggregate cost reduction in wholesale distribution	6.80	1.50	5.30	$530

SOURCE: See Chapter 5 for sources of average costs of distribution via driver-salesman and semi-trailer dock delivery systems. Specific sources and standards of efficient bread distribution services are given below.

[a] Estimate based on a study of the stale bread problem by the Stanford Food Research Institute, which concluded that a loss of 0.5 to 1.0 percent is an attainable standard, and "losses above 1.0 percent reflect objectionable trade practices, poor business management, or both." Davis and Eldred, *op. cit.*, p. 7.

[b] Using accounting records of representative dock delivery to grocery stores in large Midwestern markets utilizing semi-trailer vehicles, 48,000 pounds per week, delivery vehicle costs are about 0.7 cents per pound.

[c] Using the same source as above, semi-trailer truck driver expenses are about 0.3 cents per pound. Instore functions such as ordering and display servicing are transferred from the wholesale driver-salesman to specialized instore personnel, and are compensated for out of the gross retail store margin, as is the case for most food products distributed through grocery stores.

[d] Estimated advertising and promotion allowance reductions that would result from the exclusive use of newspaper general food ads, based on reported chain store costs of private label bread advertising of 0.08 cents per pound in 1958. *Report, op. cit.*, p. 113.

[e] Associated savings in sales supervision and accounting is a residual estimate based on calculated total dock delivery costs of 1.5 cents per pound and average wholesale distribution costs of 6.8 cents per pound as presented in Chapter 4 of this study.

[f] Same source as Table 24, adjusted. An estimated 76 percent, or $1,719 million of annual sales of bread and bread type rolls estimated at $2,262 million in 1958, were by wholesale baking companies. The estimated total cost reductions are calculated on the basis of $1,719 million sales.

22. Enochian, *op. cit.*, p. 5.

conditions under which bread is distributed to grocery stores differ very little from market to market, day-old bread loss and labor contract specifications including commission rates show pronounced variation. Specific factor costs can be substituted for the average cost levels shown in Table 25, and the revised relationships used to make meaningful estimates of the costs and savings that could be expected from reorganization in particular geographic and historical situations.

With the many institutional barriers to change that exist in bread markets, it is doubtful that more than a few of these adjustments with their attendant savings can be actually achieved in the short run. The driver-salesman commission system of daily delivery of a single product class to individual grocery store shelves by about one-half dozen wholesale baking companies is supported by Teamsters Union contract and by individual baking companies, each bent upon obtaining a favorable shelf position within individual grocery stores. Nor are most retail grocery firms that operate on a fixed percentage margin of bread sales likely to favor a bread distribution system which transfers costs of instore servicing of bread shelves and billing to grocery firms. Although gross grocery store margins on bread of 16–17 percent in 1958 were not appreciably lower than average store margins on grocery items of 17.9 percent in medium-sized chains,[23] most groceries are delivered to retail store docks or distribution centers, and instore display and order servicing are a normal cost of retail grocery firms.

It is estimated that reorganization of bread and bread type roll distribution to achieve the cost reductions associated with semitrailer dock delivery of wholesale bread to retail outlets would displace about 30,000 delivery and sales employees, in both direct and indirect categories. This estimate is based on Census reports that wholesale baking companies with 90 percent or more specialization in bread and bread type rolls employed about 40,000 non-production employees in 1958. These companies had sales of $1,362 million, virtually all bread and bread type rolls, or 79.2 percent of the total wholesale sales of those products. If we assume these firms had the same share of wholesale delivery and sales employees as they had of it sales, we obtain an estimate of about 50,000 workers in both direct and indirect wholesale distribution jobs. A reasonable opti-

23. DeLoach, *op. cit.*, p. 22; and Wilbur B. England, *Operating Results of Food Chains in 1958*, Harvard University Bureau of Business Research Bulletin No. 156 (Cambridge, 1960), p. 10. Markup on groceries is less than for frozen foods, produce, meat, and nonfood items, but costs are also lower.

mum-sized semi-trailer dock delivery system can handle 12,000 pounds per trip, and a single truck can average four trips per week, delivering about 48,000 pounds per week to retail outlets. This is more than ten times the average volume for a large sample of wholesale driver-salesman bread routes reported as 4,714 pounds per week in 1958.[24] Some of the over-all saving in bread delivery labor would be offset by increased instore labor requirements. The displaced bread distribution employees, as in the case of displaced production workers, could be retrained and assisted in their movement out of the baking industry into other industries where rapid growth in labor requirements develops. A hypothetical fund of approximately one-half billion dollars created by shifting the distribution of bread and bread type rolls to the semi-trailer dock delivery system could be partially devoted to facilitating this transition.

The Costs of Nonprice Competition

If the efficiencies from increased distribution volume and specialization of the delivery function by semi-trailer dock delivery are as large as suggested in Table 25, why have not the most efficient firms continued to grow until they achieved optimum efficiency? Performance in wholesale bread markets appears closely associated with the oligopolistic nature of market structure and conduct (although other variables may be equally important). The general pattern of price leadership within oligopolistic groups of wholesale baking companies has been shown to result in prices for wholesaler brands which are virtually uniform in a particular bread market.

In the short run, price and quality of product are largely predetermined. Individual companies are therefore more concerned with varying costs and volume of sales. Under the protection of price leadership, firms focus competitive tactics on preserving their market shares. They struggle for sales volume by attempting to differentiate their products. This results in selling expenses which shift the firm's average total unit cost curve upwards. The public benefits from this kind of competition in markets characterized by inelastic demand can easily be exaggerated.

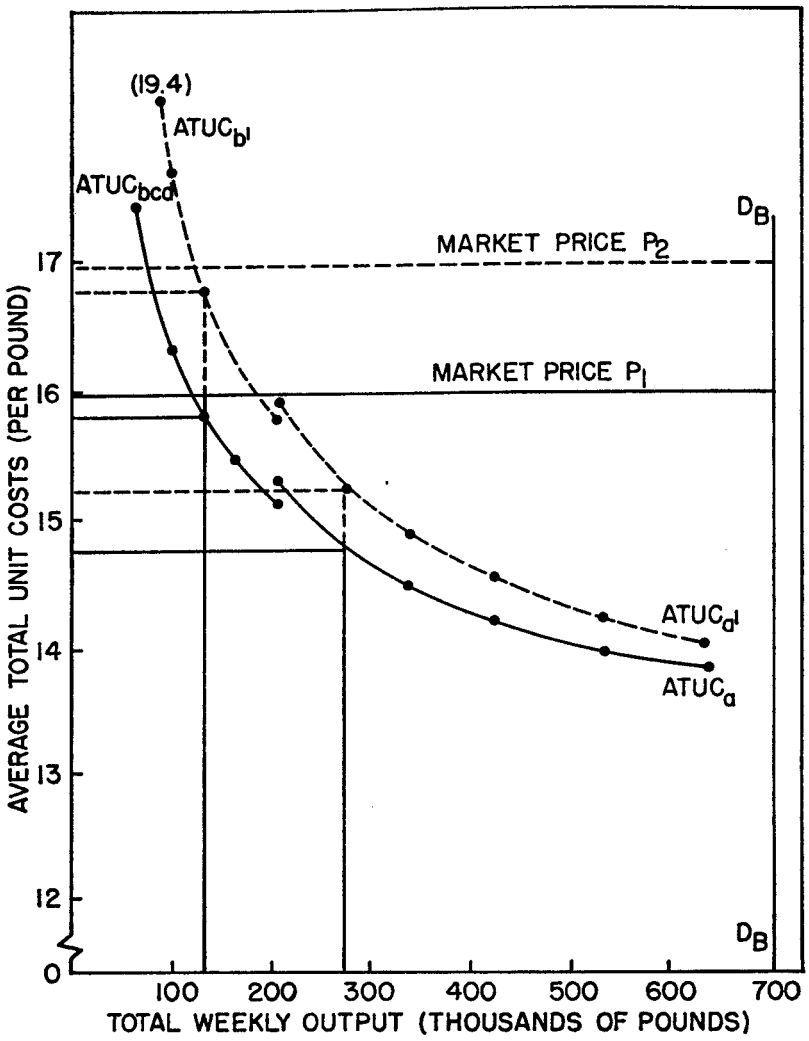
The effects on consumer demand and on bread prices of such features of nonprice competition as advertising, product variation, special packaging, and servicing are clear enough. The evidence refutes the popular thesis that these nonprice methods of competition increase demand by informing or convincing potential buyers

24. *Hearings, op. cit.*, p. 6593.

of the desirability of the product and the thesis that larger sales result in expanded output, which lowers cost through economies of scale, so consumers can buy at lower prices. If firm A's special selling effort is effective, sales and production presumably expand for firm A. But as a result of the inalterable fact of inelastic demand for bread, the increased sales of firm A mean that fewer people in the market are buying firm B's bread and its production decreases. Firm A's combined production and distribution costs may decline, but at least in the postwar years the consumer has seldom benefited by paying a lower price for bread. In many cases, of course, depending on the strength of the contending nonprice promotion strategies within the market group, firm A has attracted enough sales away from firm B to force it to abandon the market. Some of firm A's larger revenues from expanded sales have paid for continued nonprice competition to maintain the firm's advantage over other firms C and D in the market, and price competition tends to be studiously avoided. The more general market conduct since World War II, however, has been for firm B to retaliate and adopt means of nonprice competition similar to those of firm A. If firm B is to avoid lower production volume with its higher costs, it is compelled by its market interdependence with firm A to increase its selling costs along with firm A. As the evidence in Chapter 5 indicates, *most of these increased selling costs have been consistently passed on to the consumer in the form of higher bread prices.*

This type of market conduct is illustrated in Figure 11. The situation shown in the figure is one of a wholesale market for standard wholesaler brands of bread. The demand curve D_BD_B shows the quantity of these brands that can be sold at varying prices in this market area. We assume, for purposes of illustration, that four wholesale baking companies are established in this market area. Three are small-scale, relatively high-cost firms and one is a larger-scale relatively low-cost firm. The dominant firm A has bread sales of 280,000 pounds per week, which represents plant utilization of only about 48 hours per week. Assume that dominant firm A initiates a new promotion campaign (a net addition to $ATUC_a$) costing $1,400 per week. This results in a shift in its short-run cost structure upwards as suggested by the dotted cost structure, $ATUC_a$, shown in Figure 11.

Firms B, C, and D may either wait until they experience losses in volume or act immediately in anticipation of them. If they are eager to survive, they immediately adopt retaliatory tactics of nonprice competition (also costing $1,400 per week) which result in a



SOURCE: Same as Figure 10.

FIG. 11.—Average total unit costs and market price before and after introduction of a new selling cost into a bread market.

shift in their short-run cost curves upward as suggested by dotted cost structure ATUC$_b$, in Figure 11. The impact of the introduction of a given advertising budget on large and small plants and on market price is immediately apparent. In this illustration, the increase in firm A's average unit costs is one-half cent per pound and in those of firms B, C, and D is one cent per pound, or twice

that of firm A. Since total demand for the product is not increased, these increased selling costs must be passed on to the consumer in the form of higher prices *unless one of the small-scale, high-cost firms is squeezed out.* One of the high-cost firms may take the initiative as a price leader and raise the market price of wholesale brands from 16 cents to 17 cents per pound. Other firms follow, including the dominant large-scale firm, to keep most of the small-scale firms in business and to avoid aggressive price cutting.

The costs to the consumer of nonprice competition under an umbrella of price leadership are twofold. First, the structure and conduct features of bread markets have a direct *cost-push effect* on bread prices that is obvious in the upward shift of short-run average total unit cost curves. Table 26 shows in a general way the effects on costs of increased market services and sales promotion since 1940. Distribution costs rose from about 27 percent of wholesale baking company sales in 1940 to 29 percent in 1947, and to approximately 40 percent in 1958, the latest year for which data are available.

TABLE 26

AVERAGE DISTRIBUTION COSTS OF WHOLESALE BAKING COMPANIES, UNITED STATES, 1940, 1947, AND 1958[a]

Type of Expense	Expense per $100 of Net Baking Sales (dollars)			Estimated Total Costs, U. S. (million dollars)		
	1940	1947	1958	1940	1947[b]	1958[b]
Delivery vehicle	$4.8	$5.6	$6.2	$43.4	$98.8	$174.0
Delivery and selling service labor		13.2	18.5		233.0	519.4
Stale bread loss		1.9	4.9		33.5	137.6
Other promotion and service[c]		4.7	6.2		83.0	174.0
Subtotal	24.2	25.4	35.8	218.8	448.3	1,005.0
Advertising	2.6	3.8	4.6[d]	24.5	67.1	129.2
Total	$26.8	$29.2	$40.4	$243.3	$515.4	$1,134.2

SOURCE: The 1940 data, where available, are from reports of 82 companies with aggregate sales of $329.8 million, representing 37 percent wholesale bread product sales of $904.2 million reported in the 1939 census. *Report of the Federal Trade Commission on Distribution Methods and Costs,* Part I, *Important Food Products* (Washington, D. C.; Government Printing Office, 1943, p. 58. The 1947 and 1958 estimates are calculated from sources as reported in Chapter 4.

[a] Excludes retail margins.

[b] Sales value of wholesale bakery output reported as $1,765 million in 1947 and $2,808 million in 1958. See Table 1.

[c] Primarily sales supervision, special instore promotion and miscellaneous selling expenses.

[d] Advertising expense for 1958 is a composite of advertising expenditures reported for the four largest baking companies of about 4 percent of sales, wholesale bakeries affiliated with the three largest management cooperatives of 4.4 percent of sales, unaffiliated wholesale bakeries of about 5.2 percent of sales. See Chapter 5 for these data and similar sources for 1947. Other selling cost estimates for 1947 and 1958 are composites of reported average costs from the same sources. See Chapter 4.

In current dollars,* this represents an increase from less than one-quarter billion dollars in 1940 to more than one billion dollars in 1958. Much of this increase was due to the costs of various forms of nonprice competition in bread markets. The practice of massed display of products on grocery shelves is largely responsible for an increase in the cost of stale bread loss from $34 million in 1947 to about $138 million in 1958. About 5 percent of the value product of wholesale baking companies is wasted, or relegated to a lower value use such as animal feed, through stale-return loss. The practice of advertising to differentiate products and to create consumer preference for wholesaler brands over private label grocery brands has added substantially to bread costs. Advertising expenditures by wholesale baking companies increased from about $25 million in 1940 to about $130 million in 1958. Despite this sizable advertising expenditure, per capita consumption of the industry's products has continued to decline by about 1 percent per year, and it is doubtful whether society or the industry benefits appreciably from recent levels and types of bread advertising. Alleged product improvements in the form of wrapper variation, loaf twisting, upside-down baking, and multiple loaf sizes have undoubtedly raised the cost of bread production with little or no enhancement of quality, or wider real choice among products by consumers.[25]

Costs of these forms of nonprice competition are difficult to discover because they are hidden in broad ill-defined classifications in business operating statements, as are the costs of instore service and promotion practices of driver-salesmen. Combined costs of driver-salesmen delivery, service, and other promotion costs (less direct advertising) increased from $316 million in 1947 to about $693 million in 1958, or more than twice the immediate postwar costs. As was demonstrated in Chapter 4, the sizable increase in driver-salesman commission rates won by the Teamsters Union explains only about 40 percent of the expansion in these delivery and instore promotion costs. The rest is explained by the decline in average route volume to 70 percent of 1947 levels, as sales promotion time of drivers has increased.

The second important cost to consumers of nonprice competi-

* Part of the increase noted is due to price inflation.

25. Compare the average price of 52 serviced and unserviced foods including bread in three large chain stores, Washington, D.C., December 9, 1957. Roland G. Harris and Philip B. Dwoskin, "Convenience Food and Their Costs to Consumers," *The Marketing and Transportation Situation* (July, 1958), pp. 27–33; also, *Journal of Home Economics* (November, 1957), pp. 717–719; and *Baking Industry Magazine* (August 6, 1960), p. 69.

tion is its effect on the efficiency of distribution and production. The use of any cost level above that of the least-cost organization of production and delivery as the basis for cost-barometric price leadership *reduces the pressure upon all firms to increase their efficiency and reduce their costs.* The extent to which prices are permitted to exceed the costs of least-cost organization determines the pressure applied to the less efficient. Too little pressure means increasing divergence from *optimum performance* with respect to both distribution and production efficiency.

Under conditions of economically adequate performance of the wholesale driver-salesman route system, increases in volume per delivery and per route would result in a movement along the short-run route cost curve, and the lower unit distribution cost of increased efficiency would result in lower bread prices to the consumer. A sizable increase in the average sales of bread per grocery store in the postwar years provided the opportunity for the wholesale driver-salesman route system to realize increased efficiency associated with economies of scale in delivery. In 1958, supermarkets (grocery stores with more than $375,000 annual sales) accounted for 69 percent of total grocery store sales as compared with only 43 percent in 1952. However, the best available evidence suggests the opportunities for greater efficiency in bread distribution have not been realized; quite the reverse has occurred.

A representative sample of wholesale baking companies experienced a 30 percent decline in weekly wholesale route volume from 6,746 pounds in 1947 to 4,714 pounds in 1958, and an 18 percent decline in weekly volume per customer from 135 pounds in 1947 to 110 pounds in 1958.[26] Although the number of customers per route declined from 50 in 1947 to 43 in 1958, weekly miles traveled per customer increased from eight to ten miles. If we assume constant 1958 factor prices for purposes of comparison, the route cost relationships presented in Chapter 4 suggest that delivery costs increased by 1.5–2.0 cents per pound as a result of these changes in route factors: a decrease in volume per route, a decrease in volume per delivery, and an increase in length of route.

Although the driver-salesman system of bread distribution probably cannot be expected to equal the efficiency levels of the semi-trailer dock delivery system, it clearly could have approached more adequate performance levels in recent years had it merely maintained the efficiency levels achieved in 1947. Instead, distribution

26. *Hearings, op. cit.,* p. 6084.

of bread products has become more inefficient as the competing firms, under the cost protection of price leadership, focused competition on nonprice tactics to maintain or gain market shares.

Virtually all wholesale baking companies in an individual market attempt to sell bread in all retail grocery outlets within the area. Their market is shared on shelves within retail grocery outlets rather than store by store or areawise. Therefore, in competing to hold their share of shelf space, they deliver daily and often more frequently than that. They also attend to the placing and arrangement of bread on the grocery shelves. The result is that wholesale baking firms in general deliver to many stores with a small drop per store, making inefficient use of both distribution equipment and labor. Moreover, competitors extend distribution to stores at a greater distance from their plants. Even if they recognize that the most extended routes are inefficient, they are often compelled to continue them either to foreclose the invasion of their area or to retaliate against other firms. The result is that all wholesale baking companies that extend their routes experience an increase in distribution cost, as shown above, without an offsetting gain in average route volume.

Summary: Net Market Performance

The analysis thus far has considered several important criteria of market performance which have a bearing on the general welfare. These criteria have been examined individually, including the price, profit, and product norms, the efficiency of production and distribution, and the costs of nonprice competition. The relative importance of these factors is continually changing. Some apply to one segment or area of the industry and some to others. The important consideration remains to combine these criteria and establish within reasonable limits an estimate of the net performance of bread markets. In other words, how well does the total market activity of baking companies contribute to the public welfare?

It is often assumed by observers of industrial markets that changes in the product, price, and profit criteria of market performance are of primary importance. If it can be shown that the available economic improvements in product quality have occurred, if prices have a reasonable relationship to average total unit costs, and profit levels are not higher than experienced in all manufacturing, then performance of an industry may be said to be adequate (although perhaps less than optimum), and contributing satisfactorily to the general material welfare. Indeed the evidence with

respect to bakery profits supports the assumption that average profit levels of wholesale baking companies are not appreciably higher than those in all manufacturing, and at 1958 levels, have little impact on the general material welfare. While bread prices have advanced rapidly since World War II, they are closely related to changes in average total unit costs, at least in large-city markets (70 percent of U.S. consumption). Moreover, consumers often have the opportunity to purchase alternative private label brands in grocery chains at lower prices than wholesale brands. While real improvements in product quality have been very limited, there is little or no evidence that quality has deteriorated since World War II.

A consideration of these few performance criteria, however, is not sufficient to understand the performance of bread markets. In fact, the findings of this study lend support to the proposition that changes in the product and profit criteria may be secondary rather than primary determinants of performance in these markets. The conduct of firms in individual markets with respect to product quality seems to be largely predetermined, and prices of wholesaler brands are quite similar as profit levels tend to be protected by a pattern of price leadership. Individual companies are therefore more concerned with varying costs and output.

This study finds that the performance of bread markets with respect to cost and output primarily reflect the market power of oligopoly groups and changes in technology. The oligopoly market structure in wholesale bread markets is associated with interdependent conduct of enterprises with respect to pricing policies, nonprice practices and plant utilization as was shown in earlier chapters. In large part, no individual firm can independently have a beneficial effect upon market performance without risking serious economic repercussions for itself or for the oligopoly market group in question. Yet, technical advance in bakery equipment, in the transport and handling of bakery products, and in food merchandising in general are dynamic variables tending to bring about economic change in bread markets.

The performance of bread markets with respect to the introduction of efficient equipment and techniques of production, while less than optimum, has probably approached adequacy. Yet in oligopolistic bread markets, consumers have thus far realized little or no benefit from the progressive adoption of more efficient bread production technology.

Moreover, there is a tendency toward *chronic* under-utilization

of capital equipment and failure to achieve economies of scale in the baking industry. The study has revealed important potential savings in bread production and distribution. The "efficiency gap" between actual and necessary costs (in relation to given input prices) to provide the consumer with bread products suggests the performance of wholesale bread markets in 1958 was adequate except for the average retail price of bread which, at 19.3 cents per pound, was about 50 percent higher than would be required to cover necessary costs. This measure between where the industry is and where it could be if the economy were to make full use of its resources without straining productive capacity is in part a measure of the aggregate costs of oligopoly.

A comparison of the existing system with an optimum market organization suggests the *direction of possible adjustment* of undesirable market conditions which annually cost the American public more than one billion dollars. The more than $520 million potential production cost reduction could be realized by long-run adjustments in size of plant to 8,000 pounds per hour capacity, by adopting automatic continuous-mix machinery, and by operating the remaining plants at practical capacity levels (dependent in part on consumer willingness to benefit from early-week shopping). The estimated $530 million potential distribution and selling cost reductions could be realized by reorganization of the wholesale driver-salesman delivery system to semi-trailers and dock delivery. Some progress is being made toward achieving these potential economies, as noted throughout this report, but there are important institutional barriers at work that seem to account for the sizable lag in bread market performance.

While individual baking companies often have good economic reasons for technological adoption and plant expansion, such developments may be a mixed blessing for consumers, farmers, and some bakery companies. New output-increasing equipment and techniques of production have considerable potential for reducing costs as noted above. But levels of cost and output are not autonomous forces; in bread markets they are largely determined by the conduct of the industry itself. The alternatives open to bakery management include some variation of the following market conduct patterns:

(1) price competition to force bread prices to cost levels consistent with the increased efficiencies of larger plants and with a decrease in the number of bakeries (perhaps his own included); or

(2) price leadership which provides an "umbrella" covering pro-

duction and distribution costs experienced by existing plants operating at considerably less than capacity.

Empirical and logical bases have been developed in this study for the proposition that firms participating in oligopolistically structured markets generally have chosen the latter forms of market conduct. Firms tend to orient interfirm conduct around nonprice competition to increase their shares of bread markets. The resulting increase in selling costs has little or no beneficial effect on consumers. Per capita demand for the industry's products has declined by about 1 percent per year, and whatever changes in market share distribution have occurred among the oligopoly market groups have not been associated with lower costs and prices. This is because if some firms in oligopoly-structured markets increase their efficiency or gain fuller utilization of capital equipment, their success tends to shift excess capacity among participants in the market whose costs are increased. It is also due to mutual interdependence of oligopolists with respect to advertising, product variation, special packaging and servicing. Immediate immitation or retaliation usually ocurs, with the result that selling costs in bread markets increase with little or no beneficial shift in output between participants.

The general pattern of price leadership within oligopolistic groups of wholesale baking companies is usually of the cost barometric type, and is designed to keep market price comfortably above costs experienced by the group. Illegal price collusion and discrimination are seldom found in bread markets, for price leadership tends to protect the industry from destructive price competition and has the advantage of being legal. High cost firms have raised prices to cover costs of inefficient production and distribution with virtual certainty that other members of large-city market groups would follow, even though they may be more efficient. Price leadership has not usually provided the competitive discipline to drive out the higher-cost producers, or to force the remaining firms to operate at efficient levels of utilization of production and distribution facilities. Quite the reverse tends to occur. The market power of oligipoly groups in large-city bread markets tend to shield inefficient baking companies and sustain inefficient market practices.

The few exceptions to this practice are largely short run, intersegment, or a part of pricing tactics used by members of the oligopoly group in large-city markets to invade outlying areas of these markets. These modify but do not alleviate the more general price conduct and market performance pattern. As a result of increased plant capacity and grocery chain integration into baking, members

of the large-city oligopoly core have encroached upon outlying areas. Large-city bakers have practiced differential pricing and various nonprice share-gaining techniques in outlying areas beyond those practices common within the oligopoly core of large-city markets. The single-market firm in outlying areas is often unable to match these increased distribution and selling efforts, and usually dares not compete on price because of its vulnerability to price retaliation. Thus, there has been a gradual encroachment of the outlying market areas by the major wholesale bakers and an increase in concentration in the baking industry.

We can expect continued adjustment to fewer and larger bakeries. Just how far this adjustment will go is not yet clear, but potential economies are sizable. Findings of this study suggest that company growth in markets already served would better approach optimum economies of scale in bread distribution than further geographic expansion into additional market areas. Although we have not attempted here an exhaustive study of the economies of large multi-plant and multi-market company organizations, we have demonstrated that as these firms meet in several individual markets their rivalry expressed through price competition tends to diminish.

If company growth occurs in markets already served, concentration which often is already high may become higher, yet costs may decrease as aggressive nonprice competitive rivalry may diminish, a development which is a necessary (but not sufficient) condition for price reduction. It is our judgment that public policy toward maintaining competitive market structures through placing certain restraints on growth via merger should consider these different single- and multi-market effects.

This is not a study of the performance of the grocery retailing industry, but it has found that grocery chains have achieved marked efficiencies in distribution and selling without, however, consistently passing these savings on to the consumer in the form of higher quality or lower price. We find that a degree of bilateral oligopoly behavior often develops between an oligopolistic group of wholesale baking companies and an oligopsonistic group of corporate and voluntary grocery chains in which the chains often follow in both price and quality. Certainly, the private label bread price differential in many bread markets more nearly reflects general grocery chain price policy than necessary bread production and distribution costs.

This study opens a large area of legal-economic research. While it has dealt specifically with bread markets, the potential gains to the public from reorganization of bread market structure and con-

duct may not be unique among food markets in the American economy. Other studies have demonstrated similar technological and organizational problems—for example, in milk marketing.[27] These studies provide some of the information necessary to focus the forces of public opinion and of the law on the whole problem of attaining optimum market organization.

27. Bressler, *op. cit.*, p. 344–345; Clarke, *op. cit.*

Appendix

Date: February 1958

CONTRACT AND SCALE REPORT
a service of
AMERICAN BAKERS ASSOCIATION

Union: Teamsters #204
Contract Dates: 5/5/57 to 5/7/60
Opening permitted during term: No
Branch of industry: Wholesale Bread/Cake

Market area: Omaha, Nebr.
Population: 250,000
Barg. method: Joint

1. Occupational Wage Rates:[1]
   Salesmen—$74.75[2] base pay on 1st $275 in weekly sales & 6% on sales between $275 & $525 & 7% on all sales over $525 weekly. Guaranteed $77[2] per week. Salesmen (exclusive cake & sweet goods) $74.75[2] base pay on first $225 in wkly sales & 6% on sales from $225 to $525, 7% on sales over $525 wkly, guar $77[2] wk. Salesmen on route before taking responsibility for it, $72[2] 1st 4 months, $77[2] after 4 months.

	Eff. 5/5/57	Eff. 12/29/57
Transport Drivers	$2.13⅓	$2.09⅙
City store delivery	2.05	2.00
Stockroom drivers	2.00	1.95
Maintenance drivers	1.86	1.81
Special delivery drivers	1.78	1.73

2. Working time: 6-daywk. City 54 hrs., country 60 hrs (not incl check-in or lunch). City men off sts 3:30 P, country 5P (day bef dropout or hol 1 hr addit). Exclus ck & sweet goods off sts 5P. Non-commis dr guar 40 hrs in 6 days exc transp 48 hrs.
3. Principle changes in previous contract: Eff 5/5/57 sales base & guar incr $4 wk & hrly rated incr 10¢ hour. Eff 12/29/57 employer contrib $2 week to Pensions & all rates dropped $2 week or 5¢ per hour. Eff 5/4/58 conditions changed as indicated in.[1]
4. Shift differentials: no provision.
5. Overtime provisions: Transport drivers, 1½ time after 12 hours daily or 51 hours weekly. Special delivery, city store drivers, stockroom and maintenance drivers, 1½ time after 8 hours daily and 40 hours in 6 days and 1½ time after 32 hours in holiday week.
6. Vacations: 1 week after 1 year of service
   2 weeks after 3 years of service
   3 weeks after 12 years of service
   Vacation pay for salesmen based on earnings of route during vacation period. Hourly paid get regular weekly pay for vacation. If holiday in vacation period,

[1] Wkly rated reported in item 1 will be incr. eff 5/4/58 by $4 wk, $2.25 of which may be applied to Teamsters Health & Wel Fund at union's option & 5/3/59 wkly rates incr $5 wk, but $2 may be applied to Teams Pension Fund at union's option. All other employees incr proportionately on the same dates.

[2] Betw 5/5/57 & 12/29/57 rate was $2 wk higher but on 12/29/57 base pay & also guar, in case of salesmen, were reduced $2 wk & the $2 was diverted to cover employer contribution to Teamsters Pension Plan.

get $10 hol pay & get extra day off or extra day's pay at management's option.
7. Holidays: 6 holidays. Salesmen & extra salesmen $10 hol pay if work wk in which hol occurs. Transport drivers pd for time lost due to hol. No. Sun or Hol deliv of baked goods to stores. Spec deliv to restaurants, hotels, hospitals, etc okay. No Xmas delivery. Hrly workers get 8 hrs pay for hol. 1½ time after 32 hours.
8. Health and Welfare Or Pension plans: Eff 12/29/57 employer contrib $2 wk per employee to Teamsters Pension Fund[1] and [2]
9. Uniforms: If uniforms required, selected by employer. Employer pay ½ of cost, but it remains property of employee who must clean & maintain it. Unif shall bear union label & consist of cap, shirt, trousers, coat, sweater & anything else required by employer.
10. Miscellaneous: No strike, no lockout cl. Checkoff clause.

TABLE 27

UTILIZATION OF WHEAT FOR FOOD IN THE UNITED STATES, BY INDUSTRY GROUPS, TOTAL POUNDS, AND PER CAPITA, 1947, 1954, AND 1958

Industry	Wheat Flour Utilization			Percent Change	Per Capita Wheat Flour Utilization (pounds)		
	1947	1954	1958	1947-58	1947	1954	1958
Bread products							
1,000 pounds	8,273,500	8,656,077	9,175,452	10.9	57.9	54.6	52.7
percent	41.7	43.3	45.3				
Retail bake shops							
1,000 pounds	1,855,400	1,195,491	1,191,141	—35.8	13.0	7.5	6.8
percent	9.3	6.0	5.9				
Crackers and cookies							
1,000 pounds	1,428,800	1,723,161	1,962,652	37.4	10.0	10.9	11.3
percent	7.2	8.6	9.7				
Macaroni products							
1,000 pounds	833,800	805,853	906,846	8.8	5.8	5.1	5.2
percent	4.2	4.0	4.5				
Breakfast cereal							
1,000 pounds	362,618	363,345	372,969	2.9	2.5	2.3	2.2
percent	1.8	1.8	1.8				
Flour mixes							
1,000 pounds	602,459	795,851	891,590	47.9	4.2	5.0	5.1
percent	3.0	4.0	4.4				
Other*							
1,000 pounds	6,498,523	6,430,722	5,745,150	—11.6	45.5	40.6	33.0
percent	32.7	32.2	28.4				
Total, U.S.							
1,000 pounds	19,854,900	19,970,500	20,245,800	1.9	139.0	126.0	116.3
percent	100.0	100.0	100.0				

SOURCE: Calculated from U.S. Department of Agriculture and U.S. *Census of Manufactures* data.

* Primarily household and restaurant consumption, but also includes small amounts of miscellaneous food industry utilization.

[1] Wkly rated reported in item 1 will be incr. eff 5/4/58 by $4 wk, $2.25 of which may be applied to Teamsters Health & Wel Fund at union's option & 5/3/59 wkly rates incr $3 wk, but $2 may be applied to Teams Pension Fund at union's option. All other employees incr proportionately on the same dates.

[2] Betw 5/5/57 & 12/29/57 rate was $2 wk higher but on 12/29/57 base pay & also guar, in case of salesmen, were reduced $2 wk & the $2 was diverted to cover employer contribution to Teamsters Pension Plan.

TABLE 28

FOOD WHEAT UTILIZATION INDUSTRIES, VALUE OF SHIPMENT, NUMBER OF COMPANIES, AND MARKET SHARE OF THE 4, 8, AND 20 LARGEST COMPANIES, WITH PERCENT CHANGE, UNITED STATES, 1947–1958

Census Industry	Value of Shipments ($1,000)	Number of Companies (number)	4 Largest Companies (percent)	8 Largest Companies (percent)	20 Largest Companies (percent)
Bread product industry					
1947	2,403,589	5,985	16	26	36
1954	3,067,017	5,470	20	31	40
1958	3,699,473	5,305	23	32	42
Percent change 1947–58	53.9	−11.4			
Flour mix industry					
1947	78,442	115	41	60	78
1954	254,136	123	73	82	92
1958	262,720	112	75	86	94
Percent change 1947–58	234.9	−2.67			
Flour industry					
1947	2,526,646	1,084	29	41	57
1954	1,858,888	692	40	52	68
1958	1,969,993	703	38	51	68
Percent change 1947–58	−22.03	−35.15			
Cracker industry					
1947	540,222	249	72	77	85
1954	757,193	262	71	78	85
1958	915,760	280	65	72	82
Percent change 1947–58	74.7	12.45			
Macaroni industry					
1947	112,094	219	23	35	56
1954	149,656	226	26	37	58
1958	167,510	205	25	41	64
Percent change 1947–58	49.4	−6.39			
Breakfast cereal industry					
1947	284,320	55	79	91	98
1954	345,843	37	88	95	99+
1958	432,974	23	83	95	99+
Percent change 1947–58	52.3	−58.18			
Retail bake shops					
1947	562,372	15,686			
1954	641,600	16,543			
1958	728,700	16,653			
Percent change 1947–58	29.6	6.16			
Total					
1947	6,507,685	23,393			
1954	7,074,333	23,353			
1958	8,205,133	23,281			
Percent change 1947–58	26.1	−4.79			

SOURCE: U.S. *Census of Manufactures* reports.

TABLE 29

AVERAGE FACTOR COSTS OF PRODUCTION AND DISTRIBUTION, SELECTED BAKERY GROUPS—WHITE BREAD—UNITED STATES, 1958

	Quality Bakers of America (122 members)	4 Largest Wholesale Companies (203 plants)	5 Major Grocery Chains (83 plants)
	Cents	*Cents*	*Cents*
Production costs			
Ingredients	5.64	5.14	5.72
Production labor			
Direct	1.61	1.48	2.00
Indirect	.47	1.14	.68
Wrapping supplies	1.02	1.09	1.08
Depreciation	.44	.35	.17
Miscellaneous expenses	1.83	1.43	1.07
Total, production	11.01	10.63	10.72
Distribution costs			
Driver compensation	2.48		
Sales supervision	.59	3.21	.06
Shipping clerk	.30		
Advertising and promotion	.87	.66	.08
Stale return loss	.79	.60	.94
Delivery vehicle	.73		
Total, distribution	5.76	4.47	1.08

SOURCE: *Hearings, op. cit.*, p. 6593; *Report, op. cit.*, p. 113.

TABLE 30

SELECTED PRODUCTION COSTS[a] OF FOUR MODEL BREAD PLANTS WITH STANDARD EQUIPMENT, UNITED STATES, 1959

Selected Cost Items	Model Plant Sizes			
	2000 Lb./Hr.	4000 Lb./Hr.	6000 Lb./Hr.	8000 Lb./Hr.
	Dollars	*Dollars*	*Dollars*	*Dollars*
Pans	15,000	25,000	35,000	45,000
Pneumatic flour-handling equipment	48,000	60,000	72,000	84,000
Fermentation room do-tros, and hoist	20,400	27,600	34,800	45,600
Mixers and ingredient equipment	30,000	60,000	72,000	96,000
Divided, rounder, overhead proofer, moulder-panner	36,000	45,600	66,000	78,000
Proof box, monorail, and racks	24,000	36,000	48,000	60,000
Oven	54,000	72,000	84,000	96,000
Slicers and wrappers, conveyors to loading racks	21,600	48,000	72,000	84,000
Total equipment[b]	249,000	374,200	483,800	588,600
Plant[c]	200,000	300,000	400,000	500,000
Total plant and equipment	449,000	674,200	883,000	1,088,600
Production labor				
Direct (per shift)[d]	1,220	1,391	1,819	2,076
Indirect (fixed per week)[e]	1,400	1,400	2,600	2,800

[a] Excluding variable costs which are shown in Tables 31 and 32.

[b] Equipment valued at average installed price, 1959.

[c] Total plant area divided 40 percent production, 30 percent material and ingredient storage, and 30 percent shipping. Plant valued at $10 per foot.

[d] Direct production labor based on engineering estimates of bakery equipment manufacturer. It was assumed that (a) the numbers of direct production workers per shift were 13 for the 2000 lb./hr. plant, 15 for the 4000 lb./hr. plant, 20 for the 6000 lb./hr. plant, and 23 for the 8000 lb./hr. plant; (b) all workers were guaranteed a minimum of 40 hours employment for the week they were employed at $2.00 per hour, with a six and one-half hour shift guarantee and time and one-half for over-time beyond ten hours; (c) all workers were employed for a five day week with swing men utilized to fill in on a rotation basis, to allow six day bakery production; (d) all workers at each stage of the production process worked an amount of time equal to oven operating time; (e) all shifts included one additional employee as superintendent at $2.50 per hour plus time and one-half for over-time; and (f) total labor costs were increased 7 percent for Social Security, Worker's Compensation, and vacation allowance.

[e] Indirect production labor including janitor, maintenance, executive, and office salaries were derived from estimates by bakery consultants. Although this measure provides an approximation of the average level of administrative expenditures relative to level of output and plant size, no data has been developed on optimum operations.

TABLE 31

SELECTED PRODUCTION COSTS[a] OF FOUR MODEL BREAD PLANTS WITH AUTOMATIC EQUIPMENT, UNITED STATES, 1959

Selected Cost Items	Model Plant Sizes			
	2000 Lb./Hr.	4000 Lb./Hr.	6000 Lb./Hr.	8000 Lb./Hr.
	Dollars	*Dollars*	*Dollars*	*Dollars*
Pans	15,000	25,000	35,000	45,000
Pneumatic flour handling equipment	48,000	60,000	72,000	84,000
Continuous dough mix	150,000	150,000	300,000	300,000
Automatic final proofer	78,000	90,000	102,000	120,000
Oven	54,000	72,000	84,000	96,000
Slicers and wrappers, conveyors to loading racks	21,600	48,000	72,000	84,000
Depan-o-matic, pan return conveyor	16,800	19,200	21,600	26,400
Cooler, conveyors to slicers	36,000	78,000	90,000	102,000
Pan stacker and unstacker	19,200	20,400	21,600	22,800
Total equipment[b]	438,600	562,600	798,200	880,200
Plant[c]	180,000	270,000	360,000	450,000
Total plant and equipment	618,600	832,600	1,158,200	1,330,200
Production labor				
Direct (per shift)[d]	449	535	621	792
Indirect (fixed per week)[e]	1,400	1,400	2,600	2,800
Total production labor	1,849	1,935	3,221	3,592

[a] Excluding variable costs which are shown in Tables 33 and 34.

[b] Equipment valued at average installed price, 1959.

[c] Building size estimated at 10 percent less than for standard equipment due to continuous dough mix floor space saving. Baker Process Co., a Division of Wallace and Tiernan, Inc., 25 Main Street, Belleville, N. J.

[d] Direct production labor based on engineering estimates of bakery equipment manufacturer. It was assumed that (a) the numbers of direct production workers per shift were four for the 2000 lb./hr. plant, five for the 4000 lb./hr. plant, six for the 6000 lb./hr. plant, and eight for the 8000 lb./hr. plant; (b) all workers were guaranteed a minimum of 40 hours employment for the week they were employed at $2.00 per hour, with a six and one-half hour shift guarantee and time and one-half for over-time beyond ten hours; (c) all workers were employed for a five day week with swing men utilized to fill in on a rotation basis, to allow six day bakery production; (d) all workers at each stage of the production process worked an amount of time equal to oven operating time; (e) all shifts included one additional employee as superintendent at $2.50 per hour plus time and one-half for over-time, and (f) total labor costs were increased 7 percent for Social Security, Worker's Compensation and vacation allowance.

[e] Indirect production labor including janitor, maintenance, executive, and office salaries were derived from estimates by bakery consultants. Although this measure provides an approximation of the average level of administrative expenditures relative to level of output and plant size, no data has been developed on optimum operations.

TABLE 32

AVERAGE FIXED AND VARIABLE UNIT COSTS FOR MODEL BREAD PLANTS WITH STANDARD EQUIPMENT OPERATED UNDER CONDITIONS OF AVERAGE DAILY VARIATION IN DEMAND AND 1959 PRICES, UNITED STATES

Type and Size of Plant	Total Weekly Output[a]	Oven Operating Time[a]	Fixed Costs: Investment Depreciation[b]	Fixed Costs: Return on Investment[c]	Fixed Costs: Indirect Production Labor[d]	Fixed Costs: Total Fixed Costs	Variable Costs: Direct Production Labor[e]	Variable Costs: Ingredients[f]	Variable Costs: Wrapping Supplies[f]	Variable Costs: Shipping and Misc. Supplies[f]	Variable Costs: Utilities and Maint. Supplies[f]	Variable Costs: Total Variable Costs	Total Costs
Standard pounds/hr capacity	(lbs.)	(hours)	(cents per pound)										
2000													
	71,604	36	.650	1.123	1.955	3.728	1.693	4.90	1.02	.14	.24	7.993	11.721
	107,406	54	.433	.748	1.304	1.785	1.609	4.90	1.02	.14	.24	7.909	10.394
	143,208	72	.325	.561	.978	1.864	1.693	4.90	1.02	.14	.24	7.993	9.857
	179,010	90	.260	.449	.782	1.491	1.541	4.90	1.02	.14	.24	7.841	9.332
	214,848	108	.216	.395	.652	1.263	1.609	4.90	1.02	.14	.24	7.909	9.172
4000													
	113,393	36	.621	1.101	1.235	2.957	1.234	4.90	1.02	.14	.24	7.534	10.491
	170,089	54	.414	.734	.823	1.971	1.172	4.90	1.02	.14	.24	7.452	9.443
	226,790	72	.310	.550	.617	1.477	1.234	4.90	1.02	.14	.24	7.534	9.011
	283,480	90	.248	.440	.494	1.182	1.123	4.90	1.02	.14	.24	7.423	8.605
	340,176	108	.207	.367	.412	.986	1.172	4.90	1.02	.14	.24	7.472	8.458
6000													
	214,848	36	.433	.760	.931	2.124	.869	4.90	1.02	.14	.24	7.169	9.293
	322,272	54	.287	.507	.621	1.415	.824	4.90	1.02	.14	.24	7.124	8.539
	429,696	72	.215	.380	.466	1.061	.869	4.90	1.02	.14	.24	7.169	8.230
	537,120	90	.173	.304	.372	.849	.791	4.90	1.02	.14	.24	7.091	7.940
	644,544	108	.145	.253	.310	.708	.824	4.90	1.02	.14	.24	7.124	7.832
8000													
	286,463	36	.400	.701	.977	2.078	.749	4.90	1.02	.14	.24	7.049	9.127
	429,694	54	.267	.467	.652	1.386	.710	4.90	1.02	.14	.24	7.010	8.396
	572,926	72	.200	.350	.489	1.039	.749	4.90	1.02	.14	.24	7.049	8.088
	716,157	90	.161	.280	.391	.832	.681	4.90	1.02	.14	.24	6.981	7.813
	859,392	108	.133	.233	.326	.692	.711	4.90	1.02	.14	.24	7.011	7.703

[a] See Table 16.
[b] Depreciation of plant and equipment is based on a 20-year schedule with the exception of pans which were depreciated on a six-year basis.
[c] Return on investment (before taxes) is budgeted at 10 percent per annum.
[d] See footnote *e*, Table 29.
[e] See footnote *d*, Table 29.
[f] Based on average costs reported by an associated management group.

TABLE 33

AVERAGE FIXED AND VARIABLE UNIT COSTS FOR MODEL BREAD PLANTS WITH STANDARD EQUIPMENT OPERATED UNDER CONDITIONS OF UNIFORM DAILY DEMAND AND 1959 PRICES, UNITED STATES

Type and Size of Plant	Total Weekly Output	Oven Operating Time	Fixed Costs: Investment Depreciation	Fixed Costs: Return on Investment	Fixed Costs: Indirect Production Labor	Fixed Costs: Total Fixed Costs	Variable Costs: Direct Production Labor	Variable Costs: Ingredients	Variable Costs: Wrapping Supplies	Variable Costs: Shipping and Misc. Supplies	Variable Costs: Utilities and Maint. Supplies	Variable Costs: Total Variable Costs	Total Costs
Automatic pounds/hr capacity	(lbs.)	(hours)	(cents per pound)										
2000													
	72,000	36	.646	1.116	1.944	3.706	1.684	4.90	1.02	.14	.24	7.984	11.690
	96,000	48	.434	.837	1.458	2.779	1.516	4.90	1.02	.14	.24	7.816	10.595
	144,000	72	.323	.558	.972	1.853	1.684	4.90	1.02	.14	.24	7.984	9.837
	192,000	96	.242	.419	.729	1.390	1.516	4.90	1.02	.14	.24	7.816	9.206
	240,000	120	.194	.335	.583	1.112	1.516	4.90	1.02	.14	.24	7.816	8.928
	288,000	144	.162	.279	.486	.927	1.516	4.90	1.02	.14	.24	7.816	8.743
4000													
	144,000	36	.489	.867	.972	2.328	.972	4.90	1.02	.14	.24	7.272	9.600
	192,000	48	.367	.650	.729	1.746	.874	4.90	1.02	.14	.24	7.174	8.920
	288,000	72	.245	.433	.486	1.164	.972	4.90	1.02	.14	.24	7.272	8.436
	384,000	96	.183	.325	.365	.873	.874	4.90	1.02	.14	.24	7.174	8.047
	480,000	120	.147	.260	.292	.699	.874	4.90	1.02	.14	.24	7.174	7.873
	576,000	144	.122	.217	.243	.582	.874	4.90	1.02	.14	.24	7.174	7.756
6000													
	216,000	36	.430	.756	.926	2.112	.972	4.90	1.02	.14	.24	7.272	9.384
	288,000	48	.322	.567	.694	1.583	.777	4.90	1.02	.14	.24	7.077	8.660
	432,000	72	.215	.378	.463	1.056	.864	4.90	1.02	.14	.24	7.164	8.220
	576,000	96	.162	.283	.347	.792	.777	4.90	1.02	.14	.24	7.077	7.869
	720,000	120	.129	.227	.278	.634	.777	4.90	1.02	.14	.24	7.077	7.711
	864,000	144	.107	.189	.232	.528	.777	4.90	1.02	.14	.24	7.077	7.605
8000													
	288,000	36	.398	.697	.972	2.067	.745	4.90	1.02	.14	.24	7.045	9.112
	284,000	48	.299	.523	.729	1.551	.670	4.90	1.02	.14	.24	6.970	8.521
	576,000	72	.199	.348	.486	1.033	.745	4.90	1.02	.14	.24	7.045	8.078
	768,000	96	.150	.261	.365	.776	.670	4.90	1.02	.14	.24	6.970	7.746
	960,000	120	.119	.209	.292	.620	.670	4.90	1.02	.14	.24	6.970	7.590
	1,152,000	144	.100	.174	.243	.517	.670	4.90	1.02	.14	.24	6.970	7.487

SOURCE: Same as Table 31.

TABLE 34

AVERAGE FIXED AND VARIABLE UNIT COSTS FOR MODEL BREAD PLANTS WITH AUTOMATIC EQUIPMENT OPERATED UNDER CONDITIONS OF AVERAGE DAILY VARIATION IN DEMAND AND 1959 PRICES, UNITED STATES

Type and Size of Plant	Total Weekly Output[a]	Oven Operating Time[a]	Fixed Costs: Investment Depreciation[b]	Fixed Costs: Return on Investment[c]	Fixed Costs: Indirect Production Labor[d]	Fixed Costs: Total Fixed Costs	Variable Costs: Direct Production Labor[e]	Variable Costs: Ingredients[f]	Variable Costs: Wrapping Supplies[g]	Variable Costs: Shipping and Misc. Supplies[g]	Variable Costs: Utilities and Main. Supplies[g]	Variable Costs: Total Variable Costs	Total Costs
Continuous Automatic pounds/hr capacity	(lbs.)	(hours)	(cents per pound)										
2000													
	71,604	36	.744	1.353	1.955	4.052	.508	4.26	1.02	.14	.24	6.168	10.220
	107,406	54	.496	.902	1.304	2.702	.483	4.26	1.02	.14	.24	6.143	8.845
	143,208	72	.372	.676	.978	2.026	.508	4.26	1.02	.14	.24	6.168	8.194
	179,010	90	.297	.541	.782	1.620	.463	4.26	1.02	.14	.24	6.123	7.743
	214,848	108	.247	.451	.652	1.350	.483	4.26	1.02	.14	.24	6.143	7.493
4000													
	113,393	36	.671	1.200	1.235	3.106	.472	4.26	1.02	.14	.24	6.132	9.238
	170,089	54	.447	.800	.823	2.070	.446	4.26	1.02	.14	.24	6.106	8.176
	226,790	72	.335	.600	.617	1.552	.472	4.26	1.02	.14	.24	6.132	7.684
	283,480	90	.267	.480	.494	1.241	.430	4.26	1.02	.14	.24	6.090	7.331
	340,176	108	.224	.400	.412	1.036	.448	4.26	1.02	.14	.24	6.108	7.144
6000													
	214,848	36	.556	.871	.931	2.358	.289	4.26	1.02	.14	.24	5.949	8.307
	322,272	54	.369	.581	.621	1.571	.274	4.26	1.02	.14	.24	5.934	7.505
	429,696	72	.278	.436	.466	1.180	.289	4.26	1.02	.14	.24	5.949	7.129
	537,120	90	.222	.348	.372	.942	.263	4.26	1.02	.14	.24	5.923	6.865
	644,544	108	.185	.290	.310	.785	.274	4.26	1.02	.14	.24	5.934	6.719
8000													
	286,463	36	.447	.695	.977	2.119	.276	4.26	1.02	.14	.24	5.936	8.055
	429,694	54	.300	.463	.652	1.415	.263	4.26	1.02	.14	.24	5.923	7.338
	572,926	72	.224	.347	.489	1.060	.277	4.26	1.02	.14	.24	5.937	6.997
	716,157	90	.180	.278	.391	.849	.252	4.26	1.02	.14	.24	5.912	6.761
	859,392	108	.150	.221	.326	.697	.263	4.26	1.02	.14	.24	5.923	6.620

[a] See Table 16.
[b] Depreciation of plant and equipment is based on a 20-year schedule with the exception of pans which were depreciated on a six-year basis.
[c] Return on investment (before taxes) budgeted at 10 percent per annum.
[d] See footnote *e*, Table 30.
[e] See footnote *d*, Table 30.
[f] Based on experimental engineering data prepared by E. S. Mack, American Bakers Corporation, Inc., Teaneck, N. J.
[g] Based on average costs reported by an associated management group.

TABLE 35

AVERAGE FIXED AND VARIABLE UNIT COSTS FOR MODEL BREAD PLANTS WITH AUTOMATIC EQUIPMENT OPERATED UNDER CONDITIONS OF UNIFORM DAILY DEMAND AND 1959 PRICES, UNITED STATES

			Fixed Costs				Variable Costs						
Type and Size of Plant	Total Weekly Output	Oven Operating Time	Investment Depreciation	Return on Investment	Indirect Production Labor	Total Fixed Costs	Direct Production Labor	Ingredients	Wrapping Supplies	Shipping and Misc. Supplies	Utilities and Maint. Supplies	Total Variable Costs	Total Costs
pounds/hr capacity	(lbs.)	(hours)	(cents per pound)										
2000													
	72,000	36	.739	1.345	1.944	4.028	.506	4.26	1.02	.14	.24	6.166	10.194
	96,000	48	.554	1.009	1.458	3.021	.455	4.26	1.02	.14	.24	6.115	8.136
	144,000	72	.369	.673	.972	2.014	.506	4.26	1.02	.14	.24	6.166	8.080
	192,000	96	.277	.504	.729	1.510	.455	4.26	1.02	.14	.24	6.115	7.625
	240,000	120	.222	.404	.583	1.209	.455	4.26	1.02	.14	.24	6.115	7.324
	288,000	144	.185	.336	.486	1.007	.455	4.26	1.02	.14	.24	6.115	7.122
4000													
	144,000	36	.528	.945	.972	2.445	.372	4.26	1.02	.14	.24	6.032	8.477
	192,000	48	.396	.709	.729	1.834	.335	4.26	1.02	.14	.24	5.995	7.829
	288,000	72	.264	.472	.486	1.222	.372	4.26	1.02	.14	.24	6.032	7.254
	384,000	96	.198	.354	.365	.917	.335	4.26	1.02	.14	.24	5.995	6.912
	480,000	120	.159	.283	.292	.834	.335	4.26	1.02	.14	.24	5.995	6.829
	576,000	144	.132	.236	.243	.611	.335	4.26	1.02	.14	.24	5.995	6.606
6000													
	216,000	36	.552	.867	.926	2.345	.287	4.26	1.02	.14	.24	5.947	8.292
	288,000	48	.414	.650	.694	1.758	.259	4.26	1.02	.14	.24	5.919	7.677
	432,000	72	.276	.433	.463	1.172	.287	4.26	1.02	.14	.24	5.947	7.119
	576,000	96	.207	.325	.347	.879	.259	4.26	1.02	.14	.24	5.919	6.798
	720,000	120	.166	.260	.278	.704	.259	4.26	1.02	.14	.24	5.919	6.623
	864,000	144	.188	.217	.232	.637	.259	4.26	1.02	.14	.24	5.919	6.556
8000													
	288,000	36	.445	.691	.972	2.108	.275	4.26	1.02	.14	.24	5.935	8.043
	384,000	48	.335	.518	.729	1.582	.248	4.26	1.02	.14	.24	5.908	7.490
	576,000	72	.223	.346	.486	1.055	.275	4.26	1.02	.14	.24	5.935	6.990
	768,000	96	.168	.259	.365	.792	.248	4.26	1.02	.14	.24	5.908	6.700
	960,000	120	.134	.207	.292	.633	.248	4.26	1.02	.14	.24	5.908	6.541
	1,152,000	144	.112	.173	.243	.528	.248	4.26	1.02	.14	.24	5.908	6.436

SOURCE: Same as Table 33.

Index

Abel, Martin E., 42
Adelman, M. A., 96, 125
Albers Supermarkets, 26
Alsberg, Carl L., 24
American Baking Company, 2
American Machine and Foundry Company, 50
American Stores, 104, 105
American Sugar Refining, 84
Anheuser-Busch, 84
Antitrust as a remedy, 4
Automatic equipment, 7
  cost advantages of, 54 ff.
Automatic conveyor systems, 51 ff.

Bain, Joe E., 3, 8, 34, 37, 113, 115, 122, 129
Baker Process Company, 50
Bell, Hugh P., 36
Best Foods, 84
Blair, John, 46
Bressler, R. G., Jr., 77
Bright, Imogene, 46, 73
Brownies Chip Company, 33
Burk, M. C., 35
Burns, Arthur F., 84

Campbell Soup Company, 34
Campbell Taggert Associated Bakeries, 2, 24, 83, 97, 98, 101, 130
Capacity, 58 ff, 139
  reducing excess, 63 ff.
Carter, W. A., 96
Chain store bakeries
  capacity utilization, 62
  integration into baking, 103
  pricing practices, 102 ff.
  profits, 125 ff.
Chamberlin, Edward H., 106
Clarke, D. A., 77
Clayton Act, 88, 99
Clodius, Robert L., 3
Cochrane, Willard, 1, 42
Colonial Baking Company, 2, 97, 98, 104, 107
Colonial Stores, 26
Competition, 115 ff.
Consumer, 36 ff.
Consumption, 41, 66
Continental Baking Company, 2, 18, 24, 29, 30, 32, 33, 46, 82, 83, 84, 97, 98, 99, 102
Continuous mix, 48 ff.
Costs, distribution, 65, 68 ff
  alternative methods cost, 79 ff.
  as affected by route type, 74 ff., 148
  driver-salesmen, 73
  increases in, 146
  nature, 69
  potential reduction, 140 ff.
    barriers to, 142
  stale returns, 73
Costs, production
  alternative costs, 133
  labor, 46, 55
  plant utilization effect, 66, 131
  related to size, 16
  related to total costs, 44
  technological effects, 54 ff.
Costs, investment, 52

Davis, J. S., 108
DeLaoch, D. B., 131
Demand, 30, 40 ff., 68, 144
Driver salesmen compensation, 7
Dwoskin, Philip B., 147

Eberhard's Supermarket, 26
Edwards, Dorwin D., 88, 96
Eldred, Wilfred, 108
Engineering economic approach, 7
England, Wilber, 142
Engle, Nathanael H., 37, 113
Enochain, Robert V., 63, 141

Federal Trade Commission, 2, 88, 94, 99, 124
  advertising, 111 ff.
Fellner, William, 4
First National Stores, 104, 105
Fischer Bakery, 97
Flavor, 36
Flour, 35
Food Fair, 104

Garoian, Leon, 22, 23, 25, 26
Gechtel, W. G., 121
General Baking Corporation, 24, 30, 31, 32, 33, 46, 82, 84, 97
General Foods, 84
General Mills, 84
Grand Union, 104, 105
Great Atlantic and Pacific Tea Company, 104, 105, 106, 125
Guarantee Trust, 84

Harrus Roland G., 147
Hart's Bakery, 2, 98
Heflebower, Richard B., 138
Hinky Dinky Stores, 101
Hoffman, A. C., 103
Hollywood Bread, 112
Hoos, Sidney, 111

Inputs, 44
Ingredients, 44
Integration (see mergers)
  conglomerate, 33
  horizontal, 15
  vertical, 6
    by grocery chains, 8, 21, 100
Interstate Baking Company, 84

Johnson Pie Company, 34
Juree, L., 42
Justice Department, 2

Kaplan, David, 38
Kaysen, Carl, 12
Kindstrand, Evert, 133
Kingston Cake Company, 34
Kroger Supermarkets, 26, 104, 105, 106

Lamb, Roberta, 109
Langendorf Baking Company, 82
Learn, Elmern W., 42
Least cost production, 130 ff.
Lindahl, M. L., 96
Little, Arthur D., 3, 16
Loscher, Elan M., 76

Marine Midland Trust, 84
Market Behavior, see Market Conduct
Market Conduct, 82 ff.
  definition, 3
  discriminatory pricing, 2, 88, 98
  nonprice, 55, 106, 147
    advertising, 36, 70, 87, 99, 109 ff., 147
      private label, 110
    cost push, 106, 146
    costs of nonprice competition, 143 ff.
    packaging, 114
    product display, 39 ff., 62, 107 ff.
      stale return, 108
    product variation, 112 ff.
  predatory price practices, 97 ff.
  price conduct, 82 ff.
    collusive price fixing, 97
    differential pricing, 87 ff.
      as a marginal product, 96
      private label, 103 ff.
  price cutting, 87, 99, 101
  price leadership, 82 ff., 152
    cost barometric determination, 85
  reasons for following, 84
  pricing
    increases to meet competition, 84
    umbrella, 85, 146
  price competition, 83
    by independents, 94
    effects of, 87

Market Performance, 115 ff.
  definitions 3, 115
  efficiency, 130 ff., 148
    barriers to, 136 ff.
    price, 117 ff.
    product quality, 128 ff.
    profit, 112 ff.
    summary, 149 ff.

Market Structure, 8 ff.
  barriers to entry, 8, 37 ff.
  concentration
    buyer, 2, 12, 20 ff.
    seller (by markets), 16 ff.
      how increased, 28
    seller (nationally), 8 ff.
    under optimum conditions, 134 ff.
  definition, 3
  economies of scale, 7, 43 ff.
    increasing scale, 47
    model plants, 56 ff., 137 ff.
  mergers, 23 ff.
    horizontal, conglomerate, forward and backward vertical, 24
    reasons for, 29
  product differentiation, 8, 34 ff.

Market power
  effects of, 5, 46

Markets
  definition, 8
  inter-pentration, 17
  primary, 8
Mead's Bakery, 97, 98
Meinkenm, Kenneth W., 42
Melenbaum, Wilfred, 42

Miller Supermarkets, 26
Milling, flour, 35
Milling
  machinery, 47
Model bread plants, 54 ff.
Monopoly, 115 ff.
Morton's Frozen Foods, Inc., 33
Mueller, Willard F., 3, 22, 23, 26
Multi-plant operation, 14
  cost reducing, 64
  profits, 124
  reasons for, 31, 63

National Bakers Services, Inc., 112
National Biscuit, 84
National Dairy, 84
National Tea, 26, 104, 105
Nelson, Paul E., 25, 27, 30, 33

Oligopoly
  bilateral, 6, 22
  definition, 4
  in bread, 4, 150
  in operation, 82 ff.
  theory modification, 5
Omar, Inc., 25, 32, 33
Optimum performance, 117, 133, 151
Optimum scale, 131
  concentration under, 134 ff.
Oscar Griess Grocery Store, 107
Ovens
  operation and design, 53 ff.
Oxenfeldt, Alfred R., 82

Pan-O-Gold Bakery, 101
Panschar, William G., 2, 47
Papandreou, A. G., 37
Paul, Allen B., 25, 27, 33
Pepperidge Farms, 34, 35
Perishable, 35
Phoenix Bakery, 97
Polly Anna Pastry Kitchens, 26
Private label bread, 62, 100
  advertising, 110
  distribution, 80
    independent suppliers, 95
  price cutting, 99
Profits
  maintenance of, 85
Public interest, 3
Purdy, H. L., 96
Purity Baking Company, 46

Quality Bakers of America, 14, 125

Red Owl Supermarkets, 26
Robinson, E. A. G., 96
Robinson Patman Act, 88, 99
Rothberg, Herman J., 47, 48
Routes, 68
  cost comparisons, 141

Safeway Stores, Inc., 104, 105, 106, 112
Sammet, L. L., 7, 56
Schultz, Henry, 42
Scott, Forest E., 10
Senate Agricultural Committee, 2
Senate Subcommittee on Antitrust
  and Monopoly, 2
  hearings and reports, 6
Sherman Anti-Trust Act, 97
Silver Leaf Baking Company, 112
Slater, Charles C., 2, 31, 68, 72, 100, 120
Sosnich, Stephen H., 3, 4, 116, 117
Sperry, E. J., 109
Standard Oil, 84
Stigler, George J., 29
Stewarts, Inc., 33
Storey, David A., 65
Super Value Stores, 101
Swift and Company, 84

Taylor, L. C., 35
Teamsters Union, 72, 74
  contract specifications in appendix
Technology
  as a vehicle of change, 5, 47
Thompson's Candy House, 34
Turner, Donald F., 12

Unit costs, 54 ff., 137 ff., 144 ff.
Utilization, plant, 7, 65
  effect on costs, 58 ff., 150 ff.
  undercapacity, 50

Van de Kamp's Bakery, 32
Vatter, Harold G., 5
Vernell's Buttermints, 34

Wages, 47, 136
Wallace and Tiernan Chemical Company, 50
Ward Food Products Corporation, 24, 34, 46, 82, 83, 84, 86, 99
Wendelin Baking Company, 107
Wentmore, John R., 42
Weston, J. Fred, 24, 29, 32, 106
Wheat, 45
Wheeler, J. T., 37
William Frigofer Baking Company, 99
Wilson and Company, 84
Winn-Dixie Bakery, 26, 104, 106
Wonder Bread, 111, 112
Wrapping, 47

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