



This is to certify that the
thesis entitled

AN EXPLORATORY LOOK AT A
MULTIVARIATE APPROACH TO
RETAIL PRICE DISPERSION

presented by

John M. Schleede Jr.

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Marketing

Major professor

Date

October 2, 1978.



OVERDUE FINES:

25¢ per day per item

RETURNING LIBRARY MATERIALS:

Place in book return to remove
charge from circulation records

~~LO 0807/04-2~~ 327

AN EXPLORATORY LOOK AT A
MULTIVARIATE APPROACH TO
RETAIL PRICE DISPERSION

By

John M. Schleede Jr.

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Marketing and Transportation Administration

1978

ABSTRACT

AN EXPLORATORY LOOK AT A MULTIVARIATE APPROACH TO RETAIL PRICE DISPERSION

By

John M. Schleede, Jr.

This study was designed to investigate the nature of retail price variation more closely. Previous studies have focused on retail price dispersion as the function of a single independent variable. This study viewed price dispersion as a multivariate problem. This study also investigated the nature of retail price levels. Since this study was exploratory in nature only two consumer products were selected, flour and bacon. Three independent variables; brand advertising, retail competitive structure and retail store class were used to explain retail price variation and retail price levels.

Retail prices for flour and bacon were collected over a two day period in two hundred and thirty nine retail food stores in a ten county northwest Ohio area. A retail competitive structure index was then developed for each county in the ten county area. Brand advertising expenditures for each brand of flour and bacon found in the research were obtained. Retail store classes were determined by using the traditional classes as found in the literature. Retail price variation was measured by using simple and multiple linear regression techniques. The retail price level analysis was conducted by analysis of variance and multiple classification analysis.

The analysis of retail price dispersion showed differing results for both product classes. For flour, all three independent variables were significant. However, store class was the most efficient in explaining retail price variation. The r^2 of .542 was almost as high as the R^2 for the total model. For bacon, the most efficient model was the multiple regression model. The R^2 of .29985 was better than each variable could do individually. It is interesting that store class was the variable which explained the most variance for flour, while brand advertising was the best variable to explain price variation for bacon. In neither model was competitive structure a major factor. Two possible explanations might be the use of county wide data and the measurement of structure rather than performance.

The analysis of retail price levels was accomplished through ANOVA and MCA. In general, the results of the analysis on price dispersion were duplicated in the analysis of retail price levels. Advertising and store class were always significant. The ANOVA model utilizing these two independent variables explained the most variance in price levels for flour. In the MCA, the R^2 for the model utilizing brand advertising and store class was .589. The interactions in the ANOVA for flour were not significant.

For bacon, similar results were found. Advertising was the most important variable in explaining retail price levels. However, the R^2 for brand advertising and store class in the MCA was lower at .236. One possible explanation for this might be that the interactions in the ANOVA were significant and MCA is insensitive to interactions. As with the previous analysis, retail competitive structure was not significant.

The study points out the complexity of retail price dispersion. Earlier studies featured only one independent variable and therefore oversimplified the nature of retail price variation. It also points out that there are differing patterns of retail price dispersion. Even for products within the same general class of food products. A third contribution is that it demonstrates that manufacturers do have an influence on retail price dispersion and price levels. Brand advertising by the manufacturer was significant in every model. Finally, this study points to a possible link between price variation and price dispersion.

ACKNOWLEDGEMENTS

First acknowledgement must be given to my wife Linda, who gave me love and encouragement not only through the long process of the dissertation, but throughout the entire doctoral program. Without her support, this dissertation would not have been possible.

Secondly, my thanks to my committee; Dr. Donald A. Taylor, Dr. Gordon E. Miracle and Dr. Leo G. Erickson. Dr. Taylor undertook the crucial role of committee chairman and continually urged me to "keep my nose to the grindstone." Dr. Miracle and Dr. Erickson both provided necessary comments and suggestions throughout the dissertation process. Both worked continuously to force me to clarify both the subject and my labored prose.

Thanks also to Bowling Green State University, who provided the necessary computer time and the technical assistance of Ralph St. John of the Statistical Consulting Service.

Finally, a thank you to my typists; Melissa Hudson and Denise Grove who typed the first drafts, struggling continuously with my poor penmanship. And to Diane Scribner who put the final draft together.

TABLE OF CONTENTS

<u>Chapter</u>	<u>Page</u>
I. AN OVERVIEW OF THE STUDY	1
Problem Background	1
Statement of the Problem	3
Statement of the Hypotheses	5
Definitions	6
Methodology	7
Scope of the Study	7
Product Class Selection	8
Data Collection	8
Statistical Testing	9
Conclusion	9
Contributions	9
Limitations	10
II. A REVIEW OF THE LITERATURE	11
Introduction	11
Extent of Price Variation	12
Marketing Functions and Efficiencies	14
Food Prices and Geographic Location	17
Bargaining Strength and Price Discrimination	18
Information and Prices	21
Theories of Advertising and Price Dispersion	21
Retail Advertising and Price Dispersion	26
Manufacturer Advertising and Price Dispersion	28
Retail Competition	31
Retail Competition and Price Dispersion	35
Conclusion	37
III. RESEARCH METHODOLOGY	38
Introduction	38
Research Hypotheses	38
Data Collection	40
Brand Advertising	40
Competitive Structure	42
Store Classes	45
Retail Prices	46
Market Area	48
Rationale For Market Area Choice - Data Selection	48
Statistical Testing	51
IV. PRESENTATION OF RESEARCH FINDINGS	53
Introduction	53
Summary of the Data	53

<u>Chapter</u>	<u>Page</u>
Results of the Simple Linear Regressions	57
Product Class - Flour	60
Product Class - Bacon	62
Conclusion	62
Results of the Multiple Linear Regression Models	64
Introduction	64
Product Class - Flour	64
Product Class - Bacon	66
Conclusion	67
Differences Between the Two Product Classes	67
Presentation of Beta Weights	69
Conclusion	70
V. AN ANALYSIS OF RETAIL PRICE LEVELS	73
Introduction	73
Statistical Testing	73
The Data	74
The Calculations	75
Results	76
Product Class - Flour	76
Product Class - Bacon	79
Conclusions	81
VI. CONCLUSIONS AND RECOMMENDATIONS	83
Introduction	83
Conclusions	84
Contributions	88
Managerial Implications	88
Recommendations For Future Research	90
Conclusion	91
APPENDICES	
A. Rationale For Independent Variable Selection	92
B. Data Recording Sheet for Observations	93
C. Instructions For Data Collection	94
D. Data Summary Sheet	95
BIBLIOGRAPHY	96

LIST OF TABLES

<u>Table</u>		<u>Page</u>
3-1	Advertising By Brand	41
3-2	Employment and Size Class of Food Retailers in Ten County Area	43
3-3	Calculation of Concentration Indices	44
3-4	Food Retailers Observed In Ten County Area	47
3-5	Ten County Market Area	49
3-6	Ten County/State of Ohio Comparisons	50
4-1	Summary of Results - Flour	55
4-2	Summary of Results - Bacon	56
4-3	Correlation Matrix - Flour	58
4-4	Correlation Matrix - Bacon	59
4-5	Simple Linear Regression Results - Flour	61
4-6	Simple Linear Regression Results - Bacon	63
4-7	Multiple Linear Regression Results	65
4-8	Beta Weights For Each Independent Variable	71
5-1	Data Calculated To Replace Missing Data	77
5-2	Summary of Results - Flour	78
5-3	Summary of Results - Bacon	80
6-1	Comparison of Results From Two Studies	86

CHAPTER I

AN OVERVIEW OF THE STUDY

PROBLEM BACKGROUND

There have been many attempts to determine what causes retail price dispersion or variation. That is, why does the price of any individual brand vary from store to store? Early studies attributed the differences to the superiority of chain store operations, with centralized buying and more efficient operations.¹ Later discussions of this topic have been concerned with racial discrimination,² lack of information,³ or bargaining ability.⁴

While these factors contributed to determining what causes price dispersion, the list is far from complete. The following list illustrates others that might well be included:

¹Dorothy Dowe, "A Comparison of Independent and Chain Store Prices," Journal of Business, Vol. 5, No. 2 (April, 1932), pp. 130-144.

²Donald E. Sexton, Jr., "Comparing the Cost of Food to Blacks and to Whites - A Survey," Journal of Marketing, Vol. 35, No. 3 (July, 1971), pp. 40-46.

³George J. Stigler, "The Economics of Information," The Journal of Political Economy, Vol. 69, No. 3 (June, 1961), pp. 213-225.

⁴Walter S. Primeaux, Jr., "The Effect of Consumer Knowledge and Bargaining on Final Selling Price: A Case Study," Journal of Business, Vol. 43, No. 4 (October, 1970), pp. 419-426.

1. Retail advertising
2. Manufacturer advertising
3. Retail competition
4. Manufacturer competition
5. Geographic differences
6. Goods class
7. Stage in the Product Life Cycle
8. Factory Selling Price
9. Retail market coverage
10. Resale Price Maintenance

All of these factors might well cause prices to either become more dispersed or conversely to bunch more closely together.

Therefore, the previous studies would have to be considered as only tentative in nature, since all of them have considered the problem of price dispersion as unidimensional. Each study has considered only one possible cause of price dispersion. Further, they have failed to take into account the dynamic relationship between firms at different stages in the channel of distribution. The studies usually neglect either the retailers or the manufacturers' role in setting retail prices.

This study is an attempt to advance the knowledge of what causes price dispersion in two ways. First, by approaching the problem as multidimensional, more than one variable will be included. Secondly, both the manufacturers and retailers influence on the final selling price will be included. Because of the impracticality of including all possible products, this study will be exploratory in nature.

STATEMENT OF THE PROBLEM

The major problem is to determine the relative importance of different variables on retail price dispersion. However, as there are a large number of possible influences, many of them unmeasurable, only a few will be studied.⁵ The three independent variables which will be examined are; national advertising, retail competition, and store type.

The study will examine the differences in the dispersion of prices for nationally advertised and unadvertised products. The major purpose for including this variable is to test two diverse theories concerning the nature of advertising and retail prices. Stigler argues that retail advertising provides information and causes prices to become more homogeneous.⁶ Steiner states that just opposite occurs. Brand advertising causes retail price advertising, and this retail price advertising is itself a source of dispersion.⁷

A second factor which would tend to influence price dispersion is the level of retail competition. Studies have shown that retail prices vary by geographic area, and it is hypothesized that these differences are due to competition.⁸ However, little is known about the effect of competitive structure on price dispersion. Most authors feel that as competition increases, so does the diversity in consumer prices.

⁵For a discussion of why the variables not chosen for the study were excluded, see appendix A.

⁶Stigler, "Economists of Information," p. 223.

⁷Robert L. Steiner, "Toward a New Theory of Brand Advertising and Price," a paper presented at the Annual Meeting of the American Academy of Advertising, (Minneapolis, Minnesota, March 27, 1977), pp. 7, 8.

⁸Ralph Cassady, Jr., and E. T. Grether, "Locality Price Differentials in the Western Retail Grocery Trade," Harvard Business Review, Vol. 21, No. 2 (Spring, 1943), pp. 190-206.

The final variable that will be included in the study, is type of retail store. This has been the most widely tested area in price dispersion. There is no doubt that prices do vary by store type.¹⁰ For the most part, these differences have been attributed to variations in cost curves,¹¹ or to differences in services performed.¹²

These two reasons might well be complementary. Because different types of retailers offer varying degrees of services, they are likely to have different average cost curves. For example, the customary gross margin requirement of department stores is very different from that of mass merchandisers. Therefore, it seems likely that the same brand, sold by both types of retailers, will vary in price whether it is advertised or not.

Just as it would be impossible to include all potential variables in the analysis, it would be impossible to deal with all types of products and retailers. Therefore, this study will focus on grocery products. Foods products are sold through a large number of different types of retailers. Similarly, they range from very heavily advertised brands, to those that are not advertised at all. It has also been shown that the degree of competition varies from market to market.¹³ Therefore,

¹⁰Werner Z. Hirsch, "Grocery Chain Store Prices - A Case Study," Journal of Marketing, Vol. 21, No. 1 (July, 1956), pp. 9-25.

¹¹Robert J. Minichiello, "The Real Challenge of Food Discounters," Journal of Marketing, Vol. 31, No. 2 (April, 1967), pp. 37-41.

¹²Harold M. Haas, "Price Differentials Among Grocery Stores in Bloomington, Indiana," Journal of Marketing, Vol. 5, No. 2 (October, 1940), pp. 148-155.

¹³Howard E. Morgan, "Concentration in Food Retailing," Journal of Farm Economics, Vol. 46, No. 4 (December, 1965), pp. 1332-1346.

grocery products provide an excellent opportunity for a case study. A more complete rationale for this selection will be presented later.

STATEMENT OF HYPOTHESES

The hypotheses are drawn from the previous discussion. The first is designed to test the two alternative statements concerning advertising's effect on retail prices. The second hypothesis deals with the effects of competition on retail price variation. The evidence suggests that prices will vary when competition increases, however, this has not been empirically tested. The third hypothesis tests the effect of retail store types on retail dispersion. This variable was tested extensively during the 1930's and 1940's. The purpose of this variable is to reexamine this previous work. The final hypothesis is related more directly to the purpose of the study. It is designed to determine whether all three variables, or any combination of them can contribute more to understanding retail price variation, than any single variable.

Hypothesis One: There will be no statistical relationship between retail price dispersion and brand advertising.

Hypothesis Two: There will be no statistical relationship between retail price dispersion and retail competitive structure.

Hypothesis Three: There will be no statistical relationship between retail price dispersion and different retail store classes.

Hypothesis Four: There will be no differences in the ability of a univariate model and a multivariate model in explaining retail price dispersion.

DEFINITIONS

Retail price dispersion - The variations in prices for brands within a product class, or price variance.

Brand advertising - The support given by a manufacturer or distributor of a product through mass media advertising.

Retail competitive structure - The concentration of food retailing as measured by county.

Store classes - The different types of food retailers as modified from the literature on food retailing.

METHODOLOGY

Scope of the Study

In order to limit the scope of the study, it is necessary to concentrate on only one area of retailing. Attempting to compare products from such diverse areas as food, apparel, appliances, pharmaceuticals, etc., would present both methodological and logical problems. It would also increase the scope of the study well beyond what would be practical to attempt. As an example of this problem, consider the food, apparel and appliance businesses. The apparel business relies heavily on personal selling, the food business on brand advertising, while the appliance industry uses a fairly even blend. Therefore, it would be expected that the effect of brand advertising on price variation would differ. Since this study involves the effect of brand advertising, it was decided to concentrate on food products.

Grocery and food products typically exhibit the characteristics needed to complete this project. There are many product classes from which to select. At least some of these product classes exhibit the necessary advertising characteristics. That is, there is a distribution of advertising effort from brands with little or no advertising expenditures to those brands which spend millions of dollars. Similarly, there are many different types of retailers selling food products. This would enable the third hypothesis to be tested. Finally, a relatively small market area can be used, yet there will be enough food retailers to ensure sufficient data for hypothesis two.

Product Class Selection

The products selected for this study were chosen from those product classes listed in Leading National Advertisers, and from inspection of various retail stores in Bowling Green. For this study, only products normally stocked by all types of food stores were considered. Five pound bags of all purpose flour and one pound packages of sliced bacon were the two products selected.

The selection of these two products were guided by the hypotheses. The first criterion was based on the number of brands within the product class. If the number was too small, the results would be meaningless, since lesser brands would not have enough distribution to make any analysis possible. This would be particularly true if there were one dominant brand.

Similarly, if all of the major brands were heavily advertised by the manufacturers, there would be few, if any, differences between brands, at least in terms of the stated hypothesis. If all of the brands were unadvertised, the same situation would occur. Therefore, the product classes chosen must have at least ten brands in it, with a distribution of advertising expenditures ranging from little or none, to very heavy expenditures. Both flour and bacon exhibited the requisite pattern, therefore, they were selected for this study.

Data Collection

As defined earlier, the dependent variable is the prices of brands, between stores and within product classes, or price variance. The independent variables are brand advertising, store class and level of retail

competition. The dependent variable was collected by observation. Seven senior marketing students collected prices through a ten county area. The same method was used to determine store classes. Brand advertising figures were reported by Leading National Advertisers. The concentration figures were developed from data collected by the Bureau of Census and reported in County Business Patterns.

Statistical Testing

The statistical tests of the hypothesis were performed by simple and multiple linear regression. Simple linear regression was used to match each independent variable with the dependent variable. This technique was used to test the first three hypotheses. The final hypothesis was tested through multiple linear regression. This technique determines the degree of association between all three independent variables and the dependent variable.

CONCLUSION

Contributions

The major contribution of this study is that it examines an old problem in a new and potentially more meaningful fashion. It is the first study to use a multivariate technique to study price dispersion. It is also the first study to include both manufacturer and retailer effects in the same model. While it remains an exploratory study, the direction for future research is indicated.

Limitations

There are a number of limitations to this study. Because of its exploratory nature, it will only deal with one type of product - grocery and food items. Similarly, only a few items can be analyzed. Secondly, the data were collected from a convenience sample of ten counties in Ohio. Therefore, even within the realm of those two food products, the results cannot be generalized to any population, except that ten county area.

CHAPTER II

A REVIEW OF THE LITERATURE

INTRODUCTION

A lengthy list of possible influences on price dispersion was introduced in chapter one. However, not all of these possible influences have been discussed in the literature. Therefore, the scope of this literature review is confined only to those areas where there is a substantial body of either conceptual or empirical writings. While all areas where price dispersion has been linked to a possible cause are discussed, more emphasis is placed on the variables that will be utilized in this research.

The review begins by detailing the extent of retail price variation. After establishing that price dispersion does exist in the marketplace, store class, the most widely tested variable is presented first. The next two variables discussed are ones that are not included in this study, geographic location and price discrimination. The remainder of the chapter is devoted to the other two independent variables, advertising and retail competition.

Extent of Price Variation

There is little doubt that the prices consumers pay for a product or service varies significantly from retailer to retailer. This phenomenon holds true for even one brand in a single market. In fact, price dispersion seems to exist no matter what the type of product or where the geographic location of the market. This was demonstrated by Jung who published seven studies on price dispersion during the period from 1959-1965. Jung centered the studies around three product classes; automobiles, washing machines, and carpeting.

In investigating price variations for automobiles in the Chicago market, Jung found that "...some dealers do offer lower prices than others and that lower prices can be obtained by shopping around."¹ Jung conducted the first series of automobile price investigations only in the Chicago market. The interviewer asked for the same model, with the same optional equipment, using the same bargaining ploy.² In this study, Jung found ranges of \$182, \$333, and \$210, for three different medium sized automobiles.³ These ranges are similar to those he found for higher priced automobiles in the same market.⁴

In a similar study, Jung investigated the prices of two compact automobiles over a period of three consecutive months. Not only did the prices vary each month, but the prices varied between months. The ranges for the

¹Allen F. Jung, "Price Variations Among Automobile Dealers in Chicago, Illinois," Journal of Business, Vol. 32, No. 4 (October, 1959), p. 315.

²Allen F. Jung, "Price Policy and Discounts in the Medium-and High-Priced Car Market," Journal of Business, Vol. 33, No. 4 (October, 1960), p. 342.

³Ibid., p. 344.

⁴Ibid., p. 345.

Corvair were from \$222-280, for the Falcon from \$255-270.⁵ It is interesting to note that there is an absence of any pattern in these variations. For the Corvair, the greatest variation was in month one and the least in the second month. Exactly the opposite from the monthly variation patterns for the Falcon.⁶ This particular study was conducted in three major cities, so these price variations are not just a Chicago phenomenon.

Similar studies were also conducted by Jung for washing machines and carpeting. In both cases, Jung expressed his findings as a percentage discount from list price. In 1955, for washing machines this percentage ranged from 35.3%-6.7%. In 1958 the range was from 34.4%-20%.⁷ For carpeting, the range was from 0-22.4%.⁸ Overall, the mean discounts were much larger for washing machines than for carpeting.

Price Variation in the Food Industry

Many studies have been conducted, which demonstrate that price variations are not limited to consumer durables. A study by Millican and Rogers on non branded food items, found a difference at the .01 level of significance for eight of nine items in twenty-five stores.⁹ A similar study on branded

⁵Jung, Allen F., "Prices of Falcon and Corvair Cars in Chicago and Selected Cities," Journal of Business, Vol. 33, (April 1960), pp. 121-126.

⁶Ibid., p. 122.

⁷Allen F. Jung, "Price Variations on Automatic Washing Machines in Chicago, Illinois, Among Different Types of Retail Outlets - 1955 versus 1958," Journal of Business, Vol. 32, No. 2 (April, 1959), p. 139.

⁸Allen F. Jung, "A Different Retail Price Pattern, The Case of Carpeting," Journal of Business, Vol. 38, No. 2 (April, 1965), p. 183.

⁹Richard D. Millican and Ramona Jean Rogers, "Price Variability of Non-Branded Food Items Among Food Stores in Champaign-Urbana," Journal of Marketing, Vol. 18, No. 3 (January, 1954), p. 283.

merchandise found significant variance on all twenty-five items studied over ten retailers.¹⁰

Marketing Functions and Efficiencies

An early study of retail grocery prices by Taylor, found that the consumer could save 13.79% by shopping for 62 branded items at chain stores rather than independents.¹¹ Taylor made this conclusion after comparison shopping 24 chain stores and 69 independents. The total percentage reflects an average, as Taylor computed a mean price for each item by store type.¹²

A similar study was conducted by Dowe. She used a similar methodology in a different locale to obtain approximately the same results. Of the 48 items studied, in only one case did the independent retailers have a lower average price.¹³ This author found that on the average the price advantage of chains over independents was 8.53%.¹⁴

A study by Newcomer and Perkins differed from the previous ones by classifying stores by size rather than ownership. They concluded that, "Prices are related to size."¹⁵ In this study ten products, including both branded and non-branded items, were studied. In their analysis of the results, they state that low prices are related to efficiency, and that

¹⁰Harold M. Haas, "Price Differentials Among Grocery Stores in Bloomington, Indiana," Journal of Marketing, Vol. 5, No. 2 (October, 1940), p. 152.

¹¹Malcolm D. Taylor, "Prices in Chain and Independent Grocery Stores in Durham, North Carolina," Harvard Business Review, Vol. 8, No. 4 (July, 1930), pp. 420, 421.

¹²Ibid., p. 417.

¹³Dorothy Dowe, "A Comparison of Independent and Chain Store Prices," Journal of Business, Vol. 5, No. 2 (April, 1932), p. 136.

¹⁴Ibid., p. 137.

¹⁵Mabel Newcomer and Margret Perkins, "Price Variations Among Poughkeepsie Grocers," Journal of Marketing, Vol. 4, No. 1 (July, 1939), p. 43.

efficiency was apparently due to size.¹⁶ The authors appear to define efficiency as turnover.

Haas criticized these previous surveys for neglecting the element of service in their price studies.¹⁷ In an attempt to correct this oversight, Haas added in such things as credit and delivery. The study concentrated on the prices of fifty-one nationally advertised brands. As with the previous studies, Haas found that chain stores indeed had lower prices. But he felt that this was not the issue. He states that there are two relevant demand curves, one for products and one for services.¹⁸ Therefore, consumers will make their decision not on price alone, but by trading off between price and service.

Extending Haas' argument further, Wolfe argued that it is incorrect to compare independents and chains. Both of these groups should be divided into various subclasses. This would depend on the degree of service or self-service offered, and whether the independent belonged to a voluntary chain or not.¹⁹ According to Wolfe, what makes these divisions important are the functions that these different types of retailers perform. Wolfe, maintains that distribution costs can be lowered by:

1. Eliminating a function
2. Having the customer perform the function
3. Performing the function more efficiently²⁰

¹⁶Ibid., p. 43.

¹⁷Harold M. Haas, "Price Differentials in Bloomington," p. 148.

¹⁸Ibid., p. 151.

¹⁹Harry Deane Wolfe, "Grocery Prices and Marketing Functions," Journal of Marketing, Vol. 6, No. 1 (July, 1974), p. 27.

²⁰Ibid., p. 27.

Wolfe then proceeded as in previous studies, using 55 advertised products and twenty-five retailers. Based on his retail classification scheme, he found that the chain supermarket had the lowest price, while the full service voluntaries had the highest.²¹

A similar study was conducted by Millican and Rogers using ten non-branded products. They found similar but not necessarily identical results. They found chains to have the lowest prices in produce, while independent and voluntary retailers had lower prices for meat products.²²

In a more recent study, Minichiello studied the contrast between discount and conventional food stores. He found that discount food operations had a total gross margin of from 4.2% to 6% less than a conventional supermarket operation.²³ Minichiello attributed these differences to lower labor costs and the eliminations of trading stamps. The operating expenses for discount operations were from 2.5% to 3.6% lower than for conventional food retailers.²⁴

From these studies it would seem that different food stores do have differing policies for identical items. These can be attributed to the number of functions performed by the retailer and the operating efficiencies of the retailer. These appear to parallel the classifications of retail stores which appear in the literature.

²¹Ibid., p. 28.

²²Millican and Rogers, "Price Variability in Champaign-Urbana," p. 283.

²³Robert J. Minichiello, "The Real Challenge of Food Discounters," Journal of Marketing, Vol. 31, No. 2 (April, 1967), p. 39.

²⁴Ibid., p. 40.

Food Prices and Geographic Location

In an early study, Cassady and Grether studied prices in sixteen cities, in the west and midwest. They compared the prices of Safeway, a major grocery chain, with its competition. They developed an index number which reflected the "all item average prices" of food in each of these markets.²⁵ While the purpose was to compare the prices of Safeway stores with its competition, they found an interesting result. While the Safeway all city average equaled 100, particular Safeway stores ranged from 96.5-105.6.²⁶ Likewise, Safeway differed from its competitors in each city, from 4.4% above to 3.1% below the lowest competitive prices.²⁷ Even within a market Safeway's prices varied. In Dallas, the differential was 3.1% between the highest and lowest stores.²⁸ Therefore, from this data it appears that prices vary from region to region and even within a market, for a single chain.

A study by Jamison attempts to measure the prices in two markets, and hypothesize some of the reasons for this difference. He found that regional taste differences, higher cost curves and transportation costs account for much of the price differential.²⁹ In addition, there was a

²⁵ Ralph Cassady Jr., and E. T. Grether, "Locality Price Differentials in the Western Retail Grocery Trade," Harvard Business Review, Vol. 21, No. 2 (Spring, 1943), p. 193.

²⁶ Ibid., p. 202.

²⁷ Ibid., p. 204.

²⁸ Ibid., p. 196.

²⁹ John A. Jamison, "Inter-Market Food Cost Differentials: A Case Study of Honolulu and the San Francisco Bay Area," Food Research Institute Studies, Vol. 8, No. 2 (May, 1968), p. 185, 186.

different competitive structure in the two markets which further accentuated the difference.

Bargaining Strength and Price Discrimination

The Jamison article presents many reasons for price variations between markets, but not why stores within the same chain, in the same city would have different prices. There have been several reasons advanced to explain this form of price discrimination. One major group of work suggests that it is due to income or racial differences, while a second suggests that it is due to differences in bargaining strength.

In an early study based on the 1966 National Commission on Food Marketing Studies, Alexis and Simon found that low income families who shop at independent stores do pay more. Paradoxically upper income consumers also pay more.³¹ They found a U-shaped curve in prices, with the middle class paying the least.³²

An important article by Sexton surveyed all of the studies in this area. A large number of the studies were done informally, and Sexton eliminated them for faulty methodology.³³ Of the fifteen remaining, five found that blacks and/or low income consumers did pay more for food, while

³⁰ Ibid., p. 184.

³¹ Marcus Alexis and Leonard S. Simon, "The Food Marketing Commission and Food Prices by Income Groups," Journal of Farm Economics, Vol. 48, No. 2 (May, 1967), p. 445.

³² Ibid., p. 446.

³³ Donald E. Sexton, Jr., "Comparing the Cost of Food to Blacks and to Whites - A Survey," Journal of Marketing, Vol. 35, No. 3 (July, 1971), p. 40.

ten found no evidence to substantiate this hypothesis.³⁴ Possibly, the major problem in all of these studies is that they failed to take into account where the consumer actually shopped, and instead focused on stores. Sexton states that ghetto residents are more likely to shop at independents, who tend to charge higher prices.³⁵ Sexton concludes that there still is no way to answer this question, since shopping patterns, product quality, costs and services need to be compared along with prices.³⁶

Kumreuther attempted to compare prices, shopping patterns and store type. Because many low income families have restraints on their mobility, they tend to rely either on public transportation or nearby stores.³⁷ Similarly, budget constraints often keep poor consumers from taking advantage of bargains and large sizes. In addition, Kumreuther proposes that there are four more areas which should be included in any future studies; value of the customer's time, cost of search, availability of unit pricing and brand availability.³⁸

In an insightful analysis of a study by Masson, Shapiro argues that any differences should not be attributed to racial or any other form of discrimination. Instead, he suggests that some buyers are deficient in

³⁴Ibid., p. 44.

³⁵Ibid., p. 45.

³⁶Ibid., p. 46.

³⁷Howard Kumreuther, "Why the Poor May Pay More for Food: Theoretical and Empirical Evidence," Journal of Business, Vol. 46, No. 3, (July, 1973), p. 376.

³⁸Ibid., p. 379, 380.

price searching behavior.³⁹ Likewise, sellers are aware of these deficiencies and take advantage of these consumers.⁴⁰

Primeaux makes much the same point by stating that the price differences paid by consumers for identical products are largely due to bargaining strengths and knowledge by consumers.⁴¹ A finding substantiated by Jung in an automobile shopping study.⁴²

Holton has investigated certain types of price discrimination in supermarkets as well. Those customers who purchase products which are not on sale or purchase them before they go on sale (i.e., in the beginning of the week) are subsidizing those who do.⁴³ Likewise through multiple pricing consumers who purchase only one product are being discriminated against.⁴⁴ Finally, those who purchase a product with a relatively inelastic demand curve are helping to subsidize those who purchase staples and handed merchandise with a more elastic demand curve.⁴⁵

To summarize, it would appear that price discrimination exists in the market. The reasons for this are differences in bargaining abilities, a

³⁹David L. Shapiro, "Costs of Search and Racial Price Discrimination," Economic Inquiry, Vol. 12, No. 3 (September, 1974), p. 423.

⁴⁰Ibid., p. 423.

⁴¹Walter J. Primeaux, Jr., "The Effect of Consumer Knowledge and Bargaining Strength on Final Selling Price: A Case Study," Journal of Business, Vol. 43, No. 4 (October, 1970), p. 420.

⁴²Allen F. Jung, "Price Variations Among Automobile Dealers in Chicago, Illinois," p. 319.

⁴³Richard H. Holton, "Price Discrimination at Retail: The Supermarket Case," Journal of Industrial Economics, Vol. 6, No. 1 (October, 1957), p. 15, 16.

⁴⁴Ibid., p. 17.

⁴⁵Ibid., p. 14, 15.

different trade-off between price and service and a lack of information on the part of consumers.

INFORMATION AND PRICES

In the previous section, it was shown that it is much more difficult for price discrimination to occur when consumers possess knowledge about prices and products. Unlike the world of classical economics, in the real world there is often insufficient information. In most cases, the two most prevalent sources of information about products and services are manufacturer and retail advertising.

THEORIES OF ADVERTISING AND PRICE DISPERSION

Retail Advertising

Retail advertising is a direct source of information about prices. Prices are constantly changing and new buyers and sellers are entering the market. Retail advertising acts as the central market place, providing information on the retail market price for products.

The classic statement of retail advertising's effect on price dispersion is by Stigler, in his theory of the economics of information. He states that retail price advertising reduces the cost of search.⁴⁶

⁴⁶George J. Stigler, "The Economics of Information," The Journal of Political Economics, Vol. 69, No. 3 (June, 1961), p. 223.

So much so, that price differences diminish sharply.⁴⁷ Therefore, retail advertising provides the consumer with enough information to make search almost unnecessary.⁴⁸ This is particularly true for products where the marginal value of search is high (i.e., convenience goods). Therefore, dispersion will be reduced more for goods which are advertised at retail, than for unadvertised goods.⁴⁹

In an article based on the Stigler theory, Telser devised a simulation to determine what the shopping behavior of consumers would be like with and without retail advertising. He hypothesized that retail price distributions take one of three shapes: triangular, uniform, and U-shaped. Each of these distributions had the same minimum price. Telser then simulated the search behavior of one thousand consumers for each distribution.⁵⁰

Telser concludes that it pays retailers to provide information on prices and terms of sales at a low cost to the consumers. Secondly, retailers should seek to establish a reputation for a distinct price and quality range.⁵¹ He hypothesizes that when retail advertising is used, its purpose is to make customers store loyal.⁵²

⁴⁷Ibid., p. 223.

⁴⁸Ibid., p. 224.

⁴⁹Ibid., p. 224.

⁵⁰Lester G. Telser, "Searching for the Lowest Price," American Economic Review, Vol. 63, No. 2 (May, 1973), p. 41, 42.

⁵¹Ibid., p. 45, 46.

⁵²Ibid., p. 47.

Brand Advertising

In 1973 Steiner first stated this relationship by demonstrating how advertising lowered the price of toys.⁵³ Steiner bases his ideas on a dual stage theory of distribution.⁵⁴ Steiner states that the major economists have had in their analysis of marketing is their failure to integrate in the channel of distribution. In traditional economics, the demand curve facing a retailer for a product is derived from that facing the manufacturer. However, Steiner feels that this assumption does not fit the real world.

When the manufacturer does not advertise, he faces a relatively elastic demand curve, (Stage I). All competing products are perceived as being homogeneous, despite physical differences, including brand names. This occurs because consumers have no easy means of evaluating alternatives, lacking knowledge of alternative brands. An individual retailer will not feel constrained to stock many competing products - only one or a few, because consumers are not aware of differences. Therefore, retailers will select the brands that they stock, not on the basis of consumer demand for these individual brands, but for the product class. The brands that the retailer selects will be those in which he can achieve the best terms of trade.

⁵³Robert L. Steiner, "Does Advertising Lower Consumer Prices," Journal of Marketing, Vol. 37, No. 4 (October, 1973), pp. 19-26.

⁵⁴This Whole Section is Adapted from Robert L. Steiner, Toward A New Theory of Brand Advertising and Price, Paper presented at the annual meeting of the American Academy of Advertising, Minneapolis, Minnesota, March 27, 1977.

There are two implications of this discussion. First, that retail margins will be high, and that retail prices will be higher for unadvertised products than for advertised products. Empirical studies by Benham (eyeglasses),⁵⁵ Cady (prescription drugs),⁵⁶ and Steiner (toys)⁵⁷ have supported this conclusion.

The second implication is that the demand curve facing the retailer will be inelastic (Stage II), and the consumer must take the price as given. Since consumers aren't able to recognize products as being homogeneous, they can't effectively compare prices between stores. They have no way of knowing if product X in store A is the same as product X in store B.

Since the stage I market is very competitive, all of the retailers stocking the product will receive approximately the same terms of trade. However, since there is very little competition in the stage II market, the dealers who stock the product are more likely to be smaller retailers with a low turnover, because the demand for the product is limited. The mass merchandisers who depend on presold items, which turnover rapidly, will obtain no benefits from carrying the product. Therefore, smaller retailers with higher costs structures and greater gross margin requirements will comprise the bulk of the distribution system.

⁵⁵ Lee Benham, "The Effect of Advertising on the Price of Eyeglasses," Journal of Law and Economics, Vol. 15, No. 2 (October, 1972), pp. 337-352.

⁵⁶ John F. Cady, Drugs on the Market: The Impact of Public Policy on the Retail Market for Prescription Drugs, (Lexington, Mass.: D. C. Heath & Co., 1975).

⁵⁷ Robert L. Steiner, "Does Advertising Lower Consumer Prices?" pp. 19-26.

Since there is little competition on the basis of price, there is a strong incentive for retailers to maintain list prices. As all of the retailers will be receiving approximately the same terms of trade, the dispersion of prices is likely to be quite narrow. Retailers do not price above list since they feel sales will fall off rapidly, there is no reason to cut prices since consumers do not respond.

Contrast this with the situation when the manufacturer advertises his product. Economists point out that the manufacturer faces a relatively inelastic demand curve.⁵⁸ If this is true, then the manufacturer can raise prices and earn economic rent, a situation clearly not beneficial to the consumer. Unlike the earlier situation, the product is now perceived as being differentiated by the consumer. Because of increased information, the consumer is able to recognize and appraise differences both in brand names and physical product characteristics.

This completely changes the character of the situation occurring within the channel of distribution. Since consumers are aware of individual brands, they can ask for these by name. The retailer has very little choice about whether to stock the product or not. Now because the consumers are asking for products by brand name, he must stock it. So, the advertising of brands within a product class enables the consumer to compare alternatives. Both between the same brand in different retail stores, and between competing brands with a retail store. The consumer has a knowledge base on which to

⁵⁸Lester G. Telser, "How Much Does it Pay Whom to Advertise," American Economic Review, Vol. 51, No. 2 (April, 1961), pp. 194-205.

make a decision. Unlike the previous situation, the retailer faces a relatively elastic demand curve. The retail price will be determined primarily by competition, and the retailer will have a much lower margin.

For the advertised product, the retailer is more likely to be a mass merchandiser. However, this does not mean that smaller scale retailers will be excluded. The demand generated by the advertising will insure that there is a wide distribution of the product. For example, DeWitt's pills are stocked only by a few drug stores, while Anacin is distributed by all types of outlets.

Because of the variety of stores and the character of the competition, there will be strong pressures on the dealer to cut list prices. There will also be strong pressures on the retailer to communicate both permanent and temporary reductions to the consumer through retail price advertising. Therefore, because of the wide variety of dealers and the retail price advertising, it is likely that there will be a wide dispersion in prices for an advertised product.

RETAIL ADVERTISING AND PRICE DISPERSION

There are few empirical studies that relate advertising to retail prices. This becomes important since the theories of Stigler and Steiner have little empirical backing, and they each hypothesize a different effect. However, there are a few studies which can at least provide an indication.

An early study by Gray and Anderson compared the advertised specials of all supermarkets in a medium-sized, California city. The authors

evaluated both the advertisements and the comparative prices of the competing food retailers. Their first conclusion is that for most "specials," 92%, the advertised price was lower than the regular price.⁵⁹ However, during the eight weeks of the study, only a few of the 5,000 grocery items stocked by the average store were advertised. In fact, of the 1,546 advertised specials, only 225 items were included.⁶⁰ Therefore, not all products are advertised at the retail level.

Despite the relatively small number of products advertised, there appears to be little item overlap between supermarkets in any given week.⁶¹ According to a study by Alderson and Shapiro, supermarkets avoid direct comparison with competitors.⁶²

The major reason for this lack of similarity is that retailers are attempting to advertise those products the consumer wants, while attempting to minimize the cost of appearing competitive.⁶³ Therefore, as Nelson and Preston state; price merchandising, including retail advertising, "...does not, except in rare instances, tend to produce uniformity in retail prices."⁶⁴ In fact, the result is more variability in prices and brands.

⁵⁹Roger W. Gray and Roice Anderson, "Advertised Specials and Local Competition Among Supermarkets," Food Research Institute Studies, Vol. 3, No. 2 (May, 1962), p. 128.

⁶⁰Ibid., p. 128.

⁶¹Wroe Alderson and Stanley J. Shapiro, "Toward a Theory of Retail Competition," in Theory in Marketing, ed., by Reavis Cox, Wroe Alderson and Stanley J. Shapiro, (2nd series' Homewood, IL: Richard D. Irwin, Inc., 1964), pp. 198, 199.

⁶²Ibid., p. 200.

⁶³Wroe Alderson, "Administered Prices and Retail Grocery Advertising," Journal of Advertising Research, Vol. 3, No. 1 (March, 1963).

⁶⁴Paul E. Nelson and Lee E. Preston, Price Merchandising in Food Retailing: A Case Study, (Berkley, California: Institute of Business and Economic Research, University of California, 1966), p. 7.

It should be noted that there is also contrary evidence. In a study of retail gasoline pricing, Maurizi found that there was a smaller variance in cities where price posting was permitted.⁶⁵ Similarly, Cady found a narrower variance in prescription drug prices in states where retail price posting was permitted.⁶⁶

MANUFACTURER ADVERTISING AND PRICE DISPERSION

In most manufacturer brand advertising, the purpose is either to create a distinct image for the product or to point out features which differentiate it from competitors. If this advertising is successful, often the brand can maintain a retail price differential with respect to other brands in that product category.⁶⁷ In fact, a manufacturer who does not succeed in differentiating his product has no choice but to compete on price.⁶⁸

A study by Louis Bader demonstrated the validity of these points. Bader observed the shopping behavior of 1,300 customers in thirty-six retail food outlets in Manhattan. He concluded that consumers are "...almost universally brand conscious in grocery good products."⁶⁹ In those stores, the

⁶⁵Alex R. Maurizi, "The Effect of Laws Against Price Advertising: The Case of Retail Gasoline," Western Economic Journal, Vol. 10, No. 3 (September, 1972), p.

⁶⁶John F. Cady, Drugs on the Market.

⁶⁷James O. Peckham, The Wheel of Marketing, (Chicago: A. C. Nielsen Company, 1973), pp. 14-18.

⁶⁸William Applebaum and Roy A. Goldberg, Brand Strategy in United States Food Marketing, (Boston: Division of Research, Graduate School of Business Administration, Harvard University, 1967), p. 48.

⁶⁹Louis Bader, "Customer Preference for Brand in Grocery Products," Journal of Retailing, Vol. 10, No. 2, (July, 1934), pp. 46, 47.

penetration of national brands of coffee was on the average 96%.⁷⁰ It would seem that manufacturers use their advertising as a tool to gain distribution.

The final observation by Bader was also noted by Peckham. He found that manufacturer's major advertised brands in the grocery field have on average, a 90% retail penetration.⁷¹ Once these brands are in the store, they turn over much faster than unadvertised brands, an average 34% faster.⁷² Therefore, these are the brands which are used in retail store advertising.

There are two major reasons for this. First, consumer demand is stronger for advertised brands than unadvertised ones.⁷³ Secondly, the manufacturer tends to "force" retail advertising through trade promotions. Massey and Frank in a study of retailer advertising behavior found that, "Manufacturer promotional allowances have a measurable positive effect on retailer propensities to advertise."⁷⁴ However, as Peckham noted, these trade promotions do not work unless the brand is advertised.⁷⁵

⁷⁰Ibid., p. 47.

⁷¹Peckham, Wheel of Marketing, p. 5.

⁷²Ibid., p. 4.

⁷³For support of this, see: Bader, "Customer Preference," and Peckham, Wheel of Marketing.

⁷⁴William F. Massy and Ronald E. Frank, "Analysis of Retailer Advertising Behavior," Journal of Marketing Research, Vol. 3, No. 4 (November, 1966), p. 383.

⁷⁵Peckham, Wheel of Marketing, p. 20.

Therefore, retailers tend to advertise the brands which are heavily advertised. As Gray and Anderson point out, these items often become loss leaders, sold below wholesale cost.⁷⁶

From the above, it seems clear that retail advertising is stimulated by national advertising, and becomes a major factor in retail price variance. Trade allowances tend to make this support more pronounced for strong brands, while inhibiting it for weak ones.⁷⁷

As support for this, Steiner found that there was more retail price dispersion for advertised products, than for unadvertised ones in over-the-counter health aid products.⁷⁸ Likewise, manufacturer advertising has stimulated more variance of prices in the toy industry - particularly heavily advertised products.⁷⁹ As a contrast, Steiner points out that there is little price variance in apparel brand prices, where the majority of the brands are unadvertised. At the same time, the dispersion on Levis, an advertised brand, is considerable.⁸⁰

Jung noted a similar trend in durable goods. There was a wide variance in prices of automatic washing machines, a heavily advertised product. One hundred percent of the stores in his sample were willing to offer discounts from the list price.⁸¹ However, a survey of the retail prices of

⁷⁶Gray and Anderson, "Advertised Specials," p. 129.

⁷⁷Massy and Frank, "Retailer Advertising Behavior," p. 383.

⁷⁸Steiner, Theory of Brand Advertising, p. 7.

⁷⁹Ibid., p. 7.

⁸⁰Ibid., pp. 7, 8.

⁸¹Jung, "Price Variations on Automatic Washing Machines," p. 135.

carpeting, generally an unadvertised product, showed that only 14.1% of the department stores and 36.5% of the specialty stores were willing to offer a discount.⁸²

The evidence to date suggests that Steiner's theory is a more accurate portrayal of the nature of the market than is Stigler's. Manufacturers advertising appears to stimulate retail advertising and a wider dispersion in prices.

Retail Competition

In the previous section, the assertion was advanced that heavily advertised products exhibit a stronger consumer demand than unadvertised products. Peckham has noted that share of sales and share of manufacturer's advertising are closely related.⁸³ It was also demonstrated that this manufacturer advertising is a primary cause for advertised products' predominance in retail advertising. Since consumer demand is stronger for advertised products, retailers tend to compete for consumer dollars with these products.

Until comparatively recently there was no systematic attempt to determine what type of competitive structure prevails in retail markets. Some authors assumed that retailing was oligopolistic,⁸⁴ while others felt it

⁸²Jung, "A Different Retail Price Pattern," p. 181.

⁸³Peckham, Wheel of Marketing, pp. 48-66, especially see chart 76.

⁸⁴See Henry Smith, Retail Distribution (London: Oxford University Press, 1937), pp. 29-31. Also Holton, "Price Discrimination," pp. 13-32.

was monopolistically competitive.⁸⁵ In 1960, Holdren published the first empirical study of the structure of a retail market. It was a case study of one market for food retailing. In his case study, Holdren described the market, determined the cost and production functions and finally constructed a demand function to describe the supermarket case.

Holdren found that the competition between supermarkets, at least in the city he studied, did not conform to any traditional economic model.⁸⁶ In some ways, the market matched the description of an oligopoly. There was a relatively small number of retailers, each selling products that were close substitutes.⁸⁷ On the other hand, entry was easy and there was a tendency to engage in "price wars." These are more closely associated with monopolistic competition.⁸⁸

A similar study was conducted by Cassady a few years later. As Holdren did, Cassady found that the competitive structure did not "fit" any of the traditional economic models. What he did discover was that within each city market area, there are many smaller sub-market areas.⁸⁹ Within each of these, there may be more than one store with similar market boundaries.⁹⁰

⁸⁵ See Jane Aubert-Krier, "Monopolistic and Imperfect Competition in Retail Trade," in Monopoly and Competition and their Regulation, ed., by E. H. Chamberlain (London: MacMillan & Company, Ltd., 1954), p. 287. Also Julia Hood and D. S. Yamey, "Imperfect Competition in the Retail Trades," Economica, Vol. 18, No. 1 (February, 1951), p. 136.

⁸⁶ Bob R. Holdren, The Structure of a Retail Market and the Market Behavior of Retail Units, (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1960), p. 182.

⁸⁷ Ibid., p. 180.

⁸⁸ Ibid., pp. 181, 182.

⁸⁹ Ralph Cassady, Jr., Competition and Price Making in Food Retailing, (New York: The Ronald Press Company, 1962), p. 62.

⁹⁰ Ibid., p. 62.

Cassady also discovered that competition takes place in a number of ways. Price competition is generally emphasized more by some firms than others.⁹¹ Instead many firms emphasize non-price competition such as store location, advertising, store hours and other services.⁹² In some areas a form of semi-price variables, such as trading stamps, are used as competitive tools.⁹³ However, most supermarkets are forced to rely on some amount of price competition - because of its effectiveness.⁹⁴

Finally, Cassady notes that an analysis, such as Holdren's, can be misleading because the intensity of competition varies from market to market.⁹⁵ The following factors were the primary ones Cassady found which affected the intensity of the market.⁹⁶

1. The existence of an aggressive vendor
2. Presence of a new entrant
3. An overstocked market
4. Depressed demand conditions
5. A new retailing innovation

While Cassady's work focused primarily on performance, other authors were investigating the structure of grocery retailing. Cairns studied the concentration of sales in food retailing by state. Using data from 1958, he determined the percentage of total food sales obtained by the three leading food retailers.⁹⁷ In six states, the three firms held a percentage

⁹¹Ibid., p. 69.

⁹²Ibid., pp. 86-104.

⁹³Ibid., p. 73.

⁹⁴Ibid., p. 107.

⁹⁵Ibid., p. 109.

⁹⁶Ibid., p. 110.

⁹⁷James P. Cairns, "Concentration in Food Retailing in the United States," Journal of Retailing, Vol. 38, No. 3 (Fall, 1962), p. 14.

in excess of 35%. In one state, the percentage was 59.6%. In only two cases was the percentage of sales below 15%.⁹⁸

Markin attributes this concentration to the rapid growth of chains and the large size of their establishments.⁹⁹ According to the 1970 census, chains accounted for only 15% of the number of food retailers. Yet they account for 59.5% of total food sales.¹⁰⁰

In a study which attempts to explain the growth of concentration, Morgan states that Schumpeter's theory of creative destruction is likely to be the key. Innovation in retailing, primarily on the part of large firms has brought about lower costs and helped to change tastes.¹⁰¹ He notes that concentration in food retailing increased during the period from 1953-1962,¹⁰² as the concentration ratio increased from .83 to 1.08.¹⁰³

Perhaps Alderson presents the best summation of the evidence on concentration in food retailing. "...Both oligopoly and monopolistic competition fail as general models for the interpretation of competition among large grocery retailers."¹⁰⁴ In studying the structure of the Philadelphia market for food products, Alderson found there were distinct areas where firms

⁹⁸Ibid., p. 14.

⁹⁹Ron J. Markin, "The Supermarket - A Study of Size, Profits and Concentration," Journal of Retailing, Vol. 40, No. 4 (Winter 1964, 1965), p. 36.

¹⁰⁰Peckham, Wheel of Marketing, p. 6, especially chart 7.

¹⁰¹Howard E. Morgan, "Concentration in Food Retailing," Journal of Farm Economics, Vol. 46, No. 4 (December, 1965), p. 1336.

¹⁰²Ibid., pp. 1342, 1343.

¹⁰³Ibid., p. 1344.

¹⁰⁴Alderson, "Administered Prices," p. 3.

competed, and others where they did not. Competition was explicitly considered in store location but not in product selection.¹⁰⁵

On the other hand, whatever the structure of the food industry is, it appears to be working. Folz states that food retailing is "...probably the best example of 'healthy and workable' competition that we are likely to find."¹⁰⁶ Although supermarket chains are capturing the largest percentage of the retail food dollar, nationally the largest eight chains share of the market has actually decreased.¹⁰⁷ Folz concludes that "...if nothing is done, the food marketing system will continue to perform efficiently and effectively."¹⁰⁸

Retail Competition and Price Dispersion

While the nature of competition on food retailing has been discussed, an important consideration has yet to be discussed. What is the effect of competition on retail price dispersion? Alderson states:

Competition does produce variability of price among products, brands, quality levels and stores - and over time - reflecting the responses of each firm to market pressures and simultaneously generating new competitive pressures upon the other firms.¹⁰⁹

Holdren in studying this found that there are four classes of products on which supermarkets compete:

¹⁰⁵ Alderson and Shapiro, "Theory of Retail Competition," pp. 192-195.

¹⁰⁶ William E. Folz, "The Food Marketing Commission and Market Structure and Performance," Journal of Farm Economics, Vol. 47, No. 4 (December, 1966), p. 414.

¹⁰⁷ Ibid., p. 414.

¹⁰⁸ Ibid., p. 424.

¹⁰⁹ Nelsen and Preston, Price Merchandising in Food Retailing, p. 7.

1. Price fixed commodities (fair traded items)
2. Price is unnoticed by consumers
3. Considerable latitude due to ignorance
4. Highly competitive commodities¹¹⁰

It is interesting to note the effect competition has on these different classes of products. Canned salmon, an unadvertised, unnoticed product, has a low variance of prices, a 2% average deviation as a percentage of average price. While canned tuna, an advertised, highly competitive product has a 12% variance.¹¹¹ This appears to concur with Steiner's argument presented earlier.

In his study, Cassady notes a similar phenomenon. The elasticity of the items stocked differs, based on their sales velocity.¹¹² Since there are so many items, the consumer is only aware of the competitive prices of a few.¹¹³ Therefore, supermarkets tend not to cut their margin on the weaker items,¹¹⁴ but concentrate their advertising on the stronger ones.¹¹⁵

Overall, Cassady found few differences in shelf prices between competing supermarkets.¹¹⁶ This was particularly true for seldomly purchased-items.¹¹⁷ Cassady concludes that prices on fast moving items are more likely to be affected by competition.

¹¹⁰Holdren, Structure of a Retail Market, pp. 89, 90.

¹¹¹Ibid., pp. 76, 77.

¹¹²Cassady, Competition and Price Making, p. 33.

¹¹³Ibid., p. 33, see footnote 47.

¹¹⁴Ibid., p. 33.

¹¹⁵Ibid., p. 93.

¹¹⁶Ibid., p. 144.

¹¹⁷Ibid., p. 144.

However, both Cassady and Holdren were concerned with supermarket operations. A study by Handy and Padberg indicates that there are differences between store types as well. The larger food retailers tend to rely on price competition, while the smaller tends toward non-price competition.¹¹⁸ To demonstrate this, they present index numbers of food prices. The index numbers use the national chains as their base, and cover found product categories. In only two out of sixteen cases did any other food retailers have lower price.¹¹⁹

CONCLUSION

The literature review in this chapter has demonstrated that there are a variety of factors that influence retail price dispersion. Despite this, all of the empirical work presented has focused on price dispersion as being the result of a single variable. However, the review has been valuable by pinpointing the possible effect each of the independent variables could have on price dispersion. This information is summarized in the beginning of chapter 3 as research hypotheses.

¹¹⁸C. R. Handy and D. I. Padberg, "A Model of Competitive Behavior in Food Industries," Journal of Agricultural Economics, Vol. 53, No. 2 (May, 1971), p. 182.

¹¹⁹Ibid., p. 186.

CHAPTER III

RESEARCH METHODOLOGY

INTRODUCTION

Chapter one presented the four hypotheses to be tested in this study. These hypotheses were stated in the null form, that is the expectation that there would be no relationship between the three independent variables and retail price dispersion. However, it is expected that there will be a relationship between these variables and retail price variation. Therefore, before describing the methodology, this chapter will first focus on the expected direction of these variables.

RESEARCH HYPOTHESES

Research Hypothesis One:

As brand advertising increases, retail price dispersion will increase.

The rationale for this assertion has been presented in the literature review in chapter two. Brand advertising comprises a large portion of the total information available to the consumer about any given brand. As the

amount of information increases, through brand advertising, the brand becomes more widely known. Because it is better known, retail market coverage increases as does consumer demand. This increase in consumer demand stimulates retail advertising, which leads to increased price variation.

Research Hypothesis Two:

As the retail competitive structure becomes more concentrated, retail price dispersion will decrease.

The literature points out that it is difficult for a food retailer to avoid price competition because of its effectiveness as a competitive tool. Therefore, almost all food retailers can and do engage in some price competition. However, because food retailers operate in markets with different market structures, a retailer competing in a less concentrated market will be forced to engage in more price competition than one where the competitive structure is more highly concentrated. Therefore, firms competing in highly concentrated markets will use price competition less. This will lead to similar retail shelf prices for brands stocked by the major retailers.

Research Hypothesis Three:

As the number of store classes increases, the retail price dispersion will increase.

The many empirical studies presented in chapter two illustrate the reasoning behind this hypothesis. Different store classes have been shown to have substantially different prices. This is due to two reasons. First, these different store classes have differing cost curves, partially because

of the services they offer the consumer vary. The second reason is that there are efficiencies in purchasing and handling in some types of retail operations.

Research Hypothesis Four:

A multivariate model will explain more about retail price dispersion than a univariate model.

As was demonstrated in chapter one, price dispersion has been attributed to a large number of variables. Only a few of which have been empirically tested. However, enough have been tested to demonstrate that there is more than one explanation for retail price variation. Therefore, a model incorporating three variables should be able to explain retail price dispersion better than a model using only one variable.

DATA COLLECTION

Brand Advertising

Table one shows the total advertising expenditures for the brands in the two product classes chosen for the analysis. These figures were taken from the Leading National Advertisers report on advertising by brand for the calendar year 1974. These data reflect total expenditures in six media; magazines, newspaper supplements, network television, spot television, network radio and outdoor. The report lists every brand, by product class, that spent any dollars on advertising within the calendar year.

TABLE 3-1
ADVERTISING BY BRAND¹

<u>Product Class - Flour</u>	
<u>Brand</u>	<u>Total Dollars</u>
Gold Medal	\$1,704,000
Martha White	170,400
Pillsbury	524,700
Robin Hood	0
 <u>Product Class - Bacon</u>	
<u>Brand</u>	<u>Total Dollars</u>
Carolina Prize	\$ 0
Decker	8,300
Dinner Bell	145,500
Eck-O	0
Eckrich	134,700
Hygrade	6,000
Oscar Mayer	1,325,900
Swift Sizzlin Lean	70,100

¹Leading National Advertisers, Brand Advertising by Classification,
(New York: Leading National Advertisers, Inc., 1974), pp. 144-146, 167-172.

COMPETITIVE STRUCTURE

The competitive structures were computed from a concentration index developed by Morgan.² The index measures the percent of employment accounted for by the largest four firms within the market area (county). It also measures the percentage of all firms in the smallest size class. Therefore, the index measures the interaction between the small number of relatively large firms, and the multitude of small firms. These data are available through County Business Patterns,³ a publication of the U.S. Department of Commerce.

Table two presents the data that was collected from County Business Patterns for the ten county area included in the study. This exhibit summarizes the number of retail establishments in each size class. It also presents the total number employed in each county. Estimates were then calculated to determine the number of employees working in the four largest firms. These estimates were based on the average number of employees in each size class.

The final calculations of the concentration indices are presented in table three. It is important to note the interplay between large and small firms. For example, Lucas county has a very large concentration of employment in large firms. However, because of the large percentage of firms in the smallest size class, the concentration index is quite moderate. On the

²Howard F. Morgan, "Concentration in Food Retailing," Journal of Farm Economics, Vol. 46, No. 4, (December, 1965), pp. 1332-1346.

³Bureau of the Census, County Business Patterns, (Washington D.C.: U.S. Department of Commerce, 1974), p. 72.

TABLE 3-2
 EMPLOYMENT AND SIZE CLASS OF FOOD RETAILERS
 IN TEN COUNTY AREA⁴

<u>County</u>	<u>Total Employees</u>	<u>Total Number of Establish- ments</u>	<u>Size Class</u>							
			<u>1-3</u>	<u>4-7</u>	<u>8-19</u>	<u>20-49</u>	<u>50-99</u>	<u>100-249</u>	<u>250-499</u>	<u>500+</u>
Allen	737	38	13	11	5	6	2	0	1	0
Fulton	269	18	3	5	5	4	1	0	0	0
Hancock	370	19	6	4	4	3	1	1	0	0
Hardin	209	24	10	5	7	2	0	0	0	0
Henry	163	16	2	4	9	0	1	0	0	0
Lucas	3,782	121	51	33	24	1	7	0	2	3
Putnam	179	19	6	6	5	2	0	0	0	0
Sandusky	367	27	11	3	7	4	2	0	0	0
Seneca	371	27	6	8	9	2	2	0	0	0
Wood	587	35	11	5	12	4	3	0	0	0
TOTALS	7,034	344	119	84	87	28	19	1	3	3

⁴County Business Patterns, p. 72.

TABLE 3-3
CALCULATION OF CONCENTRATION INDICES

C = Concentration Index			
D = Percentage of employment in top four firms			
P = Percentage of firms in smallest size class			
<u>County</u>	<u>D</u>	<u>P</u>	<u>C = $\frac{D}{P}$</u>
Allen	.58	.342	1.70
Fulton	.52	.167	3.11
Hancock	.703	.316	2.22
Hardin	.421	.417	1.01
Henry	.491	.125	3.93
Lucas	.613	.421	1.45
Putnam	.492	.316	1.56
Sandusky	.49	.407	1.20
Seneca	.512	.222	2.31
Wood	.444	.314	1.41

other hand, Henry county has only a moderate concentration in employment by the four largest retailers but there are very few small ones. Therefore, Henry county has a much higher concentration index than Lucas county.

The major disadvantage of this index is its concentration on firms rather than on individual establishments. A second drawback is that the market area is defined as the county. It may well be that the relevant market area may be much smaller or larger. The market area may even cut across county lines.

Store Classes

The data on store classes were gathered from observation at the same time as the retail price data. The retailers were divided into five classes based on the literature that was summarized in chapter two. The major criteria for determining into which class the retailer would be assigned were; product selection, store size and affiliation. Following are the definitions that were used to distinguish different classes.

Chain - A retail firm with ten or more supermarket units.

Cooperative - A voluntary or retail cooperative based on an advertised affiliation with a recognized group.

Large Independent - A retail firm stocking both a wide and deep product line consisting of from one to ten retail units.

Small Independent - A single retail unit of relatively small size, carrying a wide, but not deep, product line including meat and produce.

Convenience Store - A retail unit carrying neither a wide nor deep product line.

RETAIL PRICES

Retail prices and store classes were both collected over a two-day period, June 7 and 8, 1977. These data were collected by seven senior marketing students at Bowling Green State University. Each student was assigned to one or two counties depending on the number of retailers in the county. The retailers and their addresses were taken from the yellow pages of the local telephone directories. The students were instructed to record the shelf price for each brand stocked by the retailer in both product classes. No attention was to be paid to whether the product was advertised or not. To provide consistency, each student was given sufficient forms (see appendix B) to complete one for each individual retail store. The students were instructed to enter, collect the data and leave without alerting store personnel. Consequently, in only two cases were the students prevented from collecting the shelf prices.

As a control over this process, the author conducted spot checks throughout the two-day period. The primary purpose of this was to determine that prices were indeed being collected, and not being invented. The spot checks indicated no irregularities.

The data were then transferred to summary sheets (see appendix D). This put the data into a format for preliminary data analysis and also provided convenience in key punching. Table four summarizes the number and types of retailers visited during that two-day period.

TABLE 3-4
FOOD RETAILERS OBSERVED IN TEN COUNTY AREA

<u>County</u>	<u>Chain</u>	<u>Store-Type</u>			<u>Convenience</u>	<u>Totals</u>
		<u>Large Independent</u>	<u>Voluntary</u>	<u>Small Independent</u>		
Allen	6	12	5	6	15	44
Fulton	0	2	7	3	7	19
Hancock	7	1	1	1	4	14
Hardin	1	2	3	4	8	18
Henry	0	5	3	5	9	22
Lucas	14	8	2	1	6	31
Putnam	9	6	5	2	1	14
Sandusky	6	2	5	3	12	28
Seneca	7	2	0	10	12	31
Wood	5	2	4	4	3	18
TOTALS	46	42	35	39	77	239

MARKET AREA

The market area chosen for this study was a ten county area in northwest Ohio. This area was primarily selected for convenience. It enabled the students to collect the data, and return home each evening, therefore minimizing expenses. A second reason for selecting the ten county region is for its diversity. The area encompasses two Standard Metropolitan Statistical Areas (SMSA). One, a large urban area - Toledo, the second includes a smaller metropolitan area, Lima. The remainder of the area is rural in nature. Therefore, the market area chosen for the study contains a large city, a moderately sized one as well as small towns and rural countryside. Exhibit five summarizes the market area, while exhibit six shows how this area compares to the state of Ohio as a whole.

Rationale for Market Area Choice - Data Collection

The primary reason for collecting the data in this fashion was the inability to find readily available data. Efforts were made to obtain the data on a national or regional basis through the Supermarket Institute and A. C. Nielsen Co. as well as other sources such as Abner Wolfe, Inc. This type of information is collected by A. C. Nielsen, however, since it is not published, the company was unwilling to allow access into their files. The remaining sources were willing to make data available however, it was inappropriate since only chain supermarket prices were collected. Therefore, it would appear that anyone attempting a similar study must be prepared to collect the data himself.

TABLE 3-5
TEN COUNTY MARKET AREA^{5,6}

<u>County</u>	<u>Effective Buying Income (000)</u>	<u>Retail Food Sales (000)</u>	<u>Population in thousands</u>
Allen+	597,836	122,736	108.7
Fulton	187,129	28,751	36.6
Hancock	363,576	41,341	63.0
Hardin	153,725	18,297	31.9
Henry	131,259	19,696	28.0
Lucas*	2,910,316	318,246	476.2
Putnam	138,725	15,472	32.2
Sandusky	303,874	52,472	63.7
Seneca	285,483	37,670	59.2
Wood	588,462	65,306	101.7
TOTALS	5,660,385	720,412	1,001.2

+ Includes Lima Metropolitan Area

* Includes Toledo Metropolitan Area

⁵"Sales Management," Survey of Buying Power, June 1977, pp. C158-C164.

⁶Survey of Buying Power, pp. C158-C164.

TABLE 3-6
TEN COUNTY/STATE OF OHIO COMPARISONS⁷

	<u>Ten County Area</u>	<u>State Totals</u>	<u>% Ten County of State</u>
Total Employment (in food retailing)	7,034	93,684	7.5%
Total Units (food stores)	344	5,904	5.96%
Total Food Sales	720,412,000	7,198,547,000	10.0%
Total Population	1,001,200	10,750,800	9.3%
Effective Buying Income	5,660,385,000	58,300,116,000	9.7%

⁷County Business Patterns, p. 72.

STATISTICAL TESTING

The data were analyzed through both simple linear regression and multiple linear regression. Simple linear regression describes the relationship between two variables.⁸ Multiple linear regression describes "...the collective and separate contributions of two or more independent variables, X_i , to the variation of a dependent variable, Y ."⁹ Therefore, simple and multiple linear regression have the same essential nature. The major difference being the univariate nature of simple linear regression, and the multivariate nature of multiple linear regression.

Regression techniques were chosen for this study because they are ideally suited for it.¹⁰ Regression's main advantage is its ability to explain variance in the dependent variable. That is the purpose of this study, to explain retail price variance. Secondly, regression is flexible. It is possible to use anywhere from one, to a large number of independent variables. Just as importantly, regression is the best tool to analyze non experimental data.¹¹ Because of the difficulties in collecting data, this study is nonexperimental in nature.

As the data fit the strengths of regression very well, they avoid the weaknesses inherent in the technique. First, the number of independent variables should be limited. At the maximum, this study uses only three.

⁸Taro Yamane, Statistics, An Introductory Analysis, (New York: Harper & Row, Publishers, 1967), p. 369.

⁹Fred N. Kerlinger and Elazar J. Pedhazur, Multiple Regression in Behavioral Research, (New York: Holt, Rinehart and Winston, Inc., 1974) p. 3.

¹⁰This section adopted from Kerlinger and Pedhazur, pp. 441-445.

¹¹Kerlinger and Pedhazur, p. 444.

Secondly, there tends to be a large standard error in the beta weights unless the number of observations is over two hundred. However, over two hundred observations were collected for each of the product classes used in this study. Finally, the results may be inaccurate if the independent variables are intercorrelated. However, the review of literature found no reason to presuppose that brand advertising, store classes and retail competitive structure are correlated in any way.

For both product classes the procedure for analyzing the data were identical. First, simple linear regressions were run with each independent variable. For each run the simple r , r^2 and beta weight were calculated. The F test was performed to determine whether the power of the independent variable to explain price variation was significant. These results were used to test the first three hypotheses.

Then the three independent variables were combined in a single model to determine their cumulative ability to explain retail price variation. The results of these runs were used to test hypothesis four. The results of all of these statistical tests are reported in chapter four.

CHAPTER IV

PRESENTATION OF RESEARCH FINDINGS

INTRODUCTION

This chapter presents the results of the study, following the procedure outlined in chapter three. First, the raw data are summarized, for all of the brands in both product classes. Then the results of the simple linear regression models used to test the first three hypotheses are presented. Then the final hypothesis, utilizing all three independent variables, is tested. The final section of this chapter summarizes the data.

SUMMARY OF THE DATA

The first two tables summarize the data collected in the two hundred and thirty nine store visits. Table one presents the results for the product class, flour, while table two presents the results for bacon. Not all of the data are included in this summary. In all, there were ten brands of all purpose flour in five pound bags observed. Similarly, the students found thirteen different brands of bacon in one pound packages.

However, six brands of bacon and all but four brands of flour were eliminated from the study. In all of these cases there were less than fifteen observations the results would not be representative of the true state of price dispersion for these brands.

Table one shows that the two most heavily advertised brands of flour had the greatest retail store coverage. Gold Medal, for example, was stocked by 91% of all retailers surveyed. On the other hand, the lesser known brands were stocked by less than half of the retailers. For this particular product class, the means and medians for all brands were roughly similar. There were less than a ten cent spread on the means and an eight cent spread on the medians. However, there is an obvious difference in the dispersion of prices between brands. The range in prices for the two most heavily advertised brands is .92 and 1.04, while the remaining two brands have ranges of .70 and .58. Similarly, the standard deviations are much greater for the advertised brands. Gold Medal has a standard deviation of almost .60 and Pillsbury .37. While Martha White and Robin Hood have standard deviations of .18 and .21 respectively. When the deviations are adjusted for differences in the means, the difference in dispersion becomes even more striking. The average deviation as a percentage of average price for Gold Medal is 15.25%, for Pillsbury it is 13.5%. For the lesser or unadvertised brands it is much lower. Robin Hood has an average deviation of 7.8% and Martha White only 1%.

Table 2 presents a similar compilation of the data for the second product class - bacon. The differences between these two product classes are striking. The means and the medians are not at all similar. The means

TABLE 4-1
SUMMARY OF RESULTS - FLOUR

<u>Brand</u>	<u>Price Range</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>	<u>Average Deviation As A Percentage Of Average Price</u>	<u>Number of Obser- vations</u>	<u>Retail Store Coverage</u>
Gold Medal	.51-1.51	.9025	87	.5979	.1525	217	91%
Martha White	.75-1.45	.8848	85	.1762	.01	23	10%
Pillsbury	.39-1.43	.8044	81	.3736	.135	158	66%
Robin Hood	.67-1.25	.8887	89	.2069	.0784	86	36%

TABLE 4-2

SUMMARY OF RESULTS - BACON

<u>Brand</u>	<u>Price Range</u>	<u>Mean</u>	<u>Median</u>	<u>Standard Deviation</u>	<u>Average Deviation As A Percentage Of Average Price</u>	<u>Number of Obser- vations</u>	<u>Retail Store Coverage</u>
Carolina Prize	.98-1.29	1.1012	1.19	.1092	.0404	17	7%
Decker	1.29-1.79	1.5458	1.59	.2289	.0813	19	8%
Dinner Bell	1.09-1.99	1.5674	1.59	.4728	.0742	138	58%
Eck-O	.89-1.49	1.1229	1.09	.3379	.1180	38	16%
Eckrich	1.39-1.99	1.8003	1.79	.2338	.0430	72	30%
Oscar Mayer	1.05-2.19	1.8849	1.89	.44	.071	67	28%
Plumrose	1.49-1.89	1.7713	1.79	.2535	.0626	16	7%

range from a high of 1.89, to a low of 1.10, for a difference of .79 between the highest and lowest. Similarly, there is a difference of .69 between the lowest median and the highest. Unlike flour, the nationally advertised brands did not dominate the market. Although Dinner Bell, Eckrich and Oscar Mayer did have the highest percentage of retail store coverage, in only one case, Dinner Bell, was this figure over 50%. While the advertised brands did have the highest ranges, the same was not necessarily true for standard deviations. While Dinner Bell and Oscar Mayer had the widest standard deviations, Eckrich was ranked fifth. When the average deviations were adjusted for the means, the highest percentages went to two relatively unadvertised brands; Decker, 8%, and Eck-O, 12%.

RESULTS OF THE SIMPLE LINEAR REGRESSIONS

Before presenting the results of the simple linear regressions, this section will first present the correlation matrices for both product classes. Table three presents the correlation matrix for all variables used in the three simple linear and multiple linear regression models used in the analysis of flour. Table four presents the same data for bacon. In none of these cases were the results biased because of problems with collinearity. For the simple linear regression models, this is true because there is only one independent variable.

However, since the multiple linear regressions had three independent variables, collinearity could result. This problem did not arise in the study. First, collinearity was not a factor in biasing the beta weights for either of the models. In neither case was there a multiple R (from

TABLE 4-3

CORRELATION MATRIX - FLOUR

<u>STORE CLASS</u>							
	PRICE	ADVERTISING	COMPETITION	VAR 001	VAR 002	VAR 003	VAR 004
PRICE	1.00000						
ADVERTISING	.13003	1.00000					
COMPETITION	.08999	.06374	1.00000				
VAR 001	-.36794	.08718	.16268	1.00000			
VAR 002	-.20735	-.13496	.01732	-.33888	1.00000		
VAR 003	-.13017	-.03781	-.00639	-.2689	-.27278	1.00000	
VAR 004	-.16978	.01753	.10497	-.25633	-.25916	-.20633	1.00000

TABLE 4-4

CORRELATION MATRIX - BACON

<u>STORE CLASS</u>							
	PRICE	ADVERTISING	COMPETITION	VAR 001	VAR 002	VAR 003	VAR 004
PRICE	1.00000						
ADVERTISING	.48384	1.00000					
COMPETITION	-.00256	-.01210	1.00000				
VAR 001	.17562	.26187	-.19175	1.00000			
VAR 002	-.05988	.0314	.02392	-.38848	1.00000		
VAR 003	-.06705	-.10245	.09984	-.32163	-.32579	1.00000	
VAR 004	-.21501	-.13926	.04628	-.22497	.22788	-.18867	1.00000

table 7) that was less than the simple correlation between any two of the variables. Secondly, the samples were split into two equal groups. The four resulting groups were then run to test the stability of the regression equations. These were then tested by transforming the data using the Fisher R to Z transformation and comparing the results to the normal curve.¹ In all four cases the results were within the acceptable range.

Product Class - Flour

Table five presents the results of the three simple regressions which were used to test the first three hypotheses. Model one deals with the ability of brand advertising to explain retail price variation. Models two and three deal with competitive structure and store class respectively. As the table shows, all three of these variables aid in explaining price variation. The probability of this relationship occurring by chance is in the acceptable range. The probabilities of accepting a false hypothesis are .001 for store class, .005 for advertising and .05 for competition.

However, as the simple r and r^2 for each model shows, the relative contributions of each model vary widely. Store class has an r^2 of .54208, or this variable by itself explains almost half of the price variance. On the other hand, competition explains very little of the variation, as the r^2 is only .0081.

On the basis of the significance tests, the first three null hypotheses would be rejected. According to the results, each model explains some significant portion of retail price variation. The probabilities are large enough, that it can be concluded that these results did not occur by chance.

¹Slakter, Malcolm J., Statistical Inference For Educational Researchers, (Reading, Mass.: Addison-Wesley Publishing Company, 1972), pp. 367-368.

TABLE 4-5

SIMPLE LINEAR REGRESSION RESULTS - FLOUR

<u>INDEPENDENT VARIABLE</u>	<u>SIMPLE r</u>	<u>r²</u>	<u>F</u>	<u>P</u>
Advertising	.13002	.01691	8.255	.005
Competition	.08999	.00810	3.919	.05
Store Class	.73626	.54208	141.166	.001

Product Class - Bacon

The identical analysis was performed by the second product class, bacon. These results are presented in table six. There are several important differences in the results. The simple r and r^2 for brand advertising in model one is considerably larger than the corresponding model for flour. On the other hand, the simple r and r^2 for store class is considerably lower than it was for flour. However in both cases, each of these models contribute to explaining retail price variation for bacon. In both cases the probability of rejecting a true hypothesis was .001. Model two using competitive structure was not a significant factor in explaining retail price variation. The r^2 was only .00001 and probability that competition and price variation are related for bacon is not significant.

Therefore, null hypothesis one is rejected for bacon. Similarly, null hypothesis three, relating price variation and store class is also rejected. Both brand advertising and store class do aid in explaining retail price variation for bacon. Both are significant at the .001 level. However, in the case of hypothesis two, competition, the null hypothesis is accepted. There is no statistical relationship between competitive structure and retail price variation.

Conclusion

The first three hypotheses investigated the ability of the three independent variables; advertising, competitive structure and store class, to explain retail price variation on a univariate level. That is, does each

TABLE 4-6

SIMPLE LINEAR REGRESSION RESULTS - BACON

<u>INDEPENDENT VARIABLES</u>	<u>SIMPLE r</u>	<u>r²</u>	<u>F</u>	<u>P</u>
Advertising	.48384	.23411	117.375	.001
Competition	.00256	.00001	.0025	NS
Store Class	.29537	.08724	9.105	.001

independent variable, individually, explain retail price variation better than by chance.

For the product class, flour, all three null hypotheses were rejected. Brand advertising, competitive structure and store class each explained some portion of retail price variation at a statistically significant level.

For the second product class, bacon, the same three hypotheses were tested. In the case of advertising and store class, the null hypotheses were rejected. Both were significantly related to retail price variation. However, the second null hypothesis, concerning competitive structure was accepted. There is no statistically significant relationship between competitive structure and retail price variation.

RESULTS OF THE MULTIPLE LINEAR REGRESSION MODELS

Introduction

The three independent variables were then combined into a single model, one for each product class. The purpose of this was to test the fourth hypothesis; that a combination of independent variables would explain retail price variation better than any of the univariate models. These results are presented in Table seven.

Product Class - Flour

For the product class, flour, the multiple R was .74 and the R^2 was .55. This compares with the individual r^2 's given in Table five of .017, .008, and .542 for each of the three models presented earlier. In this

TABLE 4-7

MULTIPLE LINEAR REGRESSION RESULTS

	<u>Multiple R</u>	<u>R²</u>	<u>F</u>	<u>P</u>
FLOUR	.74168	.5509	96.976	.001
BACON	.54763	.2999	27.058	.001

case, the null hypotheses would be accepted on the basis of parsimony. While both competition and advertising do add positively to the model, they do not add enough to significantly increase the predictive power of the model. In this case, the difference between the power of store class alone to explain retail price variance was .542, while the three independent variables in total only explain .55 of the total variance. A difference of only .008.

Product Class - Bacon

For the second product class, bacon, the model was again significant at the .001 level. In this case, the multiple R was .548 and the R^2 .2999. Comparing this result with Table six, the r^2 for each of the individual models was respectively; .23, .00001, and .87. In this case, the null hypothesis would be rejected. The multiple regression model does explain retail price variation significantly better than any of the univariate models. Again, using the principle of parsimony, the best model would utilize advertising and store class. The multiple R is .54758, and the R^2 is .29985, with an F of 32.548, significant at the .001 level. Therefore, the inclusion of competition adds only .00005 to the explanatory power of this model.

One difficulty with making a comparison between two multiple regression equations is that there really is no statistical means of determining whether there is a significant difference between the two. This is particularly true when one equation has an additional variable as is the case with the two regression equations for bacon. However, it is possible to

determine if the results were caused only because a larger number of independent variables included in the model. The technique that was used to determine this is called the adjusted coefficient of multiple determination.² In this case, the R^2 was adjusted from .29985 to .2944, to account for the second independent variable. This R^2 is still considerably larger than the .234 obtained from the model only using advertising.

Conclusion

Therefore, with respect to hypothesis four, the null hypothesis is accepted for the model using all three variables to explain price variance of flour. The best model is the univariate one, using only store class. The null hypothesis was rejected for the second product class, bacon. For this product class, the most efficient model utilizes store class and advertising as the independent variables.

DIFFERENCES BETWEEN THE TWO PRODUCT CLASSES

The evidence from tables five, six and seven, demonstrate that there are considerable differences between the results from the two product classes. For flour, store class is an extremely important variable. However, it is much less important in explaining price variance for bacon. On the other hand, advertising is not of major importance in explaining price variation for flour, yet it is of primary importance for bacon. There is really no way to determine exactly why these differences exist.

²Neter, John and Wasserman, William, Applied Linear Statistical Models, (Homewood, Ill.: Richard D. Irwin, Inc., 1974), p. 229.

Similarly, there is no sure explanation for the ineffectiveness of competitive structure as a significant variable, when other studies have shown it to be a factor. However, this section will examine some of the possible reasons why these results might have occurred as they did.

The first problem that will be dealt with is the relative importance of advertising and store class, and why the order was reversed for the two product classes. One major difference might be due to the differences in market penetration shown in tables one and two. While there were many brands of flour observed, there were only four that had significant penetration. In fact two brands, both well advertised, dominated the market place. It is possible that the sheer weight of their presence negated the effect of advertising. A second feature of this market was that these two brands were distributed fairly evenly across all store classes. Therefore, the cost curve differences between various classes of food retailers gave rise to a clear difference in price levels. The relatively large beta weights, which will be reported later serve to bear this out.

On the other hand, there were no truly dominant brands of bacon, in fact only one had over 50% penetration. In contrast to flour, no brands were evenly distributed across all store classes. This would tend to lessen the impact of store class differences on price variation. As far as advertising is concerned, the spending by brands was quite diverse. Some stores clearly sold brands like Oscar Mayer and Eckrich at a premium. Perhaps feeling that consumers would be willing to pay more for an advertised brand. Yet other retailers used the well known names of these brands as specials, or price leaders simply because they were well known. Therefore,

retailers' perceptions of consumer demand for the nationally advertised products appears to have led to more retail price variation.

The second issue which must be dealt with is retail competitive structure. In neither product class was this a major factor in explaining price variation. Yet the studies cited in the literature review attest to its effect on price dispersion. One possible problem might be with the index itself. Probably the major argument against this is that Morgan found significant results using this measure.

There are two reasons that might be advanced to explain the relative unimportance of competition. First, the index measures competitive structure not performance. Just because a high degree of concentration exists, fierce price competition is not automatically excluded. A second possible reason might be the unit of measure. Food retailers do not compete on a county or even city wide basis. Therefore, in order for the index to be effective, the retail trade zones would have to be defined, and the index recalculated.

It should be pointed out that the above discussion is by no means the only conceivable explanation for the results. There very well might be other, equally cogent arguments advanced. However, from inspecting all of the data, these explanations seem to fit the problems, and might well offer at least a partial rationale for the results.

PRESENTATION OF BETA WEIGHTS

Although not of prime importance to testing the hypotheses presented and tested earlier, it was felt that the beta weights for the two multiple

linear regression equations should be reported for completeness. These are presented in table eight. The beta weight expresses the change in the dependent variable, caused by a change in the independent variable, when all other independent variables are held constant.³ Note that in all cases, the beta coefficients are significant, with the exception of competition. For both products, the beta weights for competitive structure were negligible. For flour, the beta weight was $-.006$ and for bacon it was $.007$.

However, there were some differences in both store class and advertising. For bacon, an increase in advertising (all other variables being held constant) led to an increase in the average price. Exactly the opposite occurred in flour, where the beta coefficient was negative. Therefore, advertising has a different effect on the slope of the regression line for each of the two products studied.

Similarly, while the beta weights are all negative for all store classes, across both products, there is a difference between flour and bacon. In the case of flour, the beta coefficients are much larger than they are for bacon. Therefore, with the other variables held constant in flour each succeeding store class had a greater negative impact on price, than they did in bacon.

CONCLUSION

The results have been mixed in comparison with the hypotheses set out in chapter one. The first three hypotheses were tested with two sets of

³Fred N. Kerlinger and Elazus J. Pedhazur, Multiple Regression In Behavioral Research, (New York: Holt, Rinehart and Winston, Inc., 1974), p. 64.

TABLE 4-8

BETA WEIGHTS FOR EACH INDEPENDENT VARIABLE

<u>VARIABLE</u>	<u>FLOUR</u>	<u>F</u>	<u>SIGNIFICANCE LEVEL</u>	<u>BACON</u>	<u>F</u>	<u>SIGNIFICANCE LEVEL</u>
Advertising	-.094	8.37	.001	.484	114.65	.001
Competition	-.006	.04	NS	.007	.03	NS
Store Class 1	-.989	475.65	.001	-.233	10.71	.001
2	-.874	370.29	.001	-.326	22.71	.001
3	-.734	301.01	.001	-.259	15.92	.001
4	-.459	123.46	.001	-.323	31.31	.001
Constant	115.397			166.953		

data

null

the

exp

dea

hyp

file

pr

je

on

B

i

v

data, reflecting two product classes; flour and bacon. All three of the null hypotheses were rejected for flour. Each model demonstrated that the independent variable being tested made a significant contribution to explaining retail price variation. For bacon, hypotheses one and three, dealing with advertising and store class were rejected, while the null hypotheses relating to competitive structure was accepted.

For the fourth hypothesis, the null hypothesis was accepted for flour. Store class as a single independent variable explained retail price variance as well as the total model. The null hypothesis was rejected for the second product class. The most efficient model was the one utilizing advertising and store class as independent variables.

There were some major differences between the product classes. Brand advertising, while significant in explaining retail price variance in flour, did not explain much of the variance. For bacon, brand advertising was the most important factor in explaining retail price variation. For store class, the opposite results occurred. Store class was more efficient in explaining price variance for flour than it was for bacon. In both product classes, competitive structure explained little about retail price variation.

CHAPTER V

AN ANALYSIS OF RETAIL PRICE LEVELS

INTRODUCTION

This chapter includes the results of an analysis of the effects of the same three independent variables on average price levels. It was decided to include these results because the data were available and could easily be modified into the proper format. It was considered possible that if these three variables were related to price variation, then they might well be related to price levels.

STATISTICAL TESTING

In order to carry out this analysis, the analysis of variance technique was selected. ANOVA allows the researcher to evaluate the individual effects of each variable, as well as possible interactions between the variables.¹ In addition to the ANOVA, it was decided to use multiple

¹Gene V. Glass and Julian C. Stanley, Statistical Methods in Education and Psychology, (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970), p. 406.

classification analysis to further analyze the data. MCA allows the researcher to determine how much each independent variable contributes to the reduction in unexplained variance.² It also provides a measure of all three variables' ability to reduce unexplained variance. This model is not sensitive to interaction effects.

The Data

The data were recoded to fit the format for both ANOVA and MCA. Because there were ten different concentration levels and no levels for advertising, the data were recoded into classes. These dummy variables are appropriate for both ANOVA and MCA.

The five store classes remained the same, but were changed from a zero-one designation into:

- 1 = supermarket
- 2 = large independent
- 3 = cooperative
- 4 = small independent
- 5 = convenience

Similarly, the ten concentration indices, one for each county, were divided into four classes. This was accomplished by determining an average and calculating two standard deviations from the mean. This led to the following four classes:

- 1.01, 1.20 = 1
- 1.41, 1.45, 1.56, 1.7 = 2
- 2.22, 2.31 = 3
- 3.11, 3.93 = 4

²Frank M. Andrews and James N. Morgan, John A. Sonquist and Laura Klem, Multiple Classification Analysis, (Ann Arbor, Michigan: Institute for Social Research, The University of Michigan, 1973), pp. 1, 2.

Advertising was divided into three classes based on inspection of the data. Bacon was divided into three classes; high advertising - over \$1,000,000, moderate advertising = \$100,000 - 999,000 and low advertising - under \$100,000. Flour was divided the same way, except that there were no brands in the low advertising case. Therefore, the brand with the lowest expenditure, Martha White at \$170,000 was allocated to the low advertising case. For both products the classes were defined as follows:

- 1 = low advertising
- 2 = moderate advertising
- 3 = high advertising

The Calculations

Since it was important to look at both the main effects and the interactions of all three variables simultaneously, a three way analysis of variance was deemed most appropriate. Therefore, means were calculated for each of the sixty cells for both product classes. Unfortunately in each case, there were seventeen cells containing no information. With this much missing data, it was impossible to use the three way ANOVA.

Instead of the three way ANOVA, three two-way ANOVA's were calculated for each product class. Therefore, advertising was combined with store class, advertising with competition and the competition with store class.

Even with this format, there were some problems which made the statistics difficult to compute. First, there were still some cells missing data, even in the smaller matrices. To compensate for this, the weighted average of the appropriate row and column totals was computed. This provided one observation for the cell that was missing data. This observation would not bias the final results, but would allow the analysis to be completed.

A second problem occurred due to the unequal number of cases in each cell. Some cells had as many as thirty observations, while others had only the one that was calculated for it. Therefore, it was impossible to make the design orthogonal. Orthogonality occurs when "...each level of one factor appears the same number of times with the levels of a second factor, and this is true for all pairs of factors in the experiment."³ Because of the unequal number of observations in each cell, the vectors will not be orthogonal.

Because of these two reasons, the results of the analysis of variance will only be reported. No implications or conclusions will be drawn from the results, although the significance levels of the F test will be reported.

For the MCA, which is a dummy variable regression technique, the following data will be reported. The eta coefficient, which is the proportion of the total sum of squares explained by the predictors. The beta coefficients which are the same as the eta coefficients, except that they are based on adjusted rather than raw means. Finally, MCA calculates a multiple R and R^2 for the model as a whole.⁴

RESULTS

Product Class - Flour

Table two summarizes the results of the three models used in the

³William Mendenhall, Introduction to Linear Models and the Design and Analysis of Experiments, (Belmont, California: Duxbury Press, 1968), p. 182.

⁴Andrews, Morgan, Sonquist and Klem, pp. 6, 7.

TABLE 5-1

DATA CALCULATED TO REPLACE MISSING DATA

<u>Model</u>	<u>Product Class</u>	
	<u>Flour</u>	<u>Bacon</u>
Advertising/Competition	None	None
Advertising/Store Class	x1-1 x3-4 91	x1-3 x3-5 179
	x1-1 x3-5 101	
Competition/Store Class	x2-4 x3-1 83	x2-4 x3-1 170

TABLE 5-2

SUMMARY OF RESULTS - FLOUR

	<u>ANOVA</u>		<u>MCA</u>	
<u>Model 1</u>	<u>F</u>	<u>Sig of F</u>	<u>Eta</u>	<u>Beta</u>
Main Effects	7.677	.001		
x ₁ (Advertising)	14.010	.001		
x ₂ (Competition)	3.834	.001	.25	.25
x ₁ x ₂ (Interaction)	.972	.999	.15	.16
Total Explained	4.020	.001		
			R = .208 R ² = .088	
<u>Model 2</u>				
Main Effects	95.725	.001		
x ₁ (Advertising)	15.348	.001	.25	.18
x ₃ (Store Class)	128.388	.001	.75	.76
x ₁ x ₂ (Interaction)	1.301	.240		
Total Explained	41.769	.001		
			R = .768 R ² = .589	
<u>Model 3</u>				
Main Effects	74.977	.001		
x ₂ (Competition)	.326	.999	.15	.03
x ₃ (Store Class)	125.711	.001	.75	.76
x ₂ x ₃ (Interaction)	2.557	.003		
Total Explained	29.238	.001		
			R = .747 R ² = .559	

Analysis of Variance and Multiple Classification Analysis for the first product class - flour. In the ANOVA, both advertising and store class were significant no matter which model they were included in. The F ratio for advertising was quite high, and that for store classes even higher. Competition was not significant in one model and only marginally so in the second. The interaction terms were not significant in two models, however, it was significant in the interaction between competition and store class.

The analysis utilizing MCA, shows results which were consistent with those found in ANOVA. The beta coefficients (deviations of adjusted means from the grand mean) show very similar patterns. Store class contributes a major part in explaining variance, while advertising explains a minor amount and competition little or nothing. Consistent with this, the R^2 is highest, .589, for the model with advertising and store class as the independent variables. The lowest R^2 , .088, is found in the model which utilizes advertising and competition as the predictors.

Product Class - Bacon

Table 3 summarizes the results of the same statistical tests for the second product class - bacon. Although the results are similar to a certain extent, they differ in several ways. As with the previous product, competition was not significant in either of the ANOVA models. These are model one, advertising and competition, and model three, competition and store class. Also as with the previous product advertising and store class are always significant, no matter which model they are in. However,

TABLE 5-3

SUMMARY OF RESULTS - BACON

	<u>ANOVA</u>		<u>MCA</u>	
<u>Model 1</u>	<u>F</u>	<u>Sig of F</u>	<u>Eta</u>	<u>Beta</u>
Main Effects	14.898	.001		
x ₁ (Advertising)	34.283	.001		
x ₂ (Competition)	1.051	.371	.43	.42
x ₁ x ₂ (Interaction)	2.634	.017	.12	.09
Total Explained	8.209	.001		
			R = .436	R ² = .190
<u>Model 2</u>				
Main Effects	16.826	.001		
x ₁ (Advertising)	30.806	.001	.43	.40
x ₃ (Store Class)	5.735	.001	.30	.23
x ₁ x ₃ (Interaction)	3.412	.001		
Total Explained	9.160	.001		
			R = .486	R ² = .236
<u>Model 3</u>				
Main Effects	4.879	.001		
x ₂ (Competition)	.835	.999	.12	.09
x ₃ (Store Class)	7.249	.001	.30	.29
x ₂ x ₃ (Interaction)	1.453	.141		
Total Explained	2.715	.001		
			R = .314	R ² = .099

the F values are higher for advertising than for store class, a reverse from the results in flour.

The major point of difference between the two product classes are the interactions. The interaction between advertising and competition was significant at the .017 level. That between advertising and store class at the .001 level. Even the interaction of competition and store class was significant at the .141 level. In flour, it was clear that in at least two cases the interaction terms explained nothing.

Again, the results of the ANOVA were borne out in the MCA. The beta weights for advertising were the highest, those for store class next, and those for competition quite low, .09. However, the R^2 for these three models were considerably lower than for the three for flour. The highest R^2 was again for the model containing advertising and store class at .236, and the lowest for competition and store class at .099. One reason for the lower R^2 values might be the significance of the interaction terms. MCA is normally insensitive to interactions.

CONCLUSIONS

There are both similarities and differences in the results for both products. For both products, the effect of competition was either minor or negligible. This is probably due to the method used to measure competition, on a county wide, rather than a market by market basis. However, both advertising and store class were significant for both products. The interactions were for the most part of little value in explaining

differences in the average price levels of flour. However, they did seem to contribute to explaining price level differences in bacon.

It is important to add several disclaimers to these results. First, the problem of non-orthogonality mentioned previously makes the results suspect. Secondly, the cells which were missing data might well have changed the results. A final note is that there was enough difference in both product classes to suggest that although these variables might be related to price levels, the relationship could well be different for each product class.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

Before presenting the conclusions, the purpose and scope of the study as well as its limitations will be restated. The purpose of this study was to determine whether a multivariate approach would be more effective in explaining retail price variation than a univariate approach. The univariate model, using one independent variable to explain retail price dispersion has been the primary tool of past researchers. This study used three variables. One never tested before - brand advertising, one that has been tested extensively - store class, and one that has had theoretical support but little empirical backing - competitive structure.

The scope of the study was limited to two food products; bacon and flour. Similarly, the geographic scope of the study was limited to a ten county area of northwest Ohio. Therefore, the results of this study are not generalizable to any area but the one under study and only to the two products studied. A further limitation of this study was the inability to find the requisite data from a reliable, consistent source. The data were collected from a variety of sources and were not all collected in the same year.

A final limitation is that of the many possible causes of price dispersion discerned in the literature, only three were included in the study. However, since the purpose of the study was an exploratory look at a new approach to retail price dispersion, this is not a serious shortcoming. It was not the purpose of this study to explain retail price dispersion for all times and all circumstances, but simply to indicate that there is a better method of measurement.

CONCLUSIONS

The first and most obvious conclusion is that prices do vary in the marketplace. The standard deviations for the ten brands of flour ranged from .176 to .598. Similarly, the standard deviations for the different brands of bacon ranged from .109 to .473. Therefore, price variation existed for every brand in both product classes, at least in this market.

As the studies presented in the literature review demonstrated, all three variables chosen for the study are related to price dispersion. For the first product class, flour, all three variables were statistically significant. Brand advertising at the .005 level, retail competition at the .05 level and store class at the .001 level. For the second product class, bacon, both advertising and store class were significant at the .001 level. For this product, competition was not significantly related to price dispersion.

The major findings of the research came from the two multiple regression models which combined all three variables. For flour, the null hypothesis was accepted. Although both advertising and store class were

significant, store class by itself explained most of the variance, with an R^2 of .542. For bacon, the use of a multiple regression model did add to the explanatory power. Advertising and store class combined explained .2999 of the variance, better than either variable individually.

It is interesting to note that the nature of retail price variation is considerably more complex than previous studies have shown. The structure of retail price dispersion was distinctly different for each product class. For flour, store class was the most important variable, while in bacon, advertising was the more important variable. That two products in the same general class of grocery products would have different patterns, was an unforeseen result.

A fourth conclusion is that manufacturers do have an impact on retail price dispersion. This factor has not been explicitly addressed in previous price dispersion studies. For both products, brand advertising, by the manufacturer did affect retail price variance. This was particularly true for bacon.

A fifth conclusion, not directly connected with the initial concept of the study is that there may be a correspondence between price levels and price variation. In comparing the results, the R^2 for the MCA which was used in determining the effect of the independent variable on price level is similar to the R^2 from the regressions on price dispersion. In table 6-1 the results are compared. Advertising was the variable which explained the most about price levels and price variation in bacon. Store class was the variable which was the more effective in both instances for flour.

TABLE 6-1

COMPARISON OF RESULTS FROM TWO STUDIES

<u>Product Class</u>	<u>Independent Variables</u>	<u>Price Dispersion Regression R²</u>	<u>Price Level MCA R²</u>
Flour	Advertising and Store Class	.5509	.589
Bacon	Advertising and Store Class	.2999	.236

In general, the results matched those that would be expected from the literature review. Store class played a major role in influencing price dispersion in both product classes. For both flour and bacon, it is apparent that each class of retailer has a distinct pricing strategy. Convenience stores had the highest prices for both products and chain supermarkets the lowest. These results are identical to those found in the many empirical studies reported in chapter two.

Similarly, as Steiner has hypothesized, brand advertising influenced price dispersion for both product classes. For flour, the beta weight was negative indicating that increases in brand advertising expenditures, all other variables held constant, led to lower prices. For bacon, exactly the opposite results occurred. Increased brand advertising led to higher prices. But in both cases, brand advertising contributed to explaining part of the overall price variation.

These findings do not "prove" Steiner's hypothesis, nor discredit Stigler's. First, because only two product classes were used out of the thousands available. Secondly, because Stigler dealt with retail advertising as a form of information, not brand advertising. Since retail advertising was not selected as one of the variables in this study, it is impossible to make any conclusions.

It is only in the area of competitive structure that the results were not as expected. Again, this does not discredit the work of Holdren, Cassady or Alderson. More likely the results represent the failure of the study to capture a true picture of competition in the northwest Ohio area.

CONTRIBUTIONS

First, the nature of retail price variation is considerably more complex than previous literature has shown. In one product class, the explanatory power of the model was clearly better with a multivariate analysis. Secondly, the structure of price variation was distinctly different for both product classes. For flour, store class was of prime importance, for bacon, advertising was more important. Therefore, this study has contributed by pointing out the more complex nature of retail price dispersion.

A second contribution, is that for the first time, different patterns of price variation were discerned. This suggests, that even within the general class of grocery products, different patterns exist.

A third contribution of this study is that manufacturers do have an impact on retail price dispersion. This is the first time that this factor has explicitly been addressed in a retail price variation study.

Finally, this study has noted that there might be a correspondence between price levels and price variation. In comparing the results of the analysis in chapter four and five, there appears to be a relationship.

MANAGERIAL IMPLICATIONS

Price dispersion is the normal course of events in the marketplace. Therefore, it will continue to exist whether a manager is cognizant of its existence or not. However, since the price consumers pay for a product affects that product's image, how much that price varies could be of key importance.

Those managers who wish to control the degree of price dispersion for their products need to see the problem as multidimensional in nature. There are many possible causes of price dispersion of which only a few are controllable. Some of the controllable factors include factory selling price, brand advertising and trade deals. But a good part of the variance is accounted for by variables outside of the managers control. Factors such as the degree of retail competition. Finally, there is a group of variables which are at best semi-controllable. Factors such as store class and retail advertising.

This study has several additional findings that will aid the manager in an attempt to control the degree of price dispersion for his products. First, by using brand advertising and preselling the product to the consumer, the manager has implicitly determined that a wider price variance will result. This occurred for both of the products in this study. Secondly, while the same variable might be responsible for explaining price variations, the relative importance of each variable will change from product to product. For flour, store class was relatively more important, for bacon brand advertising was the most important factor.

One final implication worth noting is that there could well be a correspondence between price variation and price levels. This occurred for the two products in this study. Brand advertising was not only the most important factor in explaining price variation in bacon, but also the most important factor in explaining price levels. Store class played the same role for flour. If this were true for other products, influencing one could well mean influencing both. Both price levels and price variation would have to be considered simultaneously in pricing strategy.

RECOMMENDATIONS FOR FUTURE RESEARCH

The recommendations and implications proceed from the contribution section. This study was essentially exploratory in nature. Therefore, much more work needs to be done to verify these results.

First, more research of a multivariate nature needs to be done in examining price dispersion. More variables can be included to determine more precisely the nature of retail price variation. It is clear that these variables accounted for only .55 and .2999, of the variance at best. A model including more variables should be able to do a more complete job of explaining variance.

Secondly, more product classes should be examined. Although these two product classes differ, it is possible that if more classes were examined, patterns might occur. More types of products such as appliances, clothing, furniture and other products could also be examined to determine if there is any factors which are responsible for variation across product lines.

In addition, the role of the channel in contributing to retail price dispersion could be more fully explored. Although this study included brand advertising, other factors such as display allowances, quantity discounts and other pricing factors could be evaluated for their effect on price dispersion.

A final area of concern is the relationship between price variation and price levels. Is the relationship found between price levels and price variations a spurious one? Or does it occur in other cases?

Further studies along this line are needed to determine if the factors are indeed the same.

CONCLUSION

An exploratory study such as this leaves more questions unanswered than it ultimately answers. It is clear that the nature of retail price variations is more complex than at first supposed. Therefore, there can be no final conclusion to this study. Hopefully, additional research will answer some of the questions that this study has raised.

APPENDICES

APPENDIX A

RATIONALE FOR INDEPENDENT VARIABLE SELECTION

<u>Possible Causes of Price Dispersion</u>	<u>Reasons for Relating Variable to Price Dispersion</u>	<u>Reasons for Excluding Variable from Study</u>
1. Geographic differences	1. Included in literature as possible cause. 2. Empirical support for this variable (Cassady and Grether)	1. Difficulty in getting information on a national basis. 2. Study was confined to one geographic area.
2. Racial Discrimination and bargaining ability	1. Included in literature as a possible cause. 2. Empirical support for this variable (Shapiro, et. al.)	1. Requires a separate study first to determine nature of shoppers at each store. 2. Beyond scope of study.
3. Retail Advertising	1. Included in literature as a possible cause. 2. Empirical justification for this variable (Gray and Andersen).	1. Possible intercorrelation between brand advertising and retail advertising (Steiner, Peckham).
4. Goods Class	1. Different methods of promotion for different product classes. 2. Different channel relationships.	1. Would expand study beyond what was affordable. a. two samples b. two sets of interviews.
5. Product Life Cycle	1. Difference in marketing mix over time. 2. Differences in consumer knowledge and market penetration.	1. Not enough brands or penetration in introductory phase. 2. Found no product classes which met other requirements as well.
6. Factory Selling Price	1. Direct influence because of: a. buying power of retail competitors b. state of competition between manufacturers c. factory deals	1. Dealer unwillingness to provide information. 2. Problem of determining what stock came in at what price.
7. Market Penetration	1. The larger, the number of retailers stocking a product the more chance for differences.	1. Penetration correlated to advertising. 2. Penetration correlated to store classes.
8. Resale Maintenance	1. Would force products to be sold at identical prices.	1. There is no price maintenance in the market area.

APPENDIX B

DATA RECORDING SHEET FOR OBSERVATIONS

Interviewer _____

County Name _____

City Name _____

Store Name _____

Flour - 5# bag, All Purpose

<u>Brand</u>	<u>Price</u>
Dixie Lily	_____
Gladiola	_____
Dorsel	_____
Gold Medal	_____
Sunflower	_____
Martha White	_____
Omega	_____
Nunn	_____
King Midas	_____
Pillsbury's Best	_____
Aunt Jemima	_____
Metropolitan	_____
Roanoke City	_____
King Arthur	_____
Shurfine	_____
Certesota	_____
Heckers	_____
Southern Biscuit	_____
Washington	_____
Other	_____
Other	_____
Other	_____
Other	_____

Bacon - 1# pkg., Sliced

<u>Brand</u>	<u>Price</u>
Farmer John	_____
Bryan	_____
Mayrose	_____
Swift's Premium	_____
Cudahy	_____
Armour Star	_____
Decker	_____
Southern Star	_____
Hormel	_____
Hygrade	_____
Smithfield	_____
Williamsburg	_____
Wilsen Certified	_____
Corn King	_____
Oscar Mayer	_____
Farmer Peet's	_____
Rath Black Hawk	_____
Esskay	_____
Stark Wetzel	_____
Superiors	_____
Marvel Price	_____
Weavers	_____
Other	_____
Other	_____
Other	_____
Other	_____

STORE CLASS: Large

Small

Chain _____ Independent _____ Cooperative _____ Independent _____ Convenience _____

APPENDIX C

INSTRUCTIONS FOR DATA COLLECTION

Instructions for Students Collecting Data

1. You are to visit as many stores as possible on Friday and Saturday.
2. Try to obtain a mix of all types of food retailers, as per the data sheet.
3. Do not alert store personnel that you are collecting prices, simply collect them and leave.
4. In classifying the retail stores use the following definitions:
 - a. Chain - A group of retail stores, with more than ten members, carrying a wide and deep product line. Examples of this area would be; Foodtown, Great Scot, Kroger, A & P and Joseph's.
 - b. Independent Supermarket - An individual food retailer, or one with less than ten stores, carrying a wide deep product line. An example in this area would be Centre.
 - c. Cooperative - A voluntary chain, of independent supermarkets, operating under a common banner. An example would be IGA.
 - d. Small Independent - An individual retailer, stocking a wide, but not deep product line, including meat and produce. A local example would be Perkins.
 - e. Convenience Store - A retailer carrying neither a wide nor a deep product line. An example would be Lawsons.
5. If you have any questions, or are unable to classify a store, note this on the back of the questionnaire.
6. In collecting the prices of the products:
 - a. Make sure you get all of the brands stocked even if they are not listed on the sheet.
 - b. Make sure the product fits the definition, that is 5# All Purpose flour, 1# Sliced bacon.
7. If you want to be reimbursed, make sure you get receipts for your expenses; gas, lunch, etc.
8. Good Luck!

APPENDIX D
DATA SUMMARY SHEET

COUNTY	STORE TYPE		LARGE INDE- PENDENT	COOPER- ATIVE	SMALL INDE- PENDENT	CONVEN- IENCE	TOTAL PENE- TRATION BY COUNTY	CONCEN- TRATION INDEX
	CHAIN							
ALLEN								
FULTON								
HANCOCK								
HARDIN								
HENRY								
LUCAS								
PUTNAM								
SANDUSKY								
SENECA								
WOOD								
TOTAL PENETRATION BY STORE TYPE								

Advertising \$ _____

BIBLIOGRAPHY

BIBLIOGRAPHY

- Adelman, M. A., "Effective Competition and the Anti trust Laws," Harvard Law Review, Vol. 6, (September 1948), pp. 1289-1350.
- Alderson, Wroe, "Administered Prices and Retail Grocery Advertising," Journal of Advertising Research, Vol. 3, (March 1963), pp. 2-11.
- Alderson, Wroe and Shapiro, Stanley J., "Towards a Theory of Retail Competition," in Theory In Marketing, Second Series, eds. Wroe Alderson and Stanley J. Shapiro, Homewood, Ill: Richard D. Irwin, Inc., 1964, pp. 190-212.
- Alexis, Marcus and Simon, Leonard S., "The Food Marketing Commission and Food Prices by Income Groups," Journal of Farm Economics, Vol. 48, (May 1967), pp. 436-446.
- Andrews, Frank M., Morgan, James N., Sonquist, John A. and Klem, Laura, Multiple Classification Analysis, Ann Arbor, Mich: Institute for Social Research, The University of Michigan, 1973.
- Applebaum, William and Goldberg, Ray A., Brand Strategy In United States Food Marketing, Boston, Mass.: Division of Research, Graduate School of Business Administration, Harvard University, 1967.
- Aubert-Krier, Jane, "Monopolistic and Imperfect Competition In Retail Trade," in Monopoly and Competition and their Regulation, ed. E. H. Chamberlin, London: Macmillan and Company, ltd., 1954.
- Bader, Louis, "Customer Preference For Brands in Grocery Products," Journal of Retailing, Vol. 10, (July 1934), pp. 41-47.
- Benham, Lee, "The Effect of Advertising on the Price of Eyeglasses," Journal of Law and Economics, Vol. 15, (October 1972), pp. 337-352.
- Black, Guy, "Variations in Prices Paid for Food as Affected by Income Level," Journal of Farm Economics, Vol. 34, (February 1952), pp. 52-66.
- Bonwich, William T. and Conway, Edward B., "Pricing In Food Chains: Poverty Area Versus Nonpoverty Area Stores," Journal of Retailing, Vol. 46, (Summer 1970), pp. 60-63.
- Brandow, George E., "Discussion: Competition and Concentration In Food Retailing," Journal of Farm Economics, Vol. 46, (December 1965), pp. 1347-1351.
- Bureau of the Census, County Business Patterns, Washington D. C.: U. S. Department of Commerce, 1974.

- Cady, John F., Drugs on The Market: The Impact of Public Policy on the Retail Market for Prescription Drugs, Lexington, Mass.: D. C. Heath & Co., Lexington Books, 1975.
- Cairns, James P., "Concentration In Food Retailing In the United States," Journal of Retailing, Vol. 38, (Fall 1962), pp. 10-16.
- Cairns, James P., "Competition In Food Retailing - Some Recent Developments," Journal of Retailing, Vol. 37, (Fall 1961), pp. 34-38.
- Cassady, Ralph, Jr., Competition and Price Making In Food Retailing, New York: The Ronald Press Company, 1962.
- Cassady, Ralph, Jr., and Grether, E. T., "Locality Price Differentials In the Western Retail Grocery Trade," Harvard Business Review, Vol. 21, (Spring 1943), pp. 190-206.
- Converse, Paul D., "Drug Store Expenses and Margins," Journal of Marketing, Vol. 20, (July 1955), pp. 49, 50.
- Dowe, Dorothy, "A Comparison of Independent and Chain Store Prices," Journal of Business, Vol. 5, (July 1932), pp. 130-144.
- Entenberg, Robert D., "Implications of Interfirm Competition At the Retail Level," Journal of Retailing, Vol. 43, (Summer 1967), pp. 1-8, 66.
- Ferber, Robert, "Variations In Retail Sales Between Cities," Journal of Marketing, Vol. 23, (January 1958), pp. 295-303.
- Folz, William E., "The Food Marketing Commission and Market Structure and Market Performance," Journal of Farm Economics, Vol. 47, (December 1966), pp. 413-424.
- Glass, Gene V. and Stanley, Julian C., Statistical Methods In Education and Psychology, Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1970.
- Gray, Roger W. and Anderson, Roice, "Advertised Specials and Local Competition Among Supermarkets," Food Research Institute Studies, Vol. 3, (May 1962), pp. 125-140.
- Haas, Harold M., "Price Differentials Among Grocery Stores in Bloomington, Indiana," Journal of Marketing, Vol. 5, (October 1940), pp. 148-155.
- Handy, C. R. and Padberg, E. I., "A Model of Competitive Behavior In Food Industries," Journal of Agricultural Economics, Vol. 53, (May 1971), pp. 182-190.
- Haynes, W. Warren, "Pricing Practices In Small Firms," Southern Economic Journal, Vol. 30, (April 1964), pp. 315-324.

- Hinkle, Charles L., "The Strategy of Price Deal," Harvard Business Review, Vol. 43, (July-August 1965), pp. 75-85.
- Hirsch, Werner Z., "Grocery Chain Store Prices - A Case Study," Journal of Marketing, Vol. 21, (July 1956), pp. 9-25.
- Holdren, Bob R., "Competition In Food Retailing," Journal of Farm Economics, Vol. 46, (December 1965), pp. 1323-1331.
- Holdren, Bob R., The Structure of a Retail Market and the Market Behavior of Retail Units, Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1960.
- Hollander, Stanley C., Restraints Upon Retail Competition, Marketing and Transportation Paper No. 14, East Lansing, Mich.: Bureau of Business and Economic Research, Michigan State University, 1965.
- Hollander, Stanley C., Retail Price Policies, Occasional paper No. 1, East Lansing, Mich.: Bureau of Business Research, Michigan State University, 1958.
- Hollander, Stanley C., "Theoretical Implications of Empirical Research on Retail Pricing," American Economic Review, Vol. 47, (May 1957), pp. 252-265.
- Holton, Richard H., "Price Discrimination at Retail: The Supermarket Case," Journal of Industrial Economics, Vol. 6, (October 1957), pp. 13-32.
- Hood, Julia and Yamey, D. S., "Imperfect Competition in the Retail Trades," Economics, Vol. 18, (February 1951), pp. 119-137.
- Jamison, John A., "Intermarket Food Cost Differentials: A Case Study of Honolulu and the San Francisco Bay Area," Food Research Institute Studies, Vol. 8, (May 1968), pp. 155-189.
- Jung, Allen F., "A Different Retail Price Pattern The Case of Carpeting," Journal of Business, Vol. 38, (April 1965), pp. 180-185.
- Jung, Allen F., "Price Policy and Discounts in the Medium and High Priced Car Market," Journal of Business, Vol. 33, (October 1960), pp. 342-247.
- Jung, Allen F., "Price Variations On Automatic Washing Machines In Chicago, Illinois, Among Different Types of Retail Outlets - 1955 Versus 1958," Journal of Business, Vol. 32, (April 1959), pp. 315-324.
- Jung, Allen F., "Price Variations Among Automobile Dealers In Chicago, Illinois," Journal of Business, Vol. 32, (October 1959), pp. 315-324.
- Jung, Allen F., "Price Variations Among Automobile Dealers in Metropolitan Chicago," Journal of Business, Vol. 33, (January 1960), pp. 31-42.

- Jung, Allen F., "Price Variations Among Discount Houses and Other Retailers," Journal of Retailing, Vol. 37, (Spring 1961), pp. 13-16.
- Jung, Allen F., "Prices of Falcon and Corvair Cars in Chicago and Selected Cities," Journal of Business, Vol. 33, (April 1960), pp. 121-126.
- Kerlinger, Fred and Pedhazor, Elazar J., Multiple Regression in Behavioral Research, New York: Holt, Rinehart and Winston, Inc., 1974.
- Kunreuther, Howard, "Why The Poor May Pay More For Food: Theoretical and Empirical Evidence," Journal of Business, Vol. 46, (July 1973), pp. 368-383.
- Leading National Advertisers, Brand Advertising by Classification, New York: Leading National Advertisers, Inc., 1974.
- LeBow, Victor, "Price Competition In 1955," Journal of Retailing, Vol. 31, (Spring 1955), pp. 5-10, 42, 44.
- LeBow, Victor, "The Trend Toward Lower Markups," Journal of Retailing, Vol. 20, (February 1944), pp. 9-13.
- Liu, Ben-chieh, "The Relationships Among Population, Income and Retail Sales in SMSA's 1952-66," Quarterly Review of Economics and Business, Vol. 10, (Spring 1970), pp. 25-40.
- Markin, Ron J., "The Supermarket - A Study of Size, Profits, and Concentration," Journal of Retailing, Vol. 40, (Winter 1964-1965), pp. 22-36.
- Massy, William F. and Frank, Ronald E., "Analysis of Retailer Advertising Behavior," Journal of Marketing Research, Vol. 3, (November 1966), pp. 378-383.
- Maurizi, Alex R., "The Effect of Laws Against Price Advertising: The Case of Retail Gasoline," Western Economic Journal, Vol. 10, (September 1972), pp. 321-329.
- McClelland, W. G., "Pricing for Profit in Retailing," Journal of Industrial Economics, Vol. 7, (July 1959), pp. 159-175.
- Mendenhall, William, Introduction to Linear Models and the Design and Analysis of Experiments, Belmont, Calif. Duxbury Press, 1968.
- Millican, Richard D. and Rogers, Ramona Jean, "Price Variability of Non-Branded Food Items Among Food Stores In Champaign-Urbana," Journal of Marketing, Vol. 18, (January 1954), pp. 282-284.
- Minichiello, Robert J., "Comparative Assortments of Discount Food Stores and Conventional Supermarkets," Journal of Retailing, Vol. 44, (Winter 1968), pp. 29-43, 53.

- Minichiello, Robert J., "The Real Challenge of Food Discounters," Journal of Marketing, Vol. 31, (April 1967), pp. 37-42.
- Morgan, Howard E., "Concentration In Food Retailing," Journal of Farm Economics, Vol. 46, (December 1965), pp. 1332-1346.
- Naden, Kenneth D. and Jackson, George A., Sr., "Prices As Indicative of Competition Among Retail Food Stores," Journal of Farm Economics, Vol. 46, (December 1965), pp. 236-248.
- Nelson, Paul E. and Preston, Lee E., Price Merchandising In Food Retailing: A Case Study, Berkley, Calif.: Institute of Business and Economic Research, University of California, 1966.
- Neter, John and Wasserman, William, Applied Linear Statistical Models, Homewood, Ill.: Richard D. Irwin, Inc., 1974.
- Newcomer, Mabel and Perkins, Margret, "Price Variations Among Poughkeepsie Grocers," Journal of Marketing, Vol. 4, (July 1939), pp. 39-44.
- Oxenfeldt, Alfred R., "The Underlying Rationality of Business Pricing Decisions," in Prices: Issues In Theory, Practice, and Public Policy, eds., Almarin Phillips and Oliver E. Williamson, Philadelphia: University of Pennsylvania Press, 1967, pp. 214-227.
- Peckham, James O., The Wheel of Marketing, Chicago: A. C. Nielsen Company, 1973.
- Primeaux, Walter J., Jr., "The Effect of Consumer Knowledge and Bargaining Strength on Final Selling Price: A Case Study," Journal of Business, Vol. 32, (October 1970), pp. 419-426.
- Primeaux, Walter J., "Price Variability and Price Discrimination: A Case Study," Marquette Business Review, Vol. 17, (Spring 1973), pp. 25-29.
- Russell, Vera Kilduff, "The Relationship Between Income and Retail Sales In Local Areas," Journal of Marketing, Vol. 21, (January 1957), pp. 329-332.
- Sales Management, "Survey of Buying Power," June 1977.
- Sexton, Donald E., Jr., "Comparing the Cost of Food to Blacks and to Whites - A Survey," Journal of Marketing, Vol. 35, (July 1971), pp. 40-46.
- Shapiro, Benson P., "The Psychology of Pricing," Harvard Business Review, Vol. 46, (July-August 1968), pp. 14-16, 18, 20, 22, 24, 25, 160.
- Shapiro, David L., "Costs of Search and Racial Price Discrimination," Economic Inquiry, Vol. 12, (September 1974), pp. 423-430.

- Slaktor, Malcolm J., Statistical Inference for Educational Researchers, Reading, Mass.: Addison-Wesley Publishing Company, 1972.
- Smith, Henry, Retail Distribution, London: Oxford University Press, 1937.
- Steiner, Robert L., "Does Advertising Lower Consumer Prices?" Journal of Marketing, Vol. 37, (October 1973), pp. 19-26.
- Steiner, Robert L., Economic Theory and The Idea of Marketing Productivity, Cambridge, Mass.: Marketing Science Institute, 1974.
- Steiner, Robert L., "Toward A New Theory of Advertising and Price," Presented at the Annual Meeting of the American Academy of Advertising, Minneapolis, Minnesota, March 27, 1977.
- Stigler, George J., "The Economics of Information," The Journal of Political Economy, Vol. 69, (June 1961), pp. 213-225.
- Taylor, Malcolm D., "Prices in Chain and Independent Grocery Stores in Durham, North Carolina," Harvard Business Review, Vol. 8, (July 1930), pp. 413-424.
- Telser, Lester G., "How Much Does It Pay Whom to Advertise," American Economic Review, Vol. 51, (April 1961), pp. 194-205.
- Telser, Lester G., "Searching for the Lowest Price," American Economic Review, Vol. 63, (May 1973), pp. 40-49.
- Ward, T. S., The Distribution of Consumer Goods: Structure and Performance, London: Cambridge University Press, 1973.
- Wolfe, Harry Deane, "Grocery Prices and Marketing Functions," Journal of Marketing, Vol. 6, (July 1941), pp. 27-30.
- Yamane, Taro, Statistics, An Introductory Analysis, New York: Harper & Row, Publishers, 1967.