

Retail Pricing

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Retail Pricing

**An Integrated Economic
and
Psychological Approach**

By Harry Nyström

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Preface

This report, carried out at the Economic Research Institute will shortly be submitted as a doctor's thesis at the Stockholm School of Economics. The author has been entirely free to conduct his research in his own ways as an expression of his own ideas.

The study covers areas within marketing, psychology and the micro-theory of economics. According to our tradition this integrated approach is a contribution per se, and the study should not be looked upon as contributions in each of the individual areas.

The Institute is grateful for the financial support of this research — mainly from the Swedish Council for Social Science Research and the Svenska Handelsbanken's Foundation for Social Research.

Stockholm, February 1970.

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At the Joint Faculty seminar at Aspenäs and the Scandinavian Faculty Meeting in Gothenburg, both in August 1969, I had the privilege of presenting a shorter version of some of the main ideas of the present study. I would like to thank all the participants for their helpful criticism, particularly Professors Richard M. Cyert, John U. Farley and Gösta Mickwitz.

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Mr Jarl Svensson checked my statistical calculations, and Mrs. Charlyn Hultén read through and corrected my English, which has helped to clarify my ideas. The tedious work of typing my many manuscripts has mainly been carried out by Mrs. Ingrid Ekenäs, Harriet Lundh, Inger Gulldén and Christina Palmer. Needless to say, this study would not have been possible without their efforts. I would like to thank all the above persons for their help.

In 1966—1967 I had the privilege of spending the academic year at the University of California, Berkeley. The intellectually stimulating environment and the leisure to study without stress aided me greatly in developing the ideas presented in this study.

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Harry Nyström

Contents

1	Introduction	11
1.1	Background and main ideas	11
1.2	Applicability of the analysis	20
1.3	Aim of the study	20
1.4	Some basic definitions and assumptions	21
1.4.1	Competitive definitions	21
1.4.2	Assortment definitions	22
1.4.3	Informational definitions	24
1.5	Limitation of the analysis to competition between firms	25
1.6	A note on methodology	28
1.7	Plan of the book	30
	Appendix to Chapter 1	31
<hr/>		
2	Review of the pricing literature	33
2.1	Purpose of the review	33
2.2	Basic models of competition in the theory of the firm	34
2.3	Multi-product and multi-period models in the microeconomic tradition	36
2.4	Applications of microeconomic theory to retail pricing	39
2.4.1	Mickwitz	39
2.4.2	Applications of traditional single-product microeconomic models	40
2.4.3	Holton	40
2.4.4	Holdren	41
2.4.5	Andrews	42
2.5	Behavioristic extensions of microeconomic theory	43
2.6	Studies of retail pricing in the marketing literature	44
2.6.1	Cassady, Jr.	44
2.6.2	The Philadelphia studies	45
2.6.3	Nelson and Preston	45
2.6.4	McClelland	46
2.7	Buyer psychological aspects of pricing	46
2.7.1	Price surveys	47
2.7.2	Price experiments	48
2.7.3	Oxenfeldt	48
2.8	Summary of our pricing review	48
<hr/>		
3	An empirical study of retail pricing, illustration of an analytical method (single-period analysis)	50
3.1	Introduction	50
3.2	Empirical background	52
3.3	Analysis of price-changes	53
3.3.1	Flexibility of pricing	54
3.3.2	Average price-changes	58
3.3.3	Accumulated price-changes	58
3.3.4	Pricing Independence	60
3.3.5	Pricing initiative	61
3.3.6	Pricing response	63
3.4	Summary of the interviews	63
3.5	Comparisons between price data and interviews	66

4	Applicability of the proposed operational method for studying price-change strategies	70
4.1	Introduction	70
4.2	Market forms	70
4.3	Price leadership	73
4.4	The cost element of pricing	76
4.5	Vertical cost relationships	79
4.6	Pricing organization	80
4.7	Some additional research areas	83
5	Theoretical extension to relative price levels and to a multi-period analysis	85
5.1	Introduction	85
5.2	Definitions (see Appendix for mathematical details)	86
5.3	Applicability of the price level analysis	88
5.5	Length of time periods	91
5.6	A note on the measurement of relative assortment price levels	92
	Appendix to Chapter 5	96
6	Towards an extended microeconomic framework	98
6.1	Towards an extension of the price-demand relationship of traditional economic theory	98
6.2	The mechanism of price image sensitivity	104
6.3	Pricing costs	105
7	Pricing from the point of view of the individual buyer, a theoretical framework	111
7.1	Introduction	111
7.2	The economically rational buyer	111
7.3	A psychologically oriented view of buyer behavior	113
7.3.1	The psychological buyer and the concept of image	114
7.4	A comparison between the "economic" and the "psychological" buyer	116
7.5	Psychologically oriented work related to buyer behavior	117
7.6	Attempts to integrate various models of buyer behavior	119
7.7	A psychological model of individual buyer reaction to pricing	119
7.7.1	Generalization between different levels of analysis	120
7.7.2	Price image and price evaluations	121
7.7.3	A psychological process of discrimination regarding prices	122
7.7.4	Two extreme cases with regard to price evaluation	122
7.7.5	The total influence of price image and item specific price information on price evaluations	124
7.7.6	Hypotheses concerning the relative importance of the various types of price influence on price evaluations	125
7.7.7	The role of buyer learning in our model	127
7.7.8	A psychological model based on considerations of cognitive equilibrium	128
7.8	Price image viewed as attitude towards price on the assortment level	134
7.9	Price-quality relationships	136
7.10	Our buyer psychological model in relation to traditional microeconomic theory	138
8	Empirical data on the buyer psychological aspects of retail pricing	
8.1	Introduction	140
8.2	Empirical background	144
8.3	Price consciousness and price sensitivity	145
8.4	Possible interaction between the item and assortment levels of pricing	150

8.5	Consistency of price evaluations with actual prices	157
8.6	Price advertising	158
8.7	Non-price image	165
8.8	Comparisons with other studies	168
8.9	Summary of Chapter 8	171
<hr/>		
9	Towards an integrated economic and psychological framework	173
9.1	Introduction	173
9.2	The implication to the firm of individual buyer price image learning based on discrimination on the item level of pricing. A modified stimulus-response formulation	174
9.3	The aggregate implication of price image learning to the firm based on discrimination on the item level of pricing	176
9.4	An illustration of a simple strategy with variation only in flexibility of pricing	178
9.5	Extending the analysis to more complex price-change strategies	183
9.6	Price-changes versus price levels	184
9.7	The role of advertising strategies	186
9.8	The role of special prices and traffic in our analysis	190
9.9	Price evaluation sensitivity versus price image sensitivity	197
9.10	Extension to multi-store retail firms	201
9.11	Some buyer welfare implications of our integrated analysis	202
9.12	Towards an integrated framework	204
9.13	Analytical implications of our integrated model	207
	Appendix to Chapter 9	208
<hr/>		
10	Active competition, interfirm reaction to retail pricing	211
10.1	Introduction	211
10.2	Reaction functions	212
10.3	The usefulness of a game or decision theory framework	215
10.3.1	Introduction	215
10.3.2	An illustrative example	217
10.4	Summary of Chapter 10	225
<hr/>		
11	Summary and implications for future research	226
11.1	Summary	226
11.2	Implications for future research	227
<hr/>		
S.3	Supplement to Chapter 3	229
S.3.1	Data collection	229
S.3.2	Choice of products and items included in the investigation	230
S.3.3	The extent to which recommended prices by Firm A were followed in the Stockholm area on September 15, 1959	232
S.3.4	Item specification	234
S.3.5	Investigation of advertised products	
S.3.6	Price-changes diagrams	
<hr/>		
S.8	Supplement to Chapter 8	
S.8.1	Translation of questions and main results of the interview study	
S.8.2	Examples of advertisements representing Firm B, C and F in the pairwise comparisons in Table 10. (English translations in parentheses).	
<hr/>		
References		263
<hr/>		

1 Introduction

1.1 Background and main ideas¹

Many aspects of retail price competition are difficult to understand against the background of traditional microeconomic theory. This, in itself, is not particularly remarkable, since price determination in microeconomic models has generally been seen from the manufacturer's point of view. Also, microeconomic theory has been primarily intended to serve as a basis for studying resource allocation in the economy as a whole, rather than directed towards aiding the individual firm in setting its price.² Any discretionary action which may influence price is usually attributed to manufacturers, and, historically, little attention has been given to the influence which other levels of distribution, independent retail firms for instance, may exert on prices.³

At the same time retail analysts in the economic tradition have with growing uneasiness often attempted to apply the microeconomic framework more or less directly to the study of retail pricing from the individual firm's point of view. Some have even tried to use single-product models for this purpose. Others have recognized that multi-product models are necessary to adequately reflect these situations (cf. Chapter 2). This is particularly true regarding convenience goods retailing, for which food retailing may be and often has been considered representative. This area of retailing will most closely concern us in the present study.

The uneasiness on the part of retail analysts has been motivated by structural changes which have taken place in the economy. The initiative in determining price, as well as in other areas of competition, has gradually shifted from the manufacturing towards the retail

¹ A number of concepts are employed in this section which will be more closely defined later on. Their intuitive meaning should be sufficient for introductory purposes.

² The use of models of price theory for other purposes than the original one at the present time appears to be the rule rather than the exception (cf. Oxenfeldt, 1963, p. 66).

³ A historical treatment of the development of models of retail price determination in England and America from the middle ages to about 1950 is Shawver (1956).

Introduction

level. Integration both within and between different levels of distribution has led to a smaller number of larger decision units on the wholesale and retail levels. The rapid growth of chain organizations and of voluntary organizations of independent retailers has led to a relative decrease in the number and size of unaffiliated stores. On the technological side the changing cost structure of self-service, as compared to traditional service, has contributed to the concentration process. On the buyer-consumer⁴ side, the urbanization process has led to greater demand within geographically concentrated areas. Increases in real disposable buyer income have at the same time led to a greater proportion of discretionary purchases, which probably tends to increase the importance of "unplanned" buying in convenience goods retailing. All these factors, it may be argued, have tended to increase the competition between retail firms. In Sweden the legislation against restrictions on competition of 1953, while prohibiting retail price maintenance for instance, has on the other hand made possible independent retail price competition to a greater extent than was previously the case.

The above general structural changes in Sweden⁵ were preceded by similar changes, for instance, in the U.S.A., and will probably be followed by corresponding changes in many other countries. The basic trends thus appear to be part of a general process of economic development, and the theoretical structure we use to study retail pricing should reflect these factors if it is to help our understanding of the implications of different pricing practices both to the firm and to buyers.

If we try to apply standard economic models of competition to convenience goods retail pricing, the analytical implications are far from clear and may even, at least superficially, appear to contradict empirical evidence. The relatively small number of decision units or firms⁶ in fairly large metropolitan areas such as the Stockholm

⁴ Since we are concerned only with final buyers, I will not distinguish between buyers and consumers in the analysis. This means that the acts of purchase agents, if they do not themselves consume the items bought, are assumed to reflect the preferences of those who will use the items (cf Engel, Kollat & Blackwell, 1968, p. 6).

⁵ For a more detailed discussion and substantiation of the structural changes in the Swedish distribution system during recent years, see *SOU 1968:6 (Swedish Government report on concentration in trade)*. Convenience goods retailing is particularly treated in Chapter 7, pp. 80—97.

⁶ In our main theoretical analysis single-store firms are assumed. In the empirical analysis in Chapter 3 and in the theoretical extension in section 9.10. multi-store firms are considered. In most instances in our analysis we do

area, which admit to considering each others prices, indicates some form of oligopolistic competition. But the rigidity of prices and the comparative absence of active price competition, which such models usually predict, is typically absent. Instead, there are, in both Sweden and the U.S.A., many indications of highly active and even fierce price competition in food retailing and in many other similar types of retailing when firms do not enjoy strong location monopolies.

On the other hand, it might also be argued, as it often has been, that the relatively large number of individual stores and the type of assortment of convenience goods make monopolistic competition the most applicable market form in these instances.⁷ Since prices of individual items are low relative to the buyer's budget, it will not be worth his trouble to shop around for these items. For some reason, such as location, buyers may be assumed to prefer certain stores. These stores should then enjoy, within substantial price intervals, quite strong monopoly positions with regard to these buyers.⁸ This may also be expressed from the buyers' point of view by saying that they are relatively insensitive to the prices of convenience type items.⁹ But, this approach does not account for the competitive importance of "impulse" buying, or, rather, "unplanned" buying, which is normally of great significance in these situations. It also does not consider *retail complementarity*, which, as recent retail analysts have stressed, tends to increase the importance of price competition to the firm in convenience goods retailing. That is, price-changes on certain items may induce the buyer to change his place of purchase for other items as well. With regard to con-

not need to distinguish between firms and stores. When this is the case the word firm will be used to refer to the decision making unit and/or the physical sales outlet.

⁷ With regard to retail competition on the assortment level we may refer to "enterprise differentiation", instead of "product differentiation". (cf. Vaile, Grether & Cox, *Marketing in the American economy*, 1952, pp. 365—366). Evidently, already Chamberlin had in mind this type of extension of his analysis to retail situations (1962, p. 56 ff). If we wish to apply monopolistic competition theory to retail situations, differentiation between firms, rather than with regard to individual products, appears to be the more appropriate framework. But unless we consider interaction between the assortment and the item level, I still do not believe it is an adequate extension for studying retail pricing (cf. also Alderson, 1963, p. 6).

⁸ Cf. Aubert-Krier (1954, pp. 286, 290). She implies that price competition is less important with regard to "current goods", than with regard to "occasional goods". Cf. our footnote 19, p. 22, for closer definitions of these terms, which roughly correspond to our definitions of convenience and shopping goods, respectively.

⁹ Cf. Scitovsky (1951, p. 50), Mickwitz (1959, pp. 27, 34).

Introduction

venience type goods, the buyer usually, for reasons of convenience, jointly purchases many items during one visit to the store.

Thus, neither of these standard models of competition appears to be particularly suited to retail applications, at least not to convenience goods retailing, although elements of both these types of price competition may be found in retail situations of the type we are interested in. For some items an oligopolistic model may appear to be most applicable, for other items, a model of monopolistic competition. But this type of differentiated viewpoint, I believe, is still inadequate for studying convenience goods retail pricing.

It is not sufficient to study the competitive situation for individual items in these retail situations; the firm is basically competing with the assortment as a whole in convenience good retailing. But, neither is it sufficient to study only the assortment as a whole, viewed as the "generalized" product of the firm.¹⁰ The implication then is quite clear: in an *integrated* analysis we must consider price competition *both* on the item *and* on the assortment level, as well as the interaction between the two levels.

To a certain extent, as we shall see in Chapter 2, retail analysts in the economic tradition consider what I will call "economic interaction" between the item and assortment levels of pricing. This is implied for instance in their analysis of retail complementarity. But this type of "instantaneous economic effect" of pricing will conceivably last only as long as the firm retains the relative price differences on the items involved. When for instance decreased prices are increased again, or when competitors match price-decreases, the advantage to the firm will disappear.

I believe that it is important in these situations also to consider *psychological* interaction between the item and assortment levels. In fact, this may well have a more permanent effect for the firm than the economic effects, transcending the time periods to which the relative price-changes themselves apply.

¹⁰ Thus, for the purpose of studying retail price competition I do not find it useful to define *the* "product" of a firm as its "total service capacity", as some retail analysts have suggested (cf. Aubert—Krier, 1954, p. 282). More in line with our study, Adelman (1957, p. 269) provides a more realistic, modified variant of this approach by suggesting a compromise between considering a single, undifferentiated service and a large number of individual products. Obviously, retail firms in most instances price individual items, and buyers basically respond to their perceptions and evaluations of individual items. Therefore, as I see it, the *elementary* unit in the analysis of retail pricing should be the individual item offered for sale by the firm.

It is impossible, however, to carry out an analysis of this type in an essentially static, traditional microeconomic framework, particularly one which assumes single-products firms. To do so we must simultaneously consider in an extended framework what I call the assortment, time and psychological dimensions of pricing.¹¹

The *assortment dimension* implies that we consider that retail firms typically sell many, often thousands, of items in their assortments, and that buyers typically may, over a period of time, buy hundreds of these items in various quantities. At any given moment, for competitive reasons, the firm pays more attention to certain of these items, but the prices of all of them affect the sales and profit to the firm. The average buyer at any point in time probably shows more selective interest in prices than do firms, due to his being actively interested in buying only a small number of the items in the assortment. But, he may buy other items in the future, and the prices of items he is not presently interested in buying may also provide clues as to how expensive a store is in general. His "observation set", that is, the prices he observes at a visit to a store, may thus include price evaluations for a relatively large number of items in its total assortment.

The *time dimension* refers to the time patterns of price-changes and the resulting changes in price levels over time. Price promotion over time, which is regarded as modifying the reactions of buyers to price-changes and price levels, is also included along this dimension. The term "dynamic" is used to refer to extensions along the time dimension of pricing.

The *psychological dimension* refers to the structure of interactions which constitutes the decision process of an individual. This may be either a price-setter in a firm or a buyer or potential buyer.¹² Psychological processes such as selective attention, selective perception and learning are included along this dimension. Psychological consistency rather than economic rationality on the part of both buyers and sellers is assumed. Both price-setting and purchase behavior are viewed as functions of the experience, perceptions and

¹¹ This classification is for illustrative purposes only. I do not propose that pricing variables be quantified along these dimensions. The general framework indicated below is intended to express our main ideas in a strictly qualitative sense only.

¹² I will not distinguish between buyers and potential buyers except when necessary in a particular context. Normally the term buyer is used in a collective sense to refer to both categories.

Introduction

expectations of the individuals concerned. When I specifically refer to the psychological dimension of the buyer, I will use the expression "buyer psychological dimension".

In the situations of interest to us there would appear to be significant interdependence between the pricing factors I have classified along the above dimensions. If we are interested not only in the price variation of individual items over time, but also in variation in the price levels of the assortments or subassortments of competing firms, we must simultaneously consider the time and assortment dimensions of pricing. This then makes necessary the weighing together of individual prices, by considering purchase quantities, when estimating relative assortment price levels.

Many different patterns of price-changes may conceivably, when we consider the time and assortment dimensions, lead to the same economic implications, both to the firm and to the average buyer. But, the same pattern of price-changes may lead to various economic consequences to the firm, depending on when and how competitors and buyers react to these changes.

It is also of interest to us to consider interdependence between factors along the assortment and the psychological dimensions of pricing. The normally very large number of items in the assortments of competing firms, and the often high degree of interfirm product differentiation, should tend to make price comparisons between stores difficult for both buyers and firms to carry out, even on the *item level*. Since comparisons between firms on the *assortment level* involve weighing together the prices of different items, making valid price comparisons on the assortment level would normally appear to be much more difficult than on the item level. Thus, if we consider the assortment and psychological dimensions of pricing, the traditional economic assumption of buyers and firms, perfectly or well informed with regard to existing prices, appears highly questionable.¹³ On the assortment level it is difficult even to operationally *define* assortment price levels, and much more so to achieve reason-

¹³ This is not meant to imply that incomplete or imperfect knowledge on the part of buyers is never considered by economists in analyzing competition. Many economic writers have, at least in passing, noted that this is one type of imperfection which may modify the working of competitive mechanisms. But I believe this aspect is typically underemphasized, particularly in the analysis of retail pricing. Furthermore, I am aware of no systematic attempt to explicitly include consideration of this factor in a pricing model. Nor do I believe this may be done in a satisfactory way in a traditional economic framework, without modifying it in a psychological direction.

ably valid measurements. If the time dimension is introduced to the above analysis, we must also consider that price-changes take place frequently in the retail situations we are interested in. Since assortment price levels ideally should refer to purchase periods rather than to points in time, these retail situations are characterized by a high degree of imperfect price knowledge on the part of both buyers and sellers, even with regard to past periods. *Price expectations*, the importance of which is emphasized in our analysis of buyer reaction to pricing, naturally always contain an additional element of uncertainty with regard to prices, since perfect knowledge of the past does not imply perfect knowledge of the future.

The framework for analyzing retail pricing set forward in the present study and the more specific models formulated are together an attempt to integrate the various aspects of pricing discussed so far. Operational definitions of the pricing practices of competing firms are developed and applied to empirical data relating to price-changes over time. These definitions take into account both the time and assortment dimensions of pricing. A theoretical extension to consider assortment price levels and to a multi-period analysis is also carried out. The buyer psychological dimension is introduced in our analysis mainly by utilizing an individual model of price learning on the assortment level, as a result of discrimination¹⁴ on the item level of pricing. That is, buyers are assumed to learn to believe, as a result of exposure to prices and price-changes for individual items, that certain firms are, in general, more "expensive" or "cheaper" than competing firms. To a certain extent price promotion, e.g. price advertising, may modify this process on the item level and directly or indirectly on the assortment level.

To a certain extent and under certain conditions buyers are also assumed to generalize their price conceptions on the assortment level (their "price images") to apply also to "price evaluations" on the item level. For instance, if the buyer has no "item specific price information", that is, no relevant information on prices or price-changes for certain competing items, he is assumed to show a stronger tendency to generalize from his price images of the assortments of firms to price evaluations for these items. Also, I assume

¹⁴ "Discrimination" is used in our model of buyer reaction to pricing in the psychological meaning of distinguishing between different elements. It is not used in the economic sense implied, for instance, in "price discrimination". This latter term denotes the practice of charging different prices for the same item to different customers, depending on how price sensitive they are.

Introduction

that the greater the degree of product differentiation between firms, the greater the tendency of buyers to generalize from their price images to price evaluations for these items. Furthermore, the more favorable a buyer's price evaluation for a certain item, the greater the probability that he will purchase it. His choice of purchase place for a "basket" of items is, on the other hand, assumed to depend on his price image. The more favorable it is in relation to competing firms, the more likely the buyer is to visit the firm during a particular period of time.

By the psychological mechanisms described above it is analytically possible to consider the psychological type of interaction between the item and assortment levels of pricing previously referred to. Since changes in price image, once incurred, are assumed to be relatively stable over time, the psychological mechanism of *price image sensitivity*, i.e. of changes in price image over time, implies more permanent effects of price-changes on sales and profit to the firm than instantaneous economic mechanisms, based on retail complementarity and unplanned buying. Since any price-change, or combination of price-changes, may conceivably be effective via psychological and/or economic mechanisms, the more long run psychological and the instantaneous economic effects of price-changes may be set in relation to each other.

In our study we will mainly view retail pricing as a relatively short-run action parameter of the independent retail firm. This means, for one thing, that *changes* in pricing and in the psychological reaction of buyers (price image and price evaluations) will be emphasized. We will, however, employ a more multidimensional and complex view of pricing than normally has been the case in retail analyses. Price promotion, e.g. price advertising, is also explicitly considered as part of the pricing behavior of the firm. Ideally, I would like to define pricing as any action undertaken by the firm which may influence buyer conceptions of price, on both the item and assortment level, and, via changes in these psychological variables, indirectly affect sales. However, this is too broad a definition if we aim at operationality, at least at the present time. To achieve empirical manageability I will limit the definition and treatment of pricing to price-changes and the promotion of price-changes and price levels through, for example, price advertising.

Although other factors, such as location,¹⁵ assortment and service,

¹⁵ In Sweden the spatial aspects of retail competition have been studied particularly by Persson (1960).

may be assumed to modify the influence of pricing on buyer reaction and sales, these factors are assumed to be constant in our analysis. I believe it is realistic to assume that retail pricing, as defined here, may be studied relatively independently of other pricing factors, at least in the relatively short run. This, I believe, is the case with regard to both independent variation by the firm and buyer reaction to pricing. Our empirical data, I believe, also support this position in the situations which will be referred to.

Our definitions and analytical approach are chosen to analytically isolate, as far as possible, pricing influences from other factors of the above type, on both the theoretical and empirical level. Our "product" definition, which provides the basic assortment unit and thus also the basic pricing unit in our analysis, reflects this emphasis.

Finally, a few more words will be said about the choice of pricing as the center of interest in the present study. To begin with, it is apparent to both the casual observer and the careful analyst that price is an important factor in many areas of retail competition, and not the least in modern food retailing. Also, the government, the press and buyers show considerable interest in the area. It is apparent from our empirical study reported in Chapter 3 and similar studies that there is considerable independent price activity on the part of retail firms. Our data in Chapter 8 also indicate that buyers are to a considerable extent price conscious and price sensitive, at least in a psychological sense.

At the same time, as indicated above, it is not easy to understand retail pricing against the background of more general microeconomic models of competition or even more specific models of retail pricing. These factors together provide a strong incentive to try to develop a more satisfactory framework for studying retail pricing. The fact that price variation, compared to, for instance, quality variation, is comparatively easy to make operational and to study empirically also encourages attempts to integrate theoretical and empirical aspects of competition, which are none too common in the literature.

This does not mean that I view pricing, even in our extended sense, as the most important competitive factor in applicable areas of retail competition. But, in many instances it may well be the most important action parameter to the firm, which it may vary relatively independently of other parameters in the short run. One of the most important contributions of more general parameter theories¹⁶ (the

¹⁶ Among more recent works: Brems (1951), Abbott (1955), Rasmussen (1955), Mickwitz (1959).

Introduction

significance of which I by no means want to deemphasize) in my opinion lies in their stressing that in different situations different action parameters or combinations of action parameters may be most influential. The role of price has no doubt often been over-emphasized in traditional microeconomic theory. Our type of pricing analysis obviously is not very applicable to situations in which the extended role of pricing can be shown to be relatively small in relation to other action parameters.

In these situations we will simply have to apply a different type of analysis, although some of the ideas presented in our study may prove valuable also in studying, for instance, quality competition.

In summary, it may be said that retail pricing is one of the most misunderstood and underresearched areas of competition. This statement in itself is sufficient motivation to undertake the kind of analysis presented here.

1.2 Applicability of the analysis

As indicated in section 1.1, the present analysis is *specifically* intended to be applicable to studying price competition between relatively large, independent retail firms of self-service type, selling convenience goods in geographically concentrated areas. Modern food retailing in metropolitan areas in Sweden or the U.S.A. are particularly good examples. The empirical data collected in connection with the study refers to food retailing in the Stockholm area, and comparisons are made with in some respects similar data from other areas, mainly in the U.S.A. To a lesser extent, the framework developed and more specific analysis performed in the study should be applicable and valuable in studying other types of retail price competition as well.

1.3 Aim of the study

Most generally, the study aims to integrate the empirical and theoretical aspects of retail pricing in the situations of interest. A number of more specific aims have, of course, also influenced the study, the most important of which are:

- a) To develop an operational method for studying retail price variation over time and to apply this to a specific empirical situation.
- b) To empirically study some buyer psychological aspects of pricing, and to set this in relation to a buyer psychological model.

- c) To develop a theoretical framework which integrates buyer psychological and microeconomic aspects of retail pricing, from the decision making firm's point of view.
- d) To provide some basis for judging the buyer implications of different pricing practices.
- e) To indicate directions for future research in the area.

1.4 Some basic definitions and assumptions

1.4.1 Competitive definitions

Two or more firms are said to be in *passive competition* if a majority of their combined customers view the purchasing of items from *either* of these firms as a realistic alternative. This definition is buyer oriented, in contrast to the normally firm oriented definitions of inactive competition between firms in microeconomic theory, for instance in the limiting case of perfect competition. In this respect our approach more closely resembles marketing theory.

A person is said to be one of the combined customers of a firm if he has previously made purchases from at least one of them and is interested in continuing to do so. The majority of the combined customers are thus viewed as potential customers for all the competing firms. In these instances it is reasonable to assume that no high degree of location monopoly exists for any of the firms. The average customer is assumed to regularly purchase a selection of different items from the combined assortment of the competing firms that is sufficiently diversified to make it difficult for him to judge each firm's assortment price level, relative to those of competing firms, by computing quantity weighted average prices. This diversity of assortment may refer to numbers of items and/or perceived quality differences between firms.

The same firms are said to be in *active price competition*¹⁷ if they take into consideration each other's pricing behavior when determining their own pricing strategies for the decision period ahead. The term *strategy* is used in much the same sense as in game theory to refer to any action by a firm which may directly or indirectly influence its outcome, i.e. its future sales and/or profits. *Pricing*

¹⁷ Cf. the distinction between passive commodity competition and active entrepreneur competition by Mickwitz (1959, pp. 60—64), which basically resembles our distinction and represents a synthesis and extension of earlier definitions, particularly those of Clark (1940), Machlup (1952), Abbott (1955) and Rasmussen (1955).

Introduction

strategy, which in an aggregate sense refers to the only action parameter of the firm varied in our analysis, is a collective term for price-change strategies and price promotion strategies.

An *action parameter*¹⁸ is defined as a parameter which characterizes the situation and which may be freely and independently varied by the decision maker. An *expectation parameter* is a variable, the realized value of which depends on factors beyond the control of the firm, for instance, the corresponding action parameters chosen by competitors, as well as on the firm's own choice of action parameter.

1.4.2 Assortment definitions

We may speak of *convenience type goods* when the perceived price and quality differences between competing items sold by competing firms are normally regarded by buyers as small compared to the estimated cost of searching for and purchasing each individual item where its price is most attractive. With this same line of reasoning, the term *shopping goods* refers to items for which the perceived price and quality differences are viewed, by most buyers in most instances, as large, compared to the estimated cost of "shopping around" for each individual item.¹⁹

The term *item* refers to our elementary unit of analysis in the assortment of a given firm.²⁰ Every unit of merchandise offered for sale by a firm which may be bought separately from other units may theoretically be regarded as an item. This, of course, implies that an item is a unit of merchandise which may be bought by a buyer independent of other units.²¹ In practice, it is often desirable and

¹⁸ This is essentially the same definition of action parameter as formulated in the fundamental work by Frisch (1951). Cf. also Schneider's discussion of action and expectation parameters (1962, pp. 50—51).

¹⁹ These definitions are consistent with Holton's (1957, p 31) definitions of convenience and shopping goods. Other writers, e.g. Aubert—Krier (1954, p. 285), use the classification "current" and "occasional" goods instead. Aubert—Krier defines current goods as goods which are bought frequently, which convenience goods need not be, according to our definition, although in practice this will characterize many of them. Similarly, occasional goods, defined as items bought infrequently, will usually, but not always, be shopping goods according to our definition. Apparently Aubert—Krier has in mind some notion of importance relative to the buyer's budget also, but this distinction does not necessarily follow on her basic definitions.

²⁰ Cf. the definition of "variant" by Kihlstedt (1961, p. 2).

²¹ Thus, in our theoretical definition of item we need not distinguish between buyers' and sellers' criteria (cf. Brems, 1951, pp. 18—22). Our whole study may be seen as an attempt to deal with buyers' and sellers' criteria of pricing in an integrated context. Our operational definitions of price-change strategies

sometimes necessary to employ operational definitions of items which are more aggregate than is implied by our theoretical definition, for example, merchandise sold in loose weight.

A *product*²² is defined as a set of items made up of one item from the assortment of a firm and its closest substitutes, one each, from the assortments of competing firms, as seen from the viewpoint of the average buyer. The items in such a set are also referred to as *competing items*. I assume in the theoretical analysis that, regardless of the order in which we consider firms and items when determining closest substitutes, we will always arrive at the same classification of products. The closest substitute, of course, may or may not be a perfect substitute. In the former case we will speak of *identical items*. The less substitutable the competing items which make up a product, the greater the degree of interfirm *product differentiation*²³ is said to be.

Products of this type, or empirical approximations, are utilized as the basic assortment unit in our theoretical and empirical analysis of pricing. This obviously is an analytical simplification. I find it preferable, however, to the alternative, almost always used in or advocated for the empirical study of retail pricing, of limiting the treatment of price competition to identical or nearly identical items in the assortments of competing firms. I believe that our approach makes possible more differentiated and realistic studies of retail price competition than empirical studies which compare only the prices of identical items.

In our theoretical discussion I will assume that the total set of items in the combined assortment of competing firms can be completely partitioned into subsets constituting products as defined above. The union of these subsets then, of course, is the total set of items in the assortments of these firms.²⁴ The assortment of a firm is invariant in our theoretical analysis, as it is always made up of the same products. The assortments of competing firms are identical in this sense and are assumed not to vary in the course of our

in Chapter 3, for instance, refer to sellers' criteria, while buyer conceptions of price refer, naturally, to buyers' criteria. Chapter 9 represents an explicit attempt to integrate the two points of view.

²² Cf. Rasmussen's (1955, pp. 47—49) buyer oriented more general product definition based on consumer needs. His definition is theoretically interesting but appears to be difficult to make operational.

²³ This definition is consistent with Chamberlin's (1962, p. 56) definition of product differentiation.

²⁴ Cf. the set theoretical formulation in the Appendix to Chapter 1.

Introduction

analysis. This, of course, does not mean that they sell identical items.

In empirical applications it is, of course, necessary to approximate in the classification of products, according to rules which are as objective as possible, so that the above theoretical requirements are fulfilled as far as possible. Such an attempt is made in our empirical study of price-change strategies in Chapter 3.

Products of the above type (but only with identical competing items) appear to be implicit in the early economic theory of competition. The introduction of product differentiation made possible the treatment of different brands in the theory. In our analysis products are chosen which are as homogeneous as possible, within the above restrictions. They will, however, often be made up of non-identical competing items.

1.4.3 Informational definitions

In this study I will refer to "information" in a somewhat imprecise manner. This is in accordance with the usage of most economic writers²⁵ and defensible from the point of view of sacrificing empirical validity in order to achieve better theoretical control of the analysis.

Perfect information is usually interpreted by economists to mean that buyers and sellers possess "correct" information with regard to certain empirical conditions, for instance, the quality of products and prevailing prices. In models of perfect competition, monopoly and monopolistic competition, the informational assumptions made are sufficient to lead, in connection with other assumptions, to determine prices. In oligopoly models uncertainty with regard to how competitors react creates indeterminacy.

In our partial analysis of pricing we will be concerned mainly with *item specific price information*. This refers to buyers' and sellers' knowledge of prices and price-changes on the item level of pricing. Perfect price information on the item level thus refers to complete and correct information with regard to prices and price-changes during the relevant time period for all the items in the assortments of competing firms. It does *not* imply perfect *price evaluations* on the item level, except in the case of identical competing items. Nor does it mean that buyers and sellers, if they have

²⁵ Writers in organization theory and related disciplines, on the other hand, often devote intensive attention to information aspects. A very thorough discussion of this topic is Ramström (1967).

perfect price information on the item level, also have perfect price information on the assortment level, i.e. can make "correct" estimations of assortment price levels. This is due to the fact that products in our analysis may be non-homogeneous, and the establishment by buyers or sellers of correspondence relationships between competing items then requires (subjective) quality considerations. In the case of assortment price levels, purchase quantities also need to be determined.

I will assume that normally there is a high degree of imperfection in the knowledge of item specific price data on the part of both buyers and, to a lesser extent, sellers in the retail situations of interest to us. An increase in the "*degree of price information*" will be taken to refer to correct knowledge by either party of a larger number of prices and/or price-changes during the relevant time period.

1.5 Limitation of the analysis to competition between firms

In the present study we will concentrate on competition *between* independent retail firms. To achieve this emphasis, traditional economic demand interdependencies between items within assortments will not be considered as a factor which may influence the comparative implications to the firm of different pricing strategies.

The traditional economic mechanisms referred to above, which we will not consider, concern substitution and complementarity²⁶ in use between items within the assortments of firms. However, *retail complementarity*, which is a different type of demand interdependency between items in an assortment, will be explicitly considered in our analysis.

This "instantaneous economic mechanism" refers to the effect which price-changes on certain items may have on the demand for other items in the same assortment via *purchase* interdependencies. Many convenience type items are typically bought together on one trip to the store.²⁷ Price-changes on certain items may, by inducing

²⁶ Traditional economic substitution and complementarity effects are analyzed in most microeconomic textbooks (e.g. Henderson and Quandt, 1958, Chapter 2, pp. 6—41). A multi-product model which considers these relationships is developed by Coase (1946).

²⁷ Substitution in use refers to consumption considerations, which may be assumed to be effective once the buyer is *in* the store, while substitution in purchase refers to considerations of purchase place, which may be assumed to be effective before the buyer enters the store. Cf. Balderson (1956, p. 178).

Introduction

the buyer to change his place of purchase, influence the demand also for other items in the same assortment.

The limitation of our analysis to apply only to competition between firms is, of course, an analytical simplification. However, I believe this simplification may be justified for our purpose in the situations we are interested in.

In convenience goods retailing, retail firms normally enjoy relatively strong monopoly positions, once the buyer is in the store. On the other hand, due to retail complementarity and the importance of unplanned purchases,²⁸ competition between firms for customers in the situations of interest to us, not the least price competition, usually is intense. In view of this and against the background of an economic framework, it appears realistic to concentrate on competition between firms with regard to pricing behavior and not to consider demand interdependencies within assortments, if they do not result from or radically affect the competition between firms. As the result of our psychologically and time extended analysis, it will become apparent I hope, that retail price competition between firms takes on added interest. Also, there is some empirical evidence that brand substitution in the store by buyers is infrequent relative to the extent of unplanned purchases.²⁹ This should tend to diminish the relative

²⁸ Cf. the distinction by Rasmussen (1966, p. 39 ff.) of the effect of price-changes on number of customers versus average quantities bought by customers. On the retail level our analysis of the economic effects of pricing resembles this approach. The effect of retail complementarity depends on the number of potential customers brought into the store. The retailer, thus, in the short run has to balance the effect of retail complementarity, where drastic price-changes on certain items may be desirable, with the fact that once in the store, buyers may be quite insensitive to the perceived prices of some regularly purchased items while highly sensitive to the perceived prices of other items, in the case of unplanned buying. I refer to these sometimes conflicting tendencies together as the "instantaneous economic effects" of pricing. But, I also argue that the retailer should try to strike a balance between instantaneous economic effects and more long-run psychological effects.

²⁹ While it is not possible to clearly distinguish between planned and unplanned purchases, nor to treat all unplanned purchases as based on the same type of buyer considerations, the dichotomy is adequate for our purpose. In most studies of self-service food retailing "unplanned" or "impulse" buying is assumed, and/or shown, to be a highly important factor. In studies of consumer buying habits in the U.S.A. by du Pont from 1949—1965 (reported in Engel, Kollat & Blackwell, 1968, p. 489) data were obtained on the extent of unplanned ("impulse") buying, as compared to brand substitution in the store, generally planned and specifically planned purchases. For our purpose, it is interesting to note that on the average for the supermarket, mainly food products concerned, the frequency of brand substitution which is not a variable in our analysis, was only 2.7 % and 1.8 % in 1959 and 1965, while

importance to the firm of traditional economic demand interdependencies due to substitution within assortments in its choice of pricing strategy.³⁰ Traditional complementarity relationships within assortments in convenience goods retailing would appear to be normally of little significance to the firm.³¹

Furthermore, cost considerations, e.g. of inventory cost, handling costs and quantity rebates tend to limit the number of close substitutes sold by retail firms. Manufacturers, on the other hand, are naturally interested in selling their own items. But, to the extent that the retail firm has the initiative in determining what items to sell and what prices to set, as in the situations we refer to, the retailer will conceivably in most instances be primarily interested in competition with other retail firms.³²

One way in which retailers may attempt to emphasize competition with other firms instead of between different items in their own assortment is through product differentiation. By trying to achieve greater differentiation between closest substitutes in its own assortment, than between the items it sells and the closest substitutes in the assortments of competing firms, a firm may hope to increase its area of pricing discretion. This would be in the sense that its freedom in making price-cuts should tend to increase without a tendency towards lower gross margin, as a result of substitution within its assortment. At the same time, the favorable sales effect to the firm of competition with other firms may be substantial.

From what has been said it is clear that, due to retail complementarity and unplanned purchases, the instantaneous sensitivity of de-

in the case of unplanned purchases it was 50.9 % and 49.9 % respectively. The frequency of unplanned buying increased from 38.4 % in 1949 to 49.9 % in 1965.

³⁰ This is so particularly when individual price-changes are relatively small, as is normally the case in the situations of interest to us. In some instances, however, substitution effects within assortments may be so substantial that it is desirable to explicitly consider them when analyzing the competitive implications to a firm of its choice of pricing strategy. This may then be done by adjusting for the short run loss in gross margin, as a result of buyers switching from high margin to low margin items, due to price-decreases, if unit sales are not effected.

³¹ An example of this would be when the price of hot dogs is decreased and this leads to increased sales of mustard.

³² Of course, for some reason such as a favorable purchase price, he will usually *prefer* to sell certain items (brands). But, the point is that, regardless of what brand he sells, he will normally tend to increase his profit. And, if he prefers to sell a specific brand, he can limit the number of closest substitutes sold in his own assortment and thus concentrate on competition with other retail firms.

Introduction

mand for a firm's total assortment to price-changes on individual items may, even in an economic framework, be relatively high, even if there are no substitution or complementarity effects within assortments of a traditional economic nature. Unplanned purchases will impinge, then, not on the purchases of other items in the same assortment, but merely on money available for other purposes. Viewed against a psychologically and time extended framework, the role of pricing for the retail firm takes on added interest in these instances, as we shall try to show in our study.

1.6 A note on methodology³³

In our study an attempt is made to achieve a satisfactory balance for our purpose between what I will call *empirical validity* and *theoretical controllability*.³⁴ I view empirical validity, which I will generally define as the correspondence between the empirical and theoretical level of analysis, as depending on the *realism of the basic assumptions* and the *degree of operationality* achieved with regard to the model³⁵ concepts. Increases in either or both of these factors I regard as increasing the empirical validity of a model. On the other hand, I view theoretical controllability as depending on the *analytical simplifications* introduced by our definitions of variables and choice of functional relationships on the model level. The higher the degree of analytical simplification, the easier it will normally be, I assume, to

³³ This section has been influenced by a number of studies dealing with problems in the philosophy of science (e.g. Nagel, 1961; Ackoff, 1962; Danielsson, 1963; Hempel, 1965). This is also the case with regard to methodological criticisms and/or comparisons of psychological and economic theory (Papandreou, 1950; Simon, 1959; Katona, 1963; Clarkson, 1963). The particular emphasis and conceptual framework is, however, a personal declaration, intended to illustrate the methodological approach chosen in the present study.

³⁴ The concepts employed in this section (empirical validity, theoretical controllability, degrees of operationality and analytical simplification, realism of basic assumptions) will not be operationally defined or measured but will merely be employed intuitively to compare different methodological approaches. Madsen (1959, pp. 316—326) makes an interesting attempt to compare the empirical content of different models in motivation theory. His work shows the feasibility of defining and measuring the degree of operationality in different models. Similar comparisons could conceivably be carried out with regard to the models of interest to us.

³⁵ Models are defined as conceptual systems on the theoretical level of analysis. While no clear distinction may be drawn between the empirical and theoretical level, I will use these terms to indicate what level of analysis is emphasized in a particular context.

theoretically control a model.

However, the introduction of greater realism in the assumptions in models intended to apply to complex empirical situations may easily lead to decreased theoretical controllability, unless additional analytical simplifications are made in the models. But, at the same time, the greater analytical simplifications may well lead to greater difficulties in making the models operational. This, then, may lead to decreases in empirical validity.

This, I believe, is a dilemma which faces most social scientists. We usually cannot increase the degree of realism of the assumptions and/or the degree of operationality of our models, and hope at the same time to retain or increase the degree of theoretical controllability. Nor can we normally make our models easier to control theoretically without also making them empirically less valid. Instead, we must try to find a satisfactory balance for our purpose between these counteracting tendencies.

Economists have traditionally often solved this problem by sacrificing empirical validity to achieve greater theoretical control of their analyses. This has been the case with regard to both degree of operationality and realism in the basic assumptions. For many purposes this has no doubt both been necessary and desirable. But, economic models have often been applied, usually by others than those who have developed them, to problem areas where greater empirical validity should have been possible to achieve without losing too much in theoretical control.

On the other hand, psychologists, particularly nowadays, often appear to choose problems for which empirical validity can be combined quite well with theoretical controllability. Experimental techniques are usually used. While such studies are admirable, they do not tell us how we are to achieve a satisfactory balance in problem areas where, for instance, experimentation is not possible for practical reasons. The risk, then, is that more complex problems, involving, for instance, interaction over time, are not studied in their own right. Intuitive generalizations from simple to more complex problems may be highly misleading, but it should be possible to diminish this risk by careful theoretical consideration of the extent to which the more complex situations are basically similar to the more simple situations.

There would appear to be a number of problem areas where an integration of methodologies and conceptual frameworks from economic and psychological theory would be desirable. Microeconomic

Introduction

models of competition, for instance, may conceivably be modified in this direction and benefit from the adaptation. Our framework developed for studying a specific type of retail pricing is the result of a compromise between the goals empirical validity and theoretical controllability. This has influenced both the level of specificity in the analysis and the choice of variables. By studying a specific competitive situation and trying to isolate, both empirically and theoretically, an important variable, namely pricing, which the firm may vary relatively independently of other factors, I have tried to achieve a balance for our purpose between theoretical controllability and empirical validity. I have attempted to increase the realism of the basic assumptions by, for instance, introducing psychological variables, and to increase the degree of operability by attempting to define and measure a larger number of variables than usually is done in more traditional economic analyses of retail pricing.

Whether this effort has resulted in a decrease in theoretical controllability which outweighs the gain in empirical validity is certainly not easy to determine. The present study may be seen as an argument to the effect that this is not the case, or, at least, that it is possible to further develop the suggested approach to arrive at models of retail pricing that achieve a better balance between empirical validity and theoretical controllability than existing models in this area.

1.7 Plan of the book

Following the introduction in this chapter, Chapter 2 will comment on and present a selective review of the pricing literature, to serve as a background for our own analysis.

In Chapter 3 I will then describe the proposed operational method for studying single-period price-change strategies of competing firms. An empirical application to food retailing will also be presented as an illustration of the method. The emphasis in this descriptively oriented chapter is on definition and measurement.

Chapter 4 deals with the general applicability of the operational method in the preceding chapter. Reference is made, for instance, to market forms, price leadership, cost-plus pricing, vertical cost relationships, and the pricing organization. Our proposed type of analysis is viewed in these respects against the background of existing theory.

A theoretical economic extension along the time and assortment dimensions, which considers relative price levels in a multi-period

analysis is outlined in Chapter 5. The problem of defining and measuring relative assortment price levels is also discussed.

Chapter 6 is an attempt to extend the microeconomic framework to better apply to retail pricing. This includes some consideration of the buyer psychological aspects of pricing. As in microeconomic theory, the analysis is carried out from the point of view of the seller-firm.

In Chapter 7 effort is devoted to constructing a theoretical framework for studying the buyer psychological aspects of retail pricing on the level of the individual buyer.

Chapter 8 provides an empirical background to Chapter 7. The main part of this chapter is devoted to an explorative empirical study of the buyer psychological implications of pricing. The results appear to make the proposed type of analysis empirically interesting.

Chapter 9 is an attempt to apply the results of the previous analysis in developing an integrated microeconomic and psychological framework. Within this theoretical framework an attempt is made to analyse the normative implications to the firm of employing various price-change strategies. In this connection, price advertising and buyer-welfare aspects of retail pricing are also dealt with to some extent.

In Chapters 1—9, the extent to which competing firms consider and react to one another's pricing strategies, i.e. the degree of active competition, while implicit in the analysis, is not explicitly included in the theoretical framework. In Chapter 10 this aspect is directly dealt with in a game (or decision-) theory context. An illustrative example is presented and set in relation to our integrated model.

Chapter 11, finally, discusses the possible further extensions of the analysis which appear against the background of this study and the implications for future research.

Appendix to Chapter 1

Set theoretical formulation of assortment definitions

j_i : elements (items) in the combined assortment of the competing firms.

$(j = 1, 2 \dots m)$ $(i = 1, 2 \dots n)$

$(m = \text{number of competing firms})$ $(n = \text{number of items in the assortment of each firm})$

Introduction

A_j : set of items making up the assortment of firm j .
($j_i \in A_j$)

$A = \bigcup_{j=1}^m A_j$: set of items making up the combined assortment of the competing firms.

p_i : product, set of closest substitutes i.e. competing items.

$$\left(\begin{array}{l} \bigcup_{i=1}^n p_i = A \\ \bigcap_{i=1}^n p_i = \emptyset \end{array} \right)$$

(the “items sets” make up a complete partitioning of A)

2 Review of the pricing literature

2.1 Purpose of the review

In this chapter I will review the pricing literature of general interest to our study. The theory of the firm in traditional microeconomic theory¹ was not initially intended for retail applications. It has, however, been directed towards this purpose and provides the basic framework for most attempts to develop specific models of retail pricing. Therefore, microeconomic theory is of considerable interest to us, more so as I will modify elements of it for use in the development of our own integrated framework.

In addition to discussing applications and extensions of microeconomic theory to retailing, I will deal with the marketing literature on retail pricing and relevant literature on the psychological aspects of pricing. It is, of course, impossible to draw a clear distinction between microeconomic and marketing studies. From our point of view the main difference is that work in marketing is usually more explorative and often is not based on any systematic model.

The review is not intended to cover or to represent the entire area of pricing. Instead, it is highly selective and reveals the extent to which the central ideas of the present study are covered in the literature. Thus, I will comment on whether I regard the cited works as significant contributions to an extension of retail theory along the assortment, psychological and time dimensions of pricing which I advocate in our study. I will pay special attention to whether or not interdependence between variables along these dimensions is explicitly dealt with.

An attempt to assess the possible contributions of the various works cited towards a systematic and integrated framework of retail pricing as part of a more general theory of competition will be made as a result of the review. An important aspect of this assessment is the extent to which the studies give operational meaning to what I consider to be the relevant dimensions of retail pricing.

Quite a few writers have chosen, as I have, food retailing as the empirical basis for their reasoning if, indeed, they find any need

¹ To get a general idea of what I mean by traditional microeconomic theory the reader is referred to Henderson and Quandt (1958).

Review of the pricing literature

for empirical data. When this has been the case, comparisons with our empirical pricing data, of course, has been made easier and more interesting. This choice of area of application is understandable if we consider the importance of food retailing in the economy as a whole. It also would seem to be one of the areas of retailing where the assumptions of traditional microeconomic theory are most unrealistic and where direct application of such reasoning easily can be misleading.

This chapter contains comments of a more general nature. Specific reference to the literature will be made in connection with the relevant discussion in subsequent chapters.

2.2 Basic models of competition in the theory of the firm

In this section I will comment on the basic models of competition in the part of microeconomic theory usually referred to as the theory of the firm. While there would seem to be no general consensus on precisely what this theory of equilibrium at the level of the firm implies, there is sufficient agreement for the purpose of our analysis with regard to its general framework and underlying assumptions.

The agreement regarding the details of the implications of the theory for perfect competition and monopoly is greater than with regard to the implications of the empirically more interesting cases of monopolistic competition and oligopoly. Although in the case of oligopoly the modification of the assumption regarding the firm's behavior to include conjectural variation normally leads to indeterminate solutions (or determinate solutions with restrictive assumptions), the traditional economic framework and assumptions are essentially retained in these cases of imperfect or quasi-monopolistic competition.

For our purpose I am principally interested in work done in the area of monopolistic competition and oligopoly. I take Chamberlin's large group case (1962, p. 83ff.) together with subsequent adaptations and developments since it was first presented in the early 1930s to be studies of monopolistic competition, while I regard his small group case (*ibid*, p. 100ff.) as part of oligopoly theory. Cournot's output variation model from 1838 laid the theoretical ground for much of the work which has subsequently been carried out with regard to oligopolistic interdependence. Bertrand and Edgeworth extended Cournot's analysis at the end of the nineteenth century to apply to price variation, followed by von Stackelberg (1934). The

reaction function type analysis of these writers has been criticized by many authors, e.g. Fellner (1949), who proposes an alternative formulation based on quasi-agreement and joint profit maximization.

Another direction of research in oligopoly theory is based on the work of von Neuman and Morgenstern (1953). They have presented a game theoretical analysis of duopoly, in which they assume that the two firms will cooperate to achieve maximum joint profit and then use side payments to settle between them. This solution is indeterminate with regard to the division of profits. Shubik (1959) has continued this approach and made an attempt to unify and extend microeconomic theory by utilizing game theory.

Characteristic for the present state of oligopoly theory is that we have a number of specific models based on different behavioristic assumptions concerning how firms react to each other. No integrated theory exists to relate the different models to one another or to indicate the applicability of the various models to empirical situations.

Of special interest to the present study is the analysis of leadership and followership patterns between firms in oligopolistic situations. We find explicit or implicit consideration of this aspect of competition in most oligopolistic models not involving complete cooperation. For instance, the concept of price leadership and the "kinked demand curve" (Hall & Hitch, 1939; Sweezy, 1939) are based on such considerations.

In Sweezy's work, in the absence of price leadership and secret price-changes, competitors are assumed to follow price-decreases but not, or to a lesser extent, price-increases, which leads to a broken demand curve and a discontinuous marginal revenue curve at the existing price, which, in turn, is assumed to create a tendency towards rigid prices.

This line of reasoning has been criticized by Stigler (1947) and Fellner (1949). Sweezy's model is incomplete in that it considers only the rigidity of prices, but not how the existing level of price has been established. One way to explain this latter fact is to assume, as Hall and Hitch do, that prices are in some way related to full cost.

Price-increases will then presumably be followed if they are a result of cost-increases, common to all competing firms. However, the inclusion of a full cost principle of price determination in the "kinked demand curve" model leads to difficulties and inconsistencies which greatly diminish the explanatory value of Hall and Hitch's formula-

One mechanism by which flexibility with regard to prices may be

explained is *price leadership*. Burns (1936) defined this term to apply to situations “when the price at which most of the units in an industry offer to sell is determined by adopting the price announced by one of their number” (ibid, p. 76). Stigler (1947) and Markham (1951) were among those to extend this type of analysis further and to distinguish between dominant and barometric forms of price leadership.

The line of development we have reviewed in this section, while essentially static, may to a limited extent be viewed as an extension along the time dimension of pricing. This is true in that leadership and followership relationships are at least implicit in most of the analyses and can usually be given a dynamic interpretation. But the implications to the firm of variations over time of strategic variables are typically not explicitly dealt with except with regard to equilibrium or limiting values where time does not enter in any essential way.

However, the basic models referred to in this section provide us with a general framework valuable to our purpose. In Chapter 3 I will operationally define and measure what I regard as indications of price leadership. In Chapter 3 I will also discuss the applicability of the basic models of competition and the relevance of the traditional concept of price leadership to our specific retail situation. And, in Chapter 10 I will, in a game or decision theoretical context, discuss price reaction functions in relation to my own analysis.

The microeconomic models referred to so far are in general single-product models. In the next section I will discuss to what extent multi-product models in the economic tradition, although not specifically intended for retail applications, may contribute to our study of the assortment dimension of retail pricing.

I will also discuss an extension from single- to multi-period analysis, which analytically resembles the extension from single- to multi-product analysis, when we do not consider interrelated demand between items in an assortment.

2.3 Multi-product and multi-period models in the microeconomic tradition

To a certain extent multi-product models in the theory of the firm may be regarded as extensions along the assortment dimension of pricing. One of the earliest examples is Edgeworth's two product taxation model (1925), further explicated by Hotelling (1932). Later attempts to modify the single-product assumption are, for instance,

Due (1941), Coase (1946), Clemens (1950—51), Brems (1951), Baily (1954), Holton (1957), Holdren (1960) and Preston (1963).

The above models may be divided into two categories: 1) those which do not consider interrelated demand between items in an assortment, and 2) those which do. Obviously, the latter appear to be more suited to retail applications. I will discuss Clemens' model as typical of the former type and Coase's as typical of the latter, since both these models exhibit the main principles involved in a formalized way.

Clemens' model is essentially the same as the familiar model of price discrimination (Robinson, 1933, pp. 179—202), if we substitute products for markets. It also is similar to Brems' multi-product model, if all action parameters other than price are kept constant (Brems, 1951, pp. 100—115).

All these models disregard interrelated demand and, therefore, are not very satisfactory for applications to our typical retail situation, where the price of one item in an assortment may very well influence the sales of another item. In such cases it is not sufficient for the profit maximizing firm merely to consider demand elasticities for individual products in price determination, as most microeconomic models assume.

Coase's model, however, explicitly considers interrelated demand in the two product case. This is done by correcting the marginal costs for the items involved to account for traditional substitution or complementary relationships between them. Holton extends Coase's reasoning to better apply to supermarket retailing by considering retail complementarity. Holdren and Preston, finally, attempt to develop more elaborate models of retail price determination, which consider demand interrelationships between the items in an assortment.

For our purpose I am primarily interested in psychological interdependence between items in an assortment, which none of these models explicitly deal with. In our theoretical analysis I do not consider traditional economic interdependency involving substitution or complementary relationships between items in an assortment when the buyer is in the store.

Therefore, the only traditional "instantaneous economic effects" of price-changes on the sales of other items which are of *direct* interest to us are those which may be attributed to retail complementarity and changes in the extent of unplanned buying.

While these economic effects are dealt with in the present study,

Review of the pricing literature

the fact that I do not employ a traditional marginalistic equilibrium model makes the specific analytical treatments of "instantaneous economic effects" by Holton, Holdren and Preston of less interest than the underlying, more general ideas. This is in line with the overall utility of the economic framework for our study, namely, in providing a general structure of ideas which may be modified for our specific purpose.

A problem related to the question of interrelated demand is that of interrelated costs. Our purpose excludes such an analysis, as we assume that no true joint costs that vary with pricing exist. Similar assumptions are usually made in retail pricing studies and, sometimes, also in more general microeconomic studies of pricing (Clemens, 1950—51, pp. 2—3). Coase, on the other hand, deals with both interrelated cost and demand in his analysis (1946), which does not, however, concern retailing.

An extension from a single- to a multi-period analysis of pricing may be performed in a manner which analytically resembles the extension from single- to multi-product model. The former may be viewed as an extension along the time dimension of competition which in some ways is similar to our analysis in Chapter 5. Such a multi-period analysis of competition is carried out by Brems (1951, pp. 116—142), who views demand between periods as being interrelated if the quantity sold in one period depends on the action parameters used in a different period.

Brems (*ibid.*, p. 124) considers time period analysis particularly important when analyzing the effects of advertising. Any economic discussion of long run effects is closely related to investment theory, as Brems points out. One of the structural differences between multi-period and multi-product models is the inclusion of an interest rate in the former case.

In my own analysis I regard the interdependence of variables along the psychological and time dimensions of pricing as vitally important.² Brems' analysis in this respect is essentially in the microeco-

² Perhaps it should be pointed out that our time analysis differs substantially from general economic dynamics both in scope and problem area (cf. Samuelson, 1947; Baumol, 1959). This type of analysis is fundamentally concerned with macroeconomics, i.e. the aggregate behavior of the national economy. Our interest is primarily in the interaction between buyers and sellers. Nevertheless it is, of course, possible that some of the analytical methods used in studying more aggregate behavior may prove useful also in the essentially undeveloped area of "microdynamics". This is also true of "macro-psychological" studies of consumer behavior over time (Katona, 1960, 1964).

conomic tradition, although he does point out, for instance, that “buyer’s inertia”, i.e. delay in buyer response to promotional efforts, is typically neglected in economic theory (*ibid.*, pp. 136—139) and indicates further that good-will may gradually build up over a period of time (*ibid.*, p. 133). Brems, however, performs no systematic analysis of these or any other type of “psychological” effect.

In this context, we may mention Shubik’s (1959, Part 2) attempt to extend the microeconomic framework in a dynamic direction. To this end he employs a multi-period analysis in a game theoretical framework. He considers, for instance, interest rates, asset structure, entry, and inventories in games of economic survival. While Shubik’s analysis, which concerns single-product firms, has limited direct relevance for our purpose, its general approach and the ideas presented are of interest. For instance, the role of information is discussed, and Shubik notes that “. . . the theory of rational or economic action, as discussed in most presentations of the theory of consumer choice, must incorporate a theory of learning” (*ibid.*, p. 152).

2.4 Applications of microeconomic theory to retail pricing

In this section I will discuss a number of applications of microeconomic theory to retail situations. Although this work is predominantly of a theoretical nature, empirical support is sometimes claimed for the ideas presented. However, this evidence is usually not based on operational measurement of the type I advocate in our study. Normally, the link between the economic models and empirical data, if any, is not made explicit.

2.4.1 Mickwitz

Some economic writers have chosen to handle retail pricing mainly by deemphasizing its importance. Mickwitz is an example of this approach: “The fact that price competition proper is not a dominating phenomena in the retail market is thus not surprising. The price policy has a significantly better chance of giving results if it is undertaken as an assortment policy based on procuring lower and cheaper qualities” (1959, p. 209).

This general statement may have been relatively true at the time it

Review of the pricing literature

was written in the retail situations Mickwitz was referring to. But it would appear less applicable in Sweden or the U.S.A. at the present time, at least in food retailing. Thus, Mickwitz' treatment of price competition as generally subordinate to assortment competition is of limited interest for our analysis, in which pricing is treated as an action parameter independent of variations in assortment (as defined by us).

2.4.2 Applications of traditional single-product microeconomic models

A number of studies seek to apply the single-product³ models of microeconomic theory to retail situations, usually without discussing their applicability (e.g. Smith, 1937; Lewis, 1948; Hall, 1949; Aubert—Krier, 1954). Even if multi-product models sometimes seem to be implicit in their discussions, I do not view this as a very satisfactory general approach to the study of retail pricing. Also, typically no attempt is made in this type of study to explicitly consider other modifications of traditional economic assumptions. Thus, these studies, while often interesting within their self-imposed limitations, are of little aid to us for the type of extensions proposed in this study.

In some retail situations, e.g. gasoline retailing, single-product microeconomic models would seem more applicable than in the typical retail situations we are most closely concerned with. Empirical pricing studies in this area have been carried out by e.g. Learned (1948), Cassady, Jr. (1954), and Lindh (1967).

2.4.3 Holton

One of the first attempts to construct a model for retail application which explicitly considers the assortment dimension is the previously mentioned adaptation of Coase's model by Holton (1957).

Holton clearly recognizes the inadequacy of the traditional single-product model for the study of retailing, especially with regard to supermarkets. His extension, which considers interrelated demand within an assortment, is, as has been noted, closely related to previous work, but his assumptions are chosen to fit the supermarket case.

Holton follows in the microeconomic tradition, assuming economic rationality and not analyzing the role of imperfect information. and he retains an essentially static framework. Thus, his work does not contribute to our study of the psychological or time dimension

³ At times the "product" is defined as the "generalized service capacity" of the firm. Cf. the discussion Chapter 1, footnote 10, p. 14.

of pricing. His model is not made operational in our sense of the word, but some general empirical implications are indicated.

Holton's main contribution from our point of view is that he was one of the first to recognize the need for multi-product models for the study of retail pricing and to attempt to construct a formal specific model of retail price determination which to a certain extent considers the assortment dimension of pricing.

2.4.4 Holdren

Perhaps the most penetrating analysis of retail competition to date is the study by Holdren (1960). While basically in the economic tradition, a number of interesting analytical developments are introduced in his work.

To begin with, the importance of the assortment dimension of pricing is emphasized. No systematic extension along the psychological or time dimensions of pricing is carried out, however, although consideration of these dimensions are occasionally implied in Holdren's discussion. In particular, reference is often made to imperfectly informed buyers and sellers.

The instantaneous economic effects of pricing are emphasized, and little attention is given to more long run effects of pricing, which no doubt is largely due to the essentially static framework employed. Many of the results Holdren arrives at appear to take on added interest when viewed against our time-extended psychological analysis.

Holdren's analysis is not limited to the analysis of price. One of the main advantages with his approach is that he also considers non-price offer variation by the firm. However, following from his economic assumptions, a distinction between price and non-price variables is maintained in a manner which I view as somewhat artificial, seen against the background of a more psychologically oriented framework.

Traditional economic distinctions, based on sellers' criteria between variables such as price, advertising, quality, etc. appear much less realistic when we introduce psychological variables. The independence of these variables, necessary for analytical treatment of the type traditionally employed in economic models, seems more questionable against the background of our integrated psychological and economic framework.

While considerable and impressive empirical evidence is offered as documentation for Holdren's ideas, very few operational concepts

Review of the pricing literature

provide links between the formal models and the data. I regard this as a shortcoming which Holdren shares with most retail analysts in the economic tradition.

In summary, I regard Holdren's work as an impressive pioneering attempt to develop a specific model of retail competition largely, however, within the limitations imposed by microeconomic theory. His analysis of the assortment dimension of pricing is of particular interest for my purposes and the "transfer effects" of pricing which he emphasizes are considered important in my study as well. The empirical data on cost and demand relationships collected and analyzed by Holdren are also frequently of interest to our study.

2.4.5 Andrews

Andrews is the writer more directly in the microeconomic tradition whose work, together with Holdren's, I find most in line with the ideas set forth in our study. In "On competition in economic theory" (1964) Andrews not only makes a significant theoretical contribution towards a more satisfactory general microeconomic theory of competition, but also explicitly recognizes the fact that retail theory needs a structure of its own and cannot be treated as merely a special case of traditional competition theory.

"I have said that orthodox single-product models of the firm may conceivably be legitimate simplifications in the analysis of industrial activity; the criticisms which have already been made of individual demand functions, however, suggest that it is illegitimate to use such models in retail trade theory" (*ibid.*, p. 112).

Instead, he suggests that ". . . the individual shop, rather than the individual commodity on which modern theory has concentrated, is the valid entity for the economic analysis of retail trade" (*ibid.*, p. 108).

Thus, Andrews advocates in a more general sense a theoretical development of retail theory along what I have called the assortment dimension. In my opinion, this is a step in the right direction. However, I will go one step further in proposing that *both* the total assortment of a store *and* the individual commodities are valid entities and should be analysed in an integrated framework which, above all, considers the interdependence between these two levels with regard to *both* cost and demand.

In order to do this and to achieve a more dynamic analysis, I consider it necessary also to consider the psychological and the time dimensions of pricing. Andrews does not do this, except perhaps

implicitly, in this discussion of “impulse buying” or, as he would prefer to call it, “discretionary buying” and when dealing with the questions of buyer rationality and purchasing habits.

The reason why Andrews does not emphasize these aspects, which I find central to our discussion, is apparently his adherence to a basically economic framework and the consequent absence of any psychological model for buyer behavior in his analysis. In our treatment the time dimension and psychological dimension are closely interrelated.

Andrews' study does not focus on any one branch of retailing nor does he single out pricing or any other parameter for special attention. This gain in generality, as in most economic models, is won at the cost of operationality. Andrews does not present a specific model of competition in an operational context of the type I am aiming at. This makes it difficult for Andrews to cite direct empirical evidence to support his ideas. It also complicates specific comparisons between his work and the present study.

At this point it must be remembered, however, that Andrews is mainly interested in bridging the gap between macroeconomic and microeconomic theory. I have chosen to work in the other direction, from microeconomics to “micro-microeconomics”. While Andrews' approach centers on the concept of an industry and is thus more difficult to operationalize, ours centers on the decision making units in the firm and its individual customers.

In spite of the differences in scope and methodology, Andrews' work is of considerable interest for our purpose and should be of theoretical interest in the development of more satisfactory models or retail pricing.

2.5 Behavioristic extensions of microeconomic theory

An attempt to extend microeconomic theory in a behavioral direction by integrating elements of organization theory is made by Cyert and March (1963). In Chapter 7 of their book an attempt is made to develop a specific model of price and output determination in a department store. A computer model based on observed pricing procedures was developed and predicted with a high degree of accuracy prices actually set. This proves mainly that it was possible to incorporate the pricing procedures in a formal model and that these procedures were followed quite consistently in the cases studied. The

Review of the pricing literature

analysis and results are interesting also for our study, as will be shown in Chapter 4.

The learned set of rules of behavior, the standard pricing procedures may be regarded as an example of "organizational learning" (*ibid.*, p. 113). These rules are assumed to change slowly and to lend stability to the organization in the short run. Cyert and March's work may be viewed as an extension which considers interdependence between variables along the time and psychological dimensions of pricing from the point of view of the price-setting unit (the firm). Since the assortment as a whole is not treated as a pricing entity (essentially only the isolated prices of individual items are considered one at a time), I do not regard their model as a significant extension along the assortment dimension of pricing.

An attempt to introduce a learning process in the analysis of oligopolistic interdependence is made by Ferguson and Pfouts (1962). After stating that most traditional conjectural hypotheses, except that of Cournot, lead to unstable solutions in dynamic models, they observe that in the real world violent fluctuations normally do not take place. Instead, they present a duopoly model, which under certain conditions yields stable solutions with regard to price. This is done by introducing learning in their price reaction functions.

This represents an extension in a single-product model of some interest to us, as it considers interdependence between variables along the time and psychological dimensions of pricing as a result of the pricing behavior of firms.

2.6 Studies of retail pricing in the marketing literature

Although the distinction is difficult to draw between empirical and theoretical pricing studies I will discuss in this section, writers whose main contribution to our study lies in the collection and analysis of empirical data on pricing.⁴ While microeconomic theory is normally used as a background for these studies, the connection between the data and the microeconomic models they are intended to illustrate is usually implicit, and sometimes the two are inconsistent.

2.6.1 Cassady, Jr.

The study of food retailing by Cassady, Jr. (1962) contains a great deal of empirical information on retail food pricing. Unfortunately,

⁴ I have already discussed the empirical contribution of Holdren in Section 2.4.4.

the study refers directly to a traditional single product model as its theoretical background without discussing its applicability or trying to adapt it for the specific purpose of the study.

This results in considerable discrepancy between the empirical data reported and the theoretical structure referred to. In the empirical discussion, however, Cassady recognizes from time to time the lack of perfect information in and the multi-product nature of retail situations.

From our point of view, Cassady's work is of value primarily in providing data which may be compared with our empirical analysis of pricing strategies. No systematic and operational methodology for studying retail pricing is developed by him. But, the complex nature of retail pricing patterns, variations in pricing along the time dimension as well as price leadership are discussed. Little explicit reference is made, however, to the psychological dimension of pricing.

2.6.2 The Philadelphia studies

Retail food competition has been studied at the Wharton school by a number of researchers (reported in Alderson, 1963, 1965; Alderson & Shapiro, 1964).

This research has been directed towards the development of retail theory, but no systematic models have so far been presented. Of primary interest to our study are their investigations of price advertising. Alderson's suggestion that advertisers may be considered to minimize the cost of appearing competitive (1963, pp. 2—3) has influenced the approach chosen in our study.

In the above article Alderson also states: "The next stage in the research program would have to attempt some measure of consumer reaction in order to match benefits attained against the costs incurred in each method directed toward building a satisfactory price image" (1963, p. 6). This statement sums up in a general way the essence of the approach to pricing I have chosen.

2.6.3 Nelson and Preston

The empirical study on pricing which most nearly resembles our empirical analysis, although the two approaches have been developed independently is Nelson and Preston (1966). (cf. Danielsson & Nyström, 1962; Nyström, 1963, 1964, 1966.)

Some of the dimensions of pricing utilized in the present study, e.g. pricing initiative and flexibility of pricing, appear to be related to the corresponding analysis of "price change behavior" and "price

Review of the pricing literature

initiators" in the Nelson and Preston study. Thus, certain comparisons between the empirical results in the two lines of approach are possible. The operational definitions employed differ, however, and care must thus be exercised in making such comparisons.

Both studies refer to food retailing, and despite the fact that one study was carried out in California and the other in the Stockholm area, certain basic similarities appeared in the results.

In both studies the complexity of pricing was found to be much greater than expected. Nevertheless, certain patterns were evident in both cases. The main implication of these results is the need for more detailed studies of retail pricing, along many more operational dimensions of pricing than are usually studied.

The Nelson and Preston study is primarily descriptive, and the pricing analysis is not built into any systematic model of retail pricing. There is no clear connection, for instance, between this study and the theoretical work by Preston previously cited. Nor is any attempt made to study buyer reaction to pricing.

This work is significant to our study mainly in that it offers an alternative operational methodology for the study of retail price-change strategies, which to a certain extent considers the time and assortment dimensions of pricing. In addition to this, it provides empirical data on pricing of interest to our study and allows certain comparisons.

2.6.4 McClelland

Shrewd insight into retail competition is often provided by writers in trade journals. The value for our purpose is usually diminished, however, by the fact that the reasoning is not related to any systematic model. Nevertheless, the practical advice and comments offered can prove valuable if the results are carefully interpreted.

An excellent example is McClelland (1959). Although directed to the practitioner, this article also sheds light on many of the aspects of pricing which interest us in our study. This is true of both pricing costs and pricing strategies, especially with regard to their role in building traffic in the store. Little new information is contained in the article, but many findings of previous investigators are confirmed by McClelland.

2.7 Buyer psychological aspects of pricing

Increasing attention is being paid to the buyer psychological aspects of pricing, but it is still largely an unexplored area. This is particular-

ly true with regard to retail pricing. I have not been able to find any systematic model which integrates microeconomic and buyer psychological aspects of pricing. In this section I will, however, refer to certain more psychologically oriented work which I find interesting for the purpose of trying to extend the analysis of retail pricing along the buyer psychological dimension.

2.7.1 Price surveys

One method used to gain information on the buyer psychological aspects of pricing is price surveys. Most of these surveys are directed towards gaining information on buyer evaluations of prices on the item level (Cooper, 1964; Gabor & Granger, 1965, 1966). Another aspect of interest to us which has been studied through the use of surveys is the degree of price consciousness of buyers (Wikström, 1960; Gabor & Granger, 1961; SPK,⁵ 1969). In the survey undertaken to give an empirical background to the present study (reported in Chapter 8) an attempt has been made to study buyer conceptions with regard to price on both the assortment level and the item level, as well as possible interdependence between these two levels of analysis. Some insight with regard to price consciousness in a typical retail situation is also gained in our study, in addition to more general background data.

Following a conceptual framework proposed by Stoetzel (1954), some interesting surveys on the item level of pricing have been carried out by Adam (1958), Fouilhé (1960), Emery (1962) and Gabor & Granger (1966). The idea behind this approach is basically that buyers believe that above certain "maximum prices" products are too expensive, and below certain "minimum prices" they are of low quality. This extension along the buyer psychological dimension is of some interest to our study.

Two surveys which try to study the implications of price learning in retail food situations are reported in Behrend (1966). The psychological framework in some ways is similar to that employed in the present study. For instance, a concept of "price image" is used in their analysis.

For our purpose I regard this work as an extension along the time and psychological dimensions of pricing, which, however, treats the problem only from the buyer's point of view, while no attempt is

⁵ Refers to a report by the Swedish Price Commission (Statens Pris- och Kartellnämnd), a Government agency.

Review of the pricing literature

made to consider pricing from the firm's point of view. Given this limitation, the article contains a number of empirical results of interest to us.

2.7.2 Price experiments

A number of price experiments on the item level, which, however, are of relatively little interest for our purpose, have been reported in the literature. Many of these studies deal with the relationship between price and quality (Leavitt, 1954; Tull, Boring & Gonsior, 1964; Ölander, 1964). The results tend to support the hypothesis that price may be used by buyers to judge quality, which makes downward sloping demand curves to the left for individual items empirically interesting. In Section 7.9 I will discuss price-quality relationships in the context of the present study. Other experiments have, for instance, been carried out to test the implications of odd versus even prices. The results of these studies have not been conclusive (cf. Dean, 1951, p. 490 f.).

2.7.3 Oxenfeldt

As has been indicated, passing reference to the buyer psychological aspects of retail pricing is sometimes found in discussions of retail competition. But, I am unaware of any systematic extension along this dimension of pricing in the literature. Perhaps the most buyer psychologically oriented discussion of retail pricing is that by Oxenfeldt (1968). Following up this work, empirical data on buyers' price perceptions in food retail situations have been reported on by Brown (1969).

2.8 Summary of our pricing review

I have been unable to find anywhere in the literature a systematic, integrated treatment of retail pricing of the type I propose. However, many general ideas and results of interest in developing such a framework, as well as some elements of a more specific nature, have been indicated in the present chapter.

Our search has progressed from standard models of competition in microeconomic theory to more specific models directly intended for retail applications in the retail literature. These latter models generally follow quite closely in the economic tradition.

The standard, traditional models of competition are essentially static, do not consider psychological variation and usually assume

single-product firms. Economic extensions of these models along the time and assortment dimensions of pricing are usually not intended for direct retail applications. They are, however, better suited for this purpose than the standard models, and have in a few instances been adapted to better apply to retail situations.

These adaptations basically consist of explicit consideration of demand interrelationships between items in an assortment. For our purpose, the most significant of these extensions along the assortment dimension of pricing emphasize retail complementarity. However, this is usually done in an essentially static economic framework, which is not made operational, and which does not explicitly consider the time and psychological dimensions.

A number of empirical studies of retail pricing, especially food retailing, may be found, particularly in the marketing literature. While the results of these studies often are of specific interest to us, their value is diminished by the fact that they are usually not directly related to any theoretical model. Some of these studies at least implicitly consider the time and assortment dimensions of pricing, but very seldom the buyer psychological dimension. These studies are essentially in the economic tradition and consider pricing from the firm's point of view.

However, growing interest is being shown in the buyer psychological implications of pricing. Price surveys and price experiments have yielded interesting empirical results, usually on the item level. At times they represent extensions along the time and psychological dimension of pricing, also of indirect interest for our purpose. At least one study involves explicit consideration of price learning over time by buyers. These studies, however, usually do not consider the economic implications of pricing to the firm.

3 An empirical study of retail pricing. Illustration of an analytical method (single-period analysis)

3.1 Introduction

This chapter is an attempt to systematically study the price-changes of competing firms during given, relatively short periods of time. The resulting pattern of price-changes for a firm is called its *realized price-change strategy*, with regard to the items studied. If we are interested only in the distribution¹ of price-changes for given firms, without reference to competing firms, I will speak of *absolute* strategies. If we are interested in the distributions of price-changes in relation to competing firms, I will speak of *relative* strategies. In the latter instances the comparable price-change strategies of competing firms may be seen in relation to one another and may be taken as an indication of the price competition between the firms during the period.

It is important that we distinguish between *intended* or *expected* strategies, on the one hand and *realized* strategies. There is a subtle, but important distinction implied between intended and expected strategies. In the case of intended strategies, which refer only to absolute strategies, their realization is assumed to be at least formally under the control of the price decision maker. Informational and organizational restraints may, however, lead to discrepancies between intended and realized absolute strategies.

In the case of expected strategies, their realization depends also on how competitors behave, which in our analysis is assumed to be beyond the control of the price-setting firm. The distinction between expected and realized strategies thus refers to relative strategies, and is particularly interesting in the case of oligopolistic interdependence between firms. When considering differences between expected and realized relative strategies, we will normally assume in our theoretical

¹ More precisely the time, item and size distributions of price-changes.

analysis in subsequent chapters that there is no difference between intended and realized absolute strategies.

The present chapter is primarily concerned with the empirical analysis of realized, relative price-change strategies. For this purpose a number of operational definitions have been developed to provide measures of various pricing dimensions. In the theoretical analysis in later chapters I will refer to the corresponding dimensions of intended or expected price-change strategies.

In the study of certain promotional strategies, e.g. price advertising on the item level, the method proposed in this chapter is also directly applicable, although no such empirical analysis has been carried out in the present context. In the case of other promotional strategies, e.g. price advertising on the assortment level, it is much more difficult to operationally measure the relevant dimensions of realized strategies. Nevertheless, it should be useful to classify these strategies as absolute, relative, intended, expected or realized in much the same way as indicated above with regard to price-changes.

A firm is defined as a *price-setting unit*. While our empirical analysis in this chapter treats multi-store firms, in the main part of our theoretical analysis in later chapters single-store firms are assumed in order to simplify the analysis. (A theoretical extension to multi-store firms is carried out in Section 9.9.)

A firm's general explicit aims and principles with regard to pricing constitute its price policy. A firm's absolute price-change strategy, intended or realized, may or may not be consistent with its price policy. Usually, of course, more than one price-change strategy will be consistent with a given price policy.

Through interviews reported in this chapter an attempt has been made to study the relationships between price policies which firms claim to follow and actual price-changes made by them during a given period. A number of factors such as the pricing organization of the firm, the degree of active competition and the cost element of pricing are then viewed in relation to the resulting operational measurements of realized price-change strategies. Examples of dimensions studied are flexibility of pricing, pricing initiative, pricing response and pricing independence. Based on the empirical analysis in the present chapter, a number of hypotheses emerge which are of interest for our further analysis.

3.2 Empirical background²

The empirical study reported in this chapter refers to the first six months of 1961. Data on price-changes were collected for five pricing units, referred to as firms. Four of these were food chains and one was an organization which issues recommended price lists for a large number of small independent food stores in Stockholm. In this last case the prices listed were not the actual prices set, but they were included in our study to give an indication of price-changes during the period in a large market section which for practical reasons would otherwise have been unobservable. The extent to which the independent stores actually followed these recommendations was estimated separately.³ The sales of these firms together constituted a large proportion of total retail food sales in Stockholm during the period.

Twenty-five initial items were chosen for the study. In each firm the closest substitutes to each initial item were selected,⁴ the degree of substitutability being determined by rules constructed to be as objective as possible. Factors considered in the initial selection of items were, for instance: a) the weight of the item in total sales, b) sales margin, c) distinctiveness of the item, d) the extent of advertising for the item, and e) degree of price competition with regard to the item. Lack of randomness in this procedure made it impossible to draw statistical inferences from this sample to the total number of items sold by the firm. Cost and time considerations, however, made the chosen procedure necessary.

² The empirical data is from Danielsson and Nyström (1962). A number of the concepts originated in that study, as well as some of the calculations. Cf. also Nyström (1963, 1964, 1966). According to a Swedish Government report, (SOU 1968: 6, p. 88) interviews with representatives for different retail firms carried out in connection with a price investigation in late 1966, generally supports the conclusions of our early study. Based on casual observations and interviews, I would say that the main changes since 1961 have been that "special prices" are much more common now, as is price advertising, and that both factors are partly a consequence of retailers receiving financial support for short term price reductions and price promotion for branded items, from manufacturers or distributors. Practices of this type are also initiated by retailers without such financial support, for instance in the case of non branded items (cf. DLF, 1969). More detailed technical information on our 1961 study is found in the supplement to Chapter 3, as well as in Danielsson and Nyström (1962). (DLF is used to refer to an interview study by the Swedish association for suppliers of convenience goods. (Dagligvaruleverantörernas förbund.))

³ Cf. the Supplement to Chapter 3. (S.3.3)

⁴ Cf. the Supplement to Chapter 3. (S.3.2)

Table 1. Number of price-changes.

Product/Firm	No. of price-decreases					No. of price-increases					Total no. of price-changes					Total number
	A	B	C	D	E	A	B	C	D	E	A	B	C	D	E	
1. Bananas	—	0	1	0	—	—	1	2	0	—	—	1	3	0	—	4
2. Potatoes	—	1	0	0	0	—	1	1	0	1	—	2	1	0	1	4
3. Tomatoes	—	3	2	0	—	—	8	6	4	—	—	11	8	4	—	23
4. Sausage	0	1	1	1	0	3	2	1	0	2	3	3	2	1	2	11
5. Ham	2	4	3	3	—	2	3	6	0	—	4	7	9	3	—	23
6. Pork chops	1	2	3	1	—	2	5	5	4	—	3	7	8	5	—	23
7. Liver wurst	1	0	3	—	—	1	1	2	—	—	2	1	5	—	—	8
8. Ginger																
cookies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9. Hard bread	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	5
10. Cornflakes	1	0	0	0	1	1	0	0	0	0	2	0	0	0	1	3
11. Wheat flour	0	0	0	0	0	1	1	2	1	0	1	1	2	1	0	5
12. Mayonnaise	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1
13. Milk	0	0	0	0	—	3	3	3	2	—	3	3	3	2	—	11
14. Butter	1	1	1	1	1	1	2	2	1	2	2	3	3	2	3	13
15. Margarine	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16. Cheese	1	1	0	0	1	2	2	1	0	2	3	3	1	0	3	10
17. Eggs	1	2	3	1	1	5	5	7	2	4	6	7	10	3	5	31
18. Collops, canned	0	0	0	0	0	2	0	1	1	0	2	0	1	1	0	4
19. Pineapple, canned	0	0	1	0	0	1	0	1	0	0	1	0	2	0	0	3
20. Spinach, frozen	1	1	1	1	1	0	1	1	1	1	1	2	2	2	2	9
21. Coffee	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22. Cocoa	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1
23. Sugar	1	1	1	1	1	3	3	3	3	3	4	4	4	4	4	20
24. Beer	0	0	0	0	0	1	1	1	0	2	1	1	1	0	2	5
25. Soft drink	0	0	0	0	0	1	1	1	0	1	1	1	1	0	1	4

All price-changes during the selected period for these items were collected and analyzed. Thereafter, interviews were held with a number of people, all of whom were responsible for pricing decisions in the various firms. No attempt to determine relative assortment price levels was made. Only price-changes during the period were considered.

3.3 Analysis of price-changes

A number of operational definitions were developed to make possible a systematic analysis of the price data.

Table 2. Relative flexibility of pricing for firms based on ranking by number

Product/Firm	Rankings ¹ of price-decreases				
	A	B	C	D	E
1	—	2.5	1	2.5	—
2	—	1	3	3	3
3	—	1	2	3	—
4	4.5	2	2	2	4.5
5	4	1	2.5	2.5	—
6	3.5	2	1	3.5	—
7	2	3	1	—	—
8	3	3	3	3	3
9	3	3	3	3	3
10	1.5	4	4	4	1.5
11	3	3	3	3	3
12	3.5	1	3.5	3.5	3.5
13	2.5	2.5	2.5	2.5	—
14	3	3	3	3	3
15	3	3	3	3	3
16	2	2	4.5	4.5	2
17	4	2	1	4	4
18	3	3	3	3	3
19	3.5	3.5	1	3.5	3.5
20	5	2.5	2.5	2.5	2.5
21	3	3	3	3	3
22	3	3	3	3	3
23	3	3	3	3	3
24	3	3	3	3	3
25	3	3	3	3	3
Total	69	63	64.5	74	57.5
In relation to no. of items	3.1	2.5	2.6	3.0	3.0
Standard deviation	0.77	0.81	0.94	0.53	0.62
Coefficient of variation	25 %	32 %	36 %	18 %	21 %

¹ Rank 1 indicates largest number of price-changes, rank 2 second largest number, etc.

3.3.1 Flexibility of pricing

The *absolute flexibility of pricing* for an item is defined as the number of its price-changes during the period (Table 1). Both price-increases and price-decreases are included in the computations. Firms

price-changes.

	Rankings of price-increases				Rankings of total price-changes				
	B	C	D	E	A	B	C	D	E
-	2	1	3	—	—	2	1	3	—
-	2	2	4	2	—	1	2.5	4	2.5
-	1	2	3	—	—	1	2	3	—
	2.5	4	5	2.5	1.5	1.5	3.5	5	3.5
}	2	1	4	—	3	2	1	4	—
	1.5	1.5	3	—	4	2	1	3	—
2.5	2.5	1	—	—	2	3	1	—	—
}	3	3	3	3	3	3	3	3	3
}	3	3	3	3	3	3	3	3	3
	3.5	3.5	3.5	3.5	1	4	4	4	2
}	3	1	3	5	3	3	1	3	5
}	3	3	3	3	3.5	1	3.5	3.5	3.5
2	2	2	4	—	2	2	2	4	—
1.5	2	2	4.5	2	4.5	2	2	4.5	2
}	3	3	3	3	3	3	3	3	3
2	2	4	5	2	2	2	4	5	2
2.5	2.5	1	5	4	3	2	1	5	4
	4.5	2.5	2.5	4.5	1	4.5	2.5	2.5	4.5
1.5	4	1.5	4	4	2	4	1	4	4
}	3	3	3	3	5	2.5	2.5	2.5	2.5
}	3	3	3	3	3	3	3	3	3
3.5	3.5	1	3.5	3.5	3.5	3.5	1	3.5	3.5
}	3	3	3	3	3	3	3	3	3
}	3	3	5	1	3	3	3	5	1
2.5	2.5	2.5	5	2.5	2.5	2.5	2.5	5	2.5
}	67	57.5	88	57.5	61.5	63.5	57.0	88.5	57.5
2.6	2.7	2.3	3.7	3.0	2.8	2.5	2.3	3.7	3.0
0.89	0.77	0.96	0.82	0.93	0.98	0.92	1.01	0.84	0.94
1%	29%	42%	22%	31%	35%	37%	44%	23%	31%

Low ranking thus indicates high flexibility of pricing. Ties are represented by average of ranks.

may then be ranked according to their number of price-changes for each item. This provides a measure of the *relative flexibility of pricing* for the various firms for the total number of items studied, not only separately for either price-increases or price-decreases but

Table 3. Average absolute price-changes and ranking of firms.

Product	Average price-increase, Firms					Average price-decrease, Firms				
	A	B	C	D	E	A	B	C	D	E
1	—	10	35	0	—	—	0	60	0	—
2	—	3	1	0	2	—	2	0	0	0
3	—	26	37	38	—	—	27	35	0	—
4	10	15	10	0	13	0	10	10	20	0
5	35	23	20	0	—	65	40	37	33	—
6	35	26	28	27	—	70	15	30	20	—
7	20	20	30	—	—	20	0	10	—	—
8	0	0	0	0	0	0	0	0	0	0
9	2	1	2	2	2	0	0	0	0	0
10	1	0	0	0	0	3	0	0	0	1
11	9	9	7	8	0	0	0	0	0	0
12	0	0	0	0	0	0	10	0	0	0
13	2	2	2	3	—	0	0	0	0	—
14	15	25	13	13	13	25	50	24	25	25
15	0	0	0	0	0	0	0	0	0	0
16	20	20	20	0	15	30	30	0	0	15
17	17	20	14	15	19	35	23	13	15	15
18	13	0	25	35	0	0	0	0	0	0
19	5	0	40	0	0	0	0	40	0	0
20	0	10	10	7	10	20	10	15	2	5
21	0	0	0	0	0	0	0	0	0	0
22	0	0	3	0	0	0	0	0	0	0
23	3	3	3	3	3	3	3	3	3	2
24	1	1	1	0	1	0	0	0	0	0
25	2	2	2	0	2	0	0	0	0	0

Rank sum
In relation to number of items
Coefficient of variation

also for all price-changes regardless of sign. Since all types of items are normally not for sale in all firms, this rank sum is divided by the number of selected items sold by each firm. A low ranking in relation to number of items indicates a high relative flexibility of pricing in relation to competing firms. In Table 2 we see that Firm C had

					Rankings ¹				
Average price-increase, Firms					Average price-decrease, Firms				
B	C	D	E		A	B	C	D	E
—	2	1	3	—	—	2.5	1	2.5	—
—	1	3	4	2	—	1	3	3	3
—	3	2	1	—	—	2	1	3	—
3.5	1	3.5	5	2	4.5	2.5	2.5	1	4.5
1	2	3	4	—	1	2	3	4	—
1	4	2	3	—	1	4	2	3	—
2.5	2.5	1	—	—	1	3	2	—	—
3	3	3	3	3	3	3	3	3	3
2.5	5	2.5	2.5	2.5	3	3	3	3	3
1	3.5	3.5	3.5	3.5	1	4	4	4	2
1.5	1.5	4	3	5	3	3	3	3	3
3	3	3	3	3	3.5	1	3.5	3.5	3.5
3	3	3	1	—	2.5	2.5	2.5	2.5	—
2	1	4	4	4	3	1	5	3	3
3	3	3	3	3	3	3	3	3	3
2	2	2	5	4	1.5	1.5	4.5	4.5	3
3	1	5	4	2	1	2	5	3.5	3.5
3	4.5	2	1	4.5	3	3	3	3	3
2	4	1	4	4	3.5	3.5	1	3.5	3.5
5	2	2	4	2	1	3	2	5	4
3	3	3	3	3	3	3	3	3	3
3.5	3.5	1	3.5	3.5	3	3	3	3	3
3	3	3	3	3	2.5	2.5	2.5	2.5	5
2.5	2.5	2.5	5	2.5	3	3	3	3	3
2.5	2.5	2.5	5	2.5	3	3	3	3	3
3.5	66.5	65.5	80.5	59	54	65	71.5	75.5	62
2.6	2.7	2.6	3.4	3.1	2.5	2.6	2.9	3.1	3.3
7 %	40 %	38 %	34 %	28 %	41 %	31 %	36 %	24 %	19 %

¹ Lower figures indicate relatively higher absolute average price-changes. The firm with the largest average price-increase or decrease for an item has received rank 1, the next largest rank 2, etc. Ties are represented by averages of ranks involved.

the highest relative flexibility of pricing during the period with regard to total price-changes, while Firm D had the lowest. We can also see that as far as price-increases alone are concerned, Firm D had a low flexibility, and Firm C a high one. With regard to price-decreases the differences between firms are less pronounced.

An empirical study of retail pricing

By calculating the coefficients of variation for the rankings of individual items for each firm, we can obtain a measure of *pricing uniformity* for each firm with regard to relative flexibility of pricing. Firm D had the highest pricing uniformity with regard to price-increases and price-decreases as well as total price-changes (18—23 % variation in Table 2). Firm C had the lowest pricing uniformity in all three cases (36—44 %).

3.3.2 Average price-changes

The *average absolute price-changes* for the items may also be computed for both price-increases and price-decreases. Firms are then ranked from highest to lowest average price-change and the rank sum is divided by the number of items in the same way as is done with regard to flexibility of pricing. The results in Table 3 should be studied in relation to Table 2. We see that Firm D had the smallest average price-increases, 3.4, according to this method, and also that Firm D had the lowest flexibility of pricing with regard to price-increases. Firm E had the second smallest average price-increases (3.1) and also the greatest pricing uniformity among the firms with regard to price-increases (28 %). Firm E's flexibility of pricing with regard to price-increases was second lowest. Firms E and D in this order also had the smallest average price-decreases (3.3 and 3.1 respectively). This can be compared with the fact that their flexibilities of pricing with regard to price-decreases were among the three lowest, with relatively high pricing uniformity in both cases. Pricing uniformity with regard to the size of average price-decreases was also relatively high for both firms (19 % and 24 %).

3.3.3 Accumulated price-changes

The *accumulated price-change* for each item and firm during the entire period is defined as the sum of the differences of the price after each change and the initial price multiplied by the corresponding intervals during which the price is unchanged (see the Appendix to Chapter 5). This gives us an expression of how much more or less a customer who bought one unit of the various items each day would have had to pay than he would, had the initial price remained constant throughout the period. A necessary but not sufficient condition for close correspondence between price-changes for two firms with respect to a given item is that the respective accumulated price-changes are near one another. It is interesting to

Table 4. Accumulated price-changes for each product and firm.

Pro- duct	Firms					A				
	A	B	C	D	E	B	C	D	E	
1	—	+14	+10	0	—	13	12	12	13	I
2	—	+3	+1	0	+3	0.59	0.55	0.57	0.68	II
3 ¹	—	+23	+65	+26	—					
4 ¹	+32	+15	—4	—6	+20			B		
5 ¹	—176	—199	—54	—154	—	A	C	D	E	
6 ¹	—35	+49	—23	+42	—					
7	—7	+27	+29	—	—	14	12	13	16	I
8	0	0	0	0	0	0.64	0.48	0.54	0.80	II
9	+2	+1	+2	+2	+2					
10	0	0	0	0	0			C		
11	+15	+15	+19	+13	0	A	B	D	E	
12	0	—10	0	0	0					
13 ¹	+4	+4	+4	+4	+4	16	15	14	12	I
14 ¹	+3	+39	+20	—1	+20	0.73	0.60	0.58	0.60	II
15	0	0	0	0	0					
16 ¹	+32	+43	+21	0	+35			D		
17 ¹	+50	+50	+59	+19	+49	A	B	C	E	
18	+13	0	+17	+27	0	14	14	14	12	I
19	+4	0	—3	0	0	0.67	0.58	0.58	0.60	II
20	—34	—1	—9	+2	+8					
21	0	0	0	0	0			E		
22	0	0	+4	0	0	A	B	C	D	
23 ¹	+4	+4	+5	+4	+4					
24	+1	+1	+1	0	+2	13	14	10	12	I
25	+2	+2	+2	0	+2	0.68	0.70	0.50	0.60	II

I. Number of times each combination of firms is closest with regard to the accumulated price-changes for competing items.

II. Number of times in relation to number of items compared in each combination.

¹ Products with frequent price-changes (total of ten or more for all firms. cf. Table 1.).

note in Table 4 that the accumulated price-changes vary greatly between firms for most of those items with a large number of price-changes during the period (e.g. Nos. 4, 6, 16), while in the case of certain other items with frequent price-changes (13, 17, 23) there is considerably less variation. In order to determine whether the ac-

An empirical study of retail pricing

Table 5. Degree of pricing independence.

Firm	Total no. of price-changes	I Percentage isolated price-changes (%)	II Percentage adjusted isolated price-changes (%)
A	40	38	83
B	59	39	75
C	68	46	71
D	29	28	76
E	25	32	76

- I. Indication of pricing independence in both directions between competing firms.
- II. Indication of pricing independence in one direction only, i.e. with regard only to whether the firm in question has acted independently of other firms, not vice versa.

cumulated price-changes of any one pair of firms corresponded consistently more closely than those of any other possible pair, the number of times that each combination of two firms corresponded most closely was calculated and divided by the number of common items for each combination. Thus, in this part of Table 4 we see that B—E, C—A and E—B show the closest correspondences; C shows consistently the lowest degree of correspondence with other firms.

3.3.4 Pricing independence

The price-changes during the period are divided into *group price-changes* and *isolated price-changes*. The former are price-changes for a given product included in groups of at least two, within a specific time interval, all price-changes in a group being of the same sign, either price-increases or price-decreases.⁵ In our analysis, we chose an interval of four days after interviews with price-setters and after studying our price data.⁶ All other price-changes are defined as

⁵ If a firm has more than one price-change in the same direction for an item, within the chosen time interval, only the first is considered to be a group price-change, the others are considered to be isolated price-changes.

⁶ Of course, in another analysis another time interval might be more suitable and in a more detailed study it might be desirable to test the sensitivity of the results for intervals of different lengths.

isolated price-changes. By virtue of this distinction it is possible to operationally define the *degree of pricing independence* during the period for each of the firms. The higher the percentage of isolated price-changes out of the total number of price-changes for a firm, the higher the degree of pricing independence, and vice versa. In Table 5 we see that by this definition Firm C had the highest degree of pricing independence (46 %), while Firm D had the lowest (28 %). These percentages may be regarded as indications of possible pricing independence in two directions, i.e. with regard *both* to a firm *and* to its competitors acting independently of each other.

If we adjust the number of isolated price-changes in this calculation by adding the number of "leading" group price-changes for each firm, i.e. group price-changes seemingly initiated by the firm plus the number of "leading" price-changes made simultaneously with another firm or firms, we should arrive at a better indication of pricing independence in one direction only; that is, indicating whether a firm acted independently of other firms without also requiring that these firms apparently acted independently of it. In Column II, Table 5, we can see that by this less demanding definition of pricing independence the differences between firms are less pronounced (71—83 %). Firm C now has the lowest degree of pricing independence instead of the highest, while D ranks second highest (together with E) instead of lowest.

3.3.5 Pricing initiative

The term *pricing initiative* is used to designate the extent to which the group price-changes of a firm lead price-changes by other firms in the respective groups. The degree of pricing initiative for a single leading price-change is measured by the number of price-changes following in the group: thus, in a group containing five firms the degree of pricing initiative for a leading price-change is four; in a group containing four firms it is three, etc. This method reflects both the fact that the larger the number of firms following a price-change, the less likely it is that the leading position is random, and also that the influence a leading price-change may possibly have had on other price-changes is greater, the greater the number of firms following it. We may measure the degree of pricing initiative for either all price-changes combined, or separately for price-increases and price-decreases. Following our definition of group price-changes, all price-changes in a group are in the same direction. In the case of simultaneous leading price-changes, i.e. when more than

An empirical study of retail pricing

Tables 6A—6C. Degree of pricing initiative (within paranthesis the number of times a firm has had the pricing initiative).

6A. Total pricing initiative.

Firm	Degree of pricing initiative with regard to groups with:				total degree	in relation to no. of items
	4 followers	3 followers	2 followers	1 follower		
A		3(1)	4(2)	2(2)	9	0.41
B			6(3)	5(5)	11	0.44
C		3(1)		5(5)	8	0.32
D				3(3)	3	0.12
E			2(1)	1(1)	3	0.15

6B. Pricing initiative with regard to price-decreases.

Firm	Degree of pricing initiative with regard to groups with:				total degree	in relation to no. of items
	4 followers	3 followers	2 followers	1 follower		
A				1(1)	1	0.05
B			2(1)		2	0.08
C		3(1)		3(3)	6	0.24
D				1(1)	1	0.04
E					0	0

6C. Pricing initiative with regard to price-increases.

Firm	Degree of pricing initiative with regard to groups with:				total degree	in relation to no. of items
	4 followers	3 followers	2 followers	1 follower		
A		3(1)	4(2)	1(1)	8	0.36
B			4(2)	5(5)	9	0.36
C				2(2)	2	0.08
D				2(2)	2	0.08
E			2(1)	1(1)	3	0.15

one price-change leads a group, the degree of pricing initiative is assumed to be zero for all of them.

By summing the pricing initiative scores for each firm and by dividing by the number of items, we obtain a total estimate of each firm's degree of pricing initiative (Tables 6A—6C). Firm B had the highest *total* pricing initiative according to this measure (0.44), followed by A (0.41), C (0.32), E (0.15) and D (0.12). When we consider price-increases and price-decreases separately we find that the relatively high degrees of pricing initiative in the case of B and A are largely due to price-increases (0.36 in both cases). Firm C has by far the highest degree of pricing initiative with regard to price-decreases (0.24). It may also be noted that the degree of pricing initiative for E (0.15) is entirely due to price-increases.

3.3.6 Pricing response

The *degree of pricing response* for a firm regarding each group price-change is defined by the chronological position of the firm's price-change within the group. If we assume interdependence of the price-changes within a group, this gives us a measure of the relative rapidity of the pricing response for the various firms. In this calculation ties are not represented by average ranks. Instead, all leading price-changes are given the rank 1; all price-changes occupying the second time position in a group, the rank 2; all those occupying the third time position, the rank 3, etc. By dividing the sum of the rank scores by the number of groups in which each firm is represented, we arrive at a measure of total pricing response for each firm. In this estimate of pricing response a price-change not preceded by other price-changes in a group is regarded as the fastest response, and thus is conceived of as a response to some factor other than competitive price-changes. With this measure, A showed the highest degree of pricing response (1.17), E, the second highest (1.37), followed by B (1.45), D (1.48) and C, the lowest (1.57).

3.4 Summary of the interviews

The analysis of the price data based on the operational definitions presented above are, of course, only a systematization of price-changes for the selected items. In order to get an idea of the extent to which these data were representative for and consistent with the overall price policies and price-change strategies of the firms, we held a series of interviews with the persons responsible for pricing

An empirical study of retail pricing

in the different firms. We were interested in both the influence on pricing which the pricing opinions of the responsible price setters might have had during the period and the possible effects of the organizational structure on pricing. In the long run these two factors are, of course, probably highly interdependent, but, in the short run, the distinction would appear to be meaningful.

Question 1. By whom are prices set? How are pricing principles determined?

The degree of centralization varies from Firm E, in which all prices are set and principles formulated by the managing director, to Firms B and D where the department buyers ($N = 14$ and 5 , respectively) determine prices according to principles established by the board of directors in the former firm and jointly by the sales and purchasing departments in the latter. In Firm C prices are set by the sales manager in collaboration with the head of the finance department, the latter determining the general principles. In Firm A, the organization which issues recommended prices, a committee is responsible for formulating the principles, while the field representatives set actual prices.

Question 2. In what way are price-changes communicated to the store managers?

Stores are usually notified of price-changes by mail, regularly either once a week (Firm C), twice a week (Firm B) or immediately after price-changes are decided (Firm D). In these firms important price-changes in the case of these firms are made by telephone and also by store radio in Firm B. Firm E sells their items by price lists after telephone order. These lists are revised once a month, and more important price-changes, especially price-decreases, are communicated in supplements. The lists of recommended price issued by Firm A are adjusted from time to time. More important price-changes are mailed the same day they are decided on.

Question 3. What are your general pricing principles?

The extremes are represented by Firm C, which mentions fast prices-changes on competitively sensitive items without considering individual cost factors, and Firms A, D and E, which claim to set prices after calculating cost differentials for different items and only secondarily considering competitive factors. Firm B advocates a principle of even pricing, based more on cost than competitive thinking, with a strong element of wait-and-see.

Question 4. What type of prices are included in the data? Are these prices followed in the stores?

Firms C and D report that the stores are required to follow the issued prices. Firm B says that due to local competition, certain stores, after a centralized decision, are allowed to set lower prices on certain items. The quoted prices are followed, however, in 95 % of the cases. Firm E, which does not sell through stores, says that the prices are those that were charged during the period. As has been mentioned before, Firm A's prices are recommended prices which the various member stores are free to follow at their own discretion.

Question 5. To what extent do you check on your competitors' prices? Do you have an organized system for following up prices?

Firms B and C say they spontaneously follow their competitors' prices; price-changes observed by stores are reported to the central office. Firm A claims to have a relatively consistent method of following up prices, according to which observed price-changes are investigated and analyzed. Firm E says that their only price follow up consists in checking A's recommended prices. Firm D has an organized system for following price-changes: In the suburbs appointed personnel are instructed to follow prices in local stores; in the central area stores take turns in checking price-changes.

Question 6. To what extent do you take into consideration price-changes made by the other firms in this study?

The answers to this question are summarized in Figure 1 which shows the order in which the firms say they take into consideration each other's price-changes.

Question 7. Do you have any special short period price reductions?

Firm C says they have special price reductions lasting for a period of one week on as many as eight different items per week. Other firms do not normally have such price reductions on ordinary items. One firm has occasional special offers on items not usually for sale.

Question 8. Do you follow special short period price reductions made by competitors?

Only one firm admits making such price-changes, occasionally and merely on a local basis.

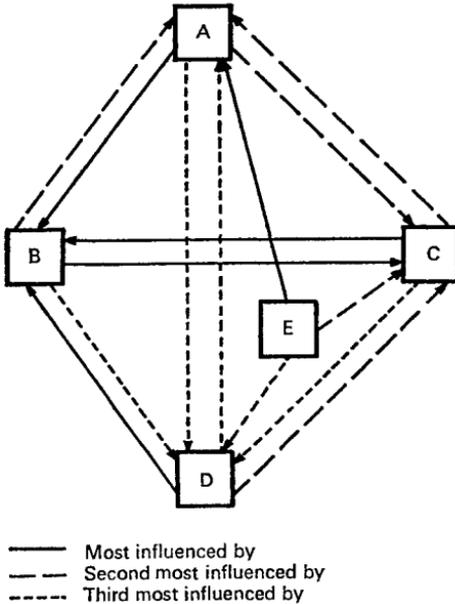


Figure 1. Extent to which firms claimed to consider each other's price-changes.

3.5 Comparisons between price data and interviews

The empirical study described in this chapter is subject to many limitations. To begin with, it is difficult to obtain an overall picture of the price-change strategies of retail firms, which, in turn, are only one aspect of their pricing strategies. Furthermore, the price data in our investigation refer only to a selection of items during a limited time period. Nevertheless, keeping these limitations in mind, it is interesting to try to find out whether the realized relative price-change strategies for the items studied are consistent with the price policies expressed in the interviews.

When employing the suggested operational definitions, we should bear in mind that the different dimensions of pricing take on added interest in relation to each other, although it is theoretically possible for the firms to carry out independent variation along these dimensions. In practice, however, independent variation would be quite difficult for the firms to achieve, even if they wanted to. Consequently, the different aspects of pricing should ideally be analyzed together in an integrated context. The partial interpretations offered

here are by no means complete and should be looked upon primarily as suggesting hypotheses for future testing.

With regard to the relative flexibility of pricing for the total number of price-changes Firm C is highest, followed by Firm B (Table 2). Several interpretations of this outcome suggest themselves. A strong tendency towards a relatively high flexibility of pricing could, for instance, result from the relatively strong emphasis which particularly Firm C, but also Firm B, claim to give to the competitive aspects of pricing (Question 3). Firm C's "special prices" (Question 7) are a case in point, although our data include only six price-changes, due to such prices which are not sufficient to substantially influence Firm C's value.

A more highly organized and efficient system for checking on competitors' prices could also be expected to tend to lead to a higher flexibility of pricing, especially in connection with demand oriented pricing. However, both Firms B and C apparently followed up the prices of competitors less systematically than did Firm D, which has the lowest total flexibility of pricing, and also Firm A, which has a value higher than Firm D but lower than Firm B.

It is also possible that the communication of price-changes had influenced the flexibility of pricing. More frequent communication should conceivably tend to lead to a higher flexibility. In the case of Firms A and E this may help to account for the relatively low values, but hardly in the case of Firm D, in which price-changes were communicated immediately.

It is interesting to note that Firm D, although it appeared to seek information about its competitors' prices most actively at the same time claimed to follow cost-plus pricing and to be very little influenced by competitive factors in setting its prices (Question 3). The operational measurements of pricing appear to support this claim. As would be expected under such circumstances its total relative flexibility of pricing is low (Table 2), its degree of pricing independence, with regard to its tendency to act independently of other firms, is fairly high (Table 5, Col. 2), and its average price-increases and price-decreases are also low (Table 3).

A reasonable hypothesis in this connection would be that by using cost-plus pricing, Firm D usually arrived at prices as low or lower than competing firms for competing items, and thus did not need to adjust these prices for competitive reasons. Firm D has a particularly low flexibility of pricing with regard to price-increases (Table 2), which would seem to indicate some sort of slack during

An empirical study of retail pricing

the period between actual prices and minimum acceptable prices to the firm. Pricing uniformity for Firm D with regard to flexibility of pricing is high, overall as well as for price-increases and price-decreases respectively, which appears to strengthen these arguments. In the interview Firm D claimed that its goal was never to have higher prices than Firms A, B and C for competing items. The degrees of pricing initiative and pricing independence are interesting to compare with the data presented in Table 7. High pricing initiative, particularly with regard to price-increases, may be viewed as a necessary but not sufficient requirement for price leadership. If, in addition to this, a firm's degree of pricing independence (in both directions) is relatively low, the case for price leadership is apparently strengthened.

Judging from Figure 2 Firms A, B and C would seem to have been price leaders, with Firm D having little, and Firm E no influence on competitive pricing. When we compare this result with the measured degrees of pricing initiative and pricing independence, Firms A and B emerge as the strongest candidates for price leadership. Firm C has the highest degree of pricing independence, in both directions, which seems to decrease the probability that it influenced the pricing of the other firms (Table 5, Col. I). Its price leadership, if any, apparently was mainly in price-decreases, while in the case of Firms A and B it was largely with regard to price-increases (Tables 6B and 6C).

As far as pricing response is concerned, we would expect at least two factors covered in the interviews to be of importance. One is the degree of centralization in making pricing decisions, and the other is the organizational aspect of communication of price-changes within the organization. Greater decentralization could reasonably be expected to lead to faster pricing response and vice versa. Quicker routines and better communication in transmitting changes should also lead to faster pricing response. In addition, systematic following up of the price-changes of competitors should lead to faster pricing response.

In view of these factors and the results of the interviews (Questions 1, 2, 5) we would expect Firm D to have relatively high pricing response, higher than the price data indicates (due to its immediate telephoning of price-changes, systematic following up of competitors' price-changes and decentralization of pricing decisions). We would predict relatively low pricing response in the cases of Firms B and C which is confirmed by the data (due to spontaneous scrutiny by

these firms of competitors' price-changes, their relatively slow communication of price-changes and relatively high centralization of pricing in Firm C). Firms A's and E's relatively high pricing responses are more surprising; it would seem that intermediate values should have been more likely.

The above remarks should be seen as possible interpretations and suggestions for hypotheses which could be more formally stated and tested by using the methodology on more representative samples of price-changes. Other hypotheses could be put forward, for instance, with regard to the following:

- (a) Differences in price policies and price-change strategies between more and less highly diversified retail firms. (Firm D above is an example of a relatively highly diversified firm.)
- (b) Differences in price-change strategies for items more or less promoted by advertising or display.
- (c) Differences in price-change strategies with regard to items which are viewed by firms, or perceived by buyers, as more or less price sensitive.

In Chapter 4 we will further discuss how the operational methodology proposed in the present chapter may be of value in studying retail price competition.

4 Applicability of the proposed operational method for studying price-change strategies

4.1 Introduction

In this chapter I will discuss the general applicability of the operational method for studying price-change strategies developed in Chapter 3. I will be more concerned with empirical applicability than in Chapter 5, where the analysis of single-period price-change strategies is theoretically extended to consider relative price levels and a multi-period analysis. A fairly wide range of applications will be discussed in the present chapter.

Chapter 4, therefore, may perhaps best be seen as an interim summary, suggesting future areas of research which appear promising against the background of the discussion in Chapter 3. It contains specific references to microeconomic competition theory and organization theory as well as to how consideration of vertical cost relationships affects the proposed type of analysis.

To a certain extent Chapter 4 serves the purpose of relating the analysis of price-changes in Chapter 3 to a more comprehensive economic framework of the type normally employed in economic and marketing studies of pricing. It also emphasizes the important role I believe organizational factors play in pricing. This is an area where very little work of an empirical or theoretical nature has been carried out.

4.2 Market forms

The question of what market form or form of competition is most applicable in various retail situations usually leads to strong disagreement among economic writers. On the whole, the lasting impression one receives from such discussions is that there is no acceptable general retail market theory and that traditional microeconomic theory is not very useful for the study of retail competition.

Against the background of what has been said so far, in the Introduction and in our general review of the pricing literature in Chapter 2, this is hardly surprising. The heterogeneity of different types of retail situations makes the task of constructing a general theory of retail competition a formidable task, if we are aiming at reasonable empirical validity. This is so even if we center our analysis on a specific aspect of competition, such as price, which has traditionally been the case in competition theory. In this study I argue that at the present time the greatest need in this area for more specific models, and also that research strategies aimed at developing such models offer a better chance of leading to practical usefulness to price decision makers than attempts to develop more general models.

But this does not mean, as I have stressed before, that I disregard the contributions of more general models of competition toward our specific purpose. I believe that they contain many elements of value *also* for the construction of more specific models set in somewhat different frameworks, such as the psychologically extended model I have chosen to develop.

In order to evaluate these contributions, however, one must closely study the empirical conditions in the competitive situations of interest to us. The search for a balance between empirical validity and theoretical controllability will make necessary, in most instances, qualifications and modifications of the more general analysis. Similarly, it is hoped that the result of our more specific analysis will have a certain general value in that, after suitable modifications, it may be of help in the study of other specific types of competition.

The tendency of retail analysts in the economic tradition to try to classify retail competition according to the most applicable traditional market form leads to considerations of the type I have indicated above. Almost the whole range of competitive and imperfectly competitive models have been suggested by different writers at different times as the market form most applicable to retail competition. Monopolistic competition has perhaps been the favorite choice during the last 25 years or so.¹ A more recent tendency has been to em-

¹ Cf. Shawver (1956, pp. 90—93), Holdren (1960, pp. 3—7). British writers, beginning with Smith (1937), have usually followed Robinson's terminology and classified retailing as "imperfect competition" while the rest, similar to most American writers on competition, have generally followed Chamberlin and held "monopolistic competition" to be the most applicable market form. For our purpose we do not need to distinguish between imperfect competi-

(cont.)

Applicability of the proposed operational method

phasize oligopolistic interdependence, e.g. Holton (1957) in the case of supermarkets. Another American writer, Cassady, Jr. (1962, p. 56), explicitly states that retailing is a complex form of differentiated oligopoly. Attempts have also been made to distinguish between convenience goods and shopping goods retailing, and Aubert—Krier (1954, p. 287), for instance, states that competition is more active in the case of "occasional goods".

But the distinction between different market forms becomes much more difficult to draw when we realize that single product models are inadequate for studying retail situations. If buyers transfer their trade from one store to another due to retail complementarity, competition between firms on the assortment level may be intense even though customers, *once they are in the store*, are relatively insensitive to price. If buyers when choosing their place of purchase are particularly sensitive to prices or price-changes for certain items, and/or the firms believe this to be the case, the patterns of price-changes for these specific competing items may well indicate a relatively high degree of passive and/or active competition. This may be the case even though the patterns of price-changes for a *majority* of items in the assortments of the competing stores would appear to indicate a high degree of monopoly.

For instance, relatively low degrees of pricing dependence and/or low interfirm correspondence between accumulated price-changes with regard to the total assortments of competing stores may — if we adopt an economic framework — be taken as indications that the stores enjoy relatively strong monopolistic positions. But, the firms may at the same time be actively competing with regard to a limited number of items, for which the degrees of pricing dependence and/or the interfirm correspondence between accumulated price-changes may be relatively high.

The degree of *passive* competition, as indicated by relatively high levels of price consciousness and price sensitivity for buyers on the assortment and/or item level, may be relatively high regardless of the price-change strategies adopted by competing firms.

(cont.)

tion and monopolistic competition, except to the extent the former includes consideration of oligopolistic interdependence. The essential difference between monopolistic competition and oligopoly, as I use these terms, is that in the latter case the number of competitors is relatively small, and each firm feels a need to consider the effects of competitors' actions on its own sales. We are only concerned with differentiated oligopoly since competing retail firms can hardly ever be assumed to offer in every respect identical combinations of items (cf. Wärneryd, 1957, pp. 9—10).

The relevance of this appears more clearly against the background of our extended psychological framework and when we consider the time dimension of pricing. If firms compete with both their price images on the assortment level and price evaluations on the item level, there may well be a high degree of active competitive interdependence, which is not readily discernible on the item level in a traditional economic framework, since the significant price-changes may be made on a small number of items over an extended period of time. To discover indications of such interdependence, it would seem to be necessary to utilize an operational methodology which considers both the time and assortment dimensions of price-change strategies.

Thus, when we consider the time and assortment dimension, it is conceivable that competitive interaction of a traditional economic type may be more intense with regard to certain subgroups of items than to others. By studying partial price-change strategies, e.g. for advertised versus nonadvertised, identical versus non-identical or some other subsets of the total assortments of competing items, indications of this type, which otherwise might go unnoticed, may well be discovered.

For certain items or groups of items an oligopolistic model may, as a consequence of the above reasoning, seem appropriate in an economic type of analysis.² For other items models of monopoly or monopolistic competition may appear to be most applicable. However, in these same situations we may arrive at quite different conclusions if we view competition against the background of an integrated economic and psychological analysis of the type we propose in our analysis. It should be interesting to compare the "economic" conclusions with those arrived at by applying our extended type of analysis. The method for studying price-change strategies presented in Chapter 3 should, as has been indicated, prove useful for this purpose.

4.3 Price leadership

One kind of price influence which has been analyzed extensively in traditional economic theory is price leadership. In 1936 Burns de-

² Alderson (1963, p. 2) states with regard to competition between supermarkets that there is some evidence of oligopolistic interaction, but only with regard to less than 1 percent of the thousands of items carried. He also claims that both oligopoly and monopolistic competition fail as general models applicable to competition between large grocery retailers (*ibid.*, p. 3).

Applicability of the proposed operational method

defined this concept as the situation in which one or a small number of firms dominates a certain market and determines the price. In this manner an "artificially" high price level could well be established.

Other economists, among them Stigler (1947) and Markham (1951), discussed the distinction introduced by Stigler between "dominant" and "barometric" price leadership. Dominant price leadership would then be close to Burns' definition while barometric price leadership would be the case of one firm voluntarily being accepted by the others as a norm for pricing.

The reason for such acceptance could be that this firm is considered a fast and efficient interpreter of market situations. According to Markham, this latter form of price leadership need not prevent price competition, as, for instance, the role of price leader may be assumed by different firms at different times. Burns, Stigler and Markham discuss price leadership in traditional economic terms, which entails, inter alia, that each firm is assumed to sell only one item. It is, of course, possible to find actual situations where these conditions are approximately valid, e.g. gasoline retailing. Investigations of price leadership in this line have been carried out by a number of researchers (cf. Chapter 2).

However, these economic models of price leadership, in their original form, are not particularly applicable to the types of price influence between firms that interest us. Since the assortment dimension of pricing is not considered in these essentially static models, only one firm can be a price leader in each market at each specific moment or for each short period of time. In retail situations, on the other hand, it is quite possible for different firms within the same market to be price leading at the same time with regard to different products or groups of products. Imperfect price knowledge, which seems to be particularly prevalent on the part of both buyers and sellers in retail situations, increases the likelihood that such situations arise.

In economic models of oligopoly firms are usually assumed to be more likely to follow price-decreases by competing firms than price-increases. This has led to the development of the kinked demand curve often referred to as *the theory* of oligopoly. Actually, this model offers only *one* explanation for rigid prices, and it does not consider how prices may change or how the existing level has been established (cf. Stigler, 1947, p. 436). Price leadership models are used mainly to explain how price-increases may be followed by

competing firms in oligopoly situations; that price-decreases normally will be followed is a consequence of the more general assumptions of oligopolistic interdependence, underlying, for instance, the kinked demand curve.

In retail situations, especially those of the type we are interested in, the situation is much less clear-cut. When we consider the assortment dimension, it is evident that competitors may meet the change of price on one item by changing the price of another item, which is not the most closely competing one. The very fact that competing items need not be, and often are not, identical makes the traditional economic reasoning less applicable, and the results become less conclusive.³ Also, the possible negative effects of not following a price-decrease are usually greatly reduced when the firm sells many items. This apparently becomes even more the case the less accurate or complete price information is on the part of buyers and/or competing firms.

That competing retail firms in market situations involving inter-firm price dependence are certainly *less* dependent on each other regarding price-changes on *individual* items than traditional economic theory would imply makes it interesting to try to study the *degree* of pricing influence each firm exerts on competing firms through individual price-changes.

Pricing initiative, as defined in Chapter 3, is a necessary but not sufficient condition for price leadership and can be used as an indication of possible price leadership in combination with interviews.

This measure operationally considers both the time and assortment dimensions of pricing and can, of course, be calculated for either price-decreases, price-increases or all price-changes regardless of sign. It is also possible to study whether pricing initiative varies with different groupings of items, that is, whether a firm displays greater pricing initiative with respect to certain types of items than to others. The degree of pricing independence (in both directions) is also of interest in this connection. The higher, the less likely it would seem that the firm has shown a high degree of price leadership.

The degree of price information on the part of the firm which depends, for instance, on the amount of systematic price follow up and the pricing organization of the firm, may also influence the degree of pricing initiative.

³ If product differentiation is allowed, the "kink" in the demand curve will evidently tend to disappear, and price leadership may be assumed to be less influential in determining price (cf. e.g. Stigler, 1947, p. 435).

Applicability of the proposed operational method

Price leadership discussions in the economic tradition seldom ever discuss factors of this type, although they may necessarily limit the ability of a firm to be a price leader in the economic sense. In the following section I will comment further on the role of the pricing organization in actual price competition.

4.4 The cost element of pricing

There is no need here to enter the controversy between marginalists and full cost advocates over the role of cost in price determination. In retrospect this heated debate would appear to be largely the result of the opposing parties, each having misunderstood the other's position.⁴ The marginalists claimed that price *should* be based on marginal considerations of cost and revenue, while the full cost advocates maintained that businessmen in *practice* tend to set price by adding a profit margin to average cost. The full cost advocates have tried to provide theoretical justification for their position, and it has been claimed for instance that under certain condition full cost pricing will lead to the same results as marginal pricing.⁵ It is beginning to be recognized that marginalistic economic theory serves a different purpose than the pricing rules of practitioners, and the

⁴ For an excellent review of this debate and a comparison and criticism of the issues involved see Heflebower (1955). See also Kaplan, Dirlam and Lanzilotti (1958) and the following discussion in the *American Economic Review* in December 1958 and September 1959. It is essential to distinguish between determining and changing prices. The former aspect involves *setting* the margin while the latter only concerns possible relationships between cost-changes and price-changes, which of course may influence but not determine the resulting margin. For our purpose we are mainly interested in the aspect of change, especially in our theoretical analysis. Pricing procedures which emphasize the cost element of pricing will be referred to as cost-plus pricing. Full cost pricing represents the extreme version of this type of pricing, where prices and price-changes are calculated to achieve full cost coverage without explicit consideration of demand.

⁵ The theoretical requirements are essentially (a) that individual items have constant variable unit costs and that average cost = marginal cost (no fixed costs for individual items), and (b) that price elasticity of demand is constant. This line of reasoning only considers *changes* in cost and demand and assumes that the margin over cost initially is optimal in the sense that it leads to a profit maximizing price. It is not concerned with how this initial margin has been established, but this may be assumed to be a result of past competitive influences. Against the background of our analysis the assumption of constant average cost appears relatively realistic in retail situations, when we consider individual items. The assumption of constant elasticity of demand, however, appears more questionable against the background of our psychologically extended analysis than it does in a traditional economic framework (cf. Scitovsky, 1951, pp. 289—290; Preston, 1963, pp. 6—8; Sylos-Labini, 1969, pp. 30—31).

question of which position is "correct" is, therefore, largely irrelevant (cf. Machlup, 1967).

We are interested here in a more limited problem, namely, what *emphasis* should be and is accorded cost considerations in retail pricing, compared to demand considerations. I will take the position in our analysis that a firm which is interested in increasing its profit should consider only the *incremental* costs of pricing. This, of course, corresponds to the marginalistic principle, which is difficult to dispute in theory.

But, in practice, too, in the food retail situations I have studied the demand element of pricing seems to be becoming more emphasized, relative to cost, although in policy statements reference is often made mainly to cost. A probable reason for this change in emphasis is that firms are becoming increasingly aware of the fact that when individual items are priced according to full cost formulas, an arbitrary allocation of common costs must be carried out. Furthermore, full cost coverage is achieved only if unit sales estimates are realized. In large self-service firms a large proportion of costs do not vary with unit sales, and when one firm initiates demand oriented pricing, other firms are forced to follow. Of course, increases in purchase (invoice) cost may provide stimuli to price-changes on the retail level, even if pricing is demand oriented,⁶ but in these instances there need be no direct relationship between the size or even the direction of price-changes on the different levels of distribution.

Paradoxically price-increases on pre-retail levels may even lead to price-*decreases* on the retail level. This may be due to the fact that wholesale or producer price-increases often receive large publicity, for instance, in the case of coffee or dairy products. When price-increases are expected and when competitors may be expected to increase price, a demand oriented retailer may achieve dramatic effects by decreasing price.

In light of our own psychological analysis we would expect the probability that items in the above instances are included in buyer observation sets would be high, and also that the firm's price image sensitivity would be high and favorable for such decreases, if they

⁶ Cost-plus pricing, when percentage margins over invoice costs are adjusted to reflect competitive conditions, can hardly be said to emphasize cost in most instances. It would rather seem in these cases to represent demand oriented pricing, for which cost considerations are used to justify prices and price-changes and to make them appear more acceptable to buyers and other interested parties who are unaware of the complex nature of retail pricing.

Applicability of the proposed operational method

are made in such ways that they are viewed by buyers as representative of the assortment price level of the firm (cf. Chapter 9).

Naturally, in the case of price-decreases in retailers' purchase costs, public interest in and awareness of the prices and price-changes of the items involved will also normally increase. In these instances an aggressive retailer may decrease prices more than he believes is motivated by his own cost-decreases. Competitors may then be hoped at least *initially* to lower prices less, which should tend to give the first firm a psychological advantage of the same nature as in the above instances. If competitors respond by lowering price even further, a price war may result. However, in retail situations with large assortments the risk of price wars on individual items is usually less than in situations where one product dominates, e.g. gasoline retailing. This is largely due to the fact that price response may be made on items other than that of which competitors have changed the price. Some products, e.g. coffee, are evidently judged by retailers to be strategically so important that price wars are more likely to result.⁷ In most instances, however, price wars do not break out and the firm making the initial, more than cost motivated price-decrease may then well achieve a strategic advantage relative to competing firms.

In both the above instances, although cost-changes have initiated the price-changes, pricing may be said to be primarily demand oriented. The cost-changes per se only create favorable conditions for implementing elements of pricing which emphasize demand.

If we wish to employ a buyer oriented framework, pricing models emphasizing cost are not very satisfactory for yet another reason; costs are calculated from the seller's point of view. Normally, the buyers lack knowledge of the sellers' cost relationships, and, thus, even if they may be prepared to accept "fair" prices based on the seller's cost situation, they will usually not be in a position to independently check the reasonableness of price against this background. This is particularly true when we consider the assortment dimension in retail situations and realize that the allocation of com-

⁷ In December 1967 Swedish coffee roasting firms decreased their prices to retailers by about 0.50 Cr./kg. This resulted in price wars on the retail level over most of the country and retailers lowered their prices about 2 Crs./kg on the average. The reason for the price-decreases by the coffee-roasting firms has not been established. They did not follow on world market price-decreases for unroasted coffee. (*Bulletin from the Swedish Price Commission*, 1968, No. 5 (*Pris- och kartellfrågor*, referred to as P & K in the following.))

mon costs to individual items must be made in a rather arbitrary manner.

Since different competing firms may give varying attention to cost, it is interesting to study what possible effects this may have on relative price-change strategies. In Chapter 3 we have discussed this question against the background of our interview data and our empirical analysis of price-changes.⁸ This analysis could be extended in other instances and the method be used to test more specific hypotheses. The results could then be set in relation to our integrated analysis. The question of the cost element in pricing is also related to the question of vertical cost relationships in retail pricing, which we will discuss in the next section.

4.5 Vertical cost relationships

In our study we are mainly concerned with pricing from the retail firm's point of view. In our theoretical analysis the invoice cost to the firm is assumed to be constant and directly proportional to the number of units purchased (cf. section 6.3). It would be possible to extend our analysis to apply to retail firms which also manufacture at least some of their items by, for instance, assuming that the variable cost to the firm is directly proportional to the number of units made within the relevant intervals. This, however, would appear to be a less realistic assumption than the one we have employed, and in our theoretical analysis I will assume that the retail firm does not manufacture the items it sells.

If we assume that models emphasizing cost are adequate for describing retail pricing, a "cost push-through" hypothesis might be used to explain short-term variations in pricing. That is, price-changes for individual items might be regarded as depending mainly on cost-changes to the firm, and probably in the short run mainly on changes in purchase costs, which can be directly allocated to

⁸ In the interviews reported on in Chapter 3, three of the five firms gave percentage estimates as to what proportion of their price-changes they believed could be directly attributed to cost-changes on the item level. Firm B claimed this was the case in 75—85 % of all changes, Firm E in 90—95 %, and Firm D in at least 95 %. Firm A said it was most often the case, while Firm C said that cost-changes on the item level were of secondary interest in determining price-changes. These are, of course, policy statements, which probably overemphasize the direct relationships between cost- and price-changes on the item level, but, nevertheless, it is interesting to note the varying emphasis which the firms claimed to give to cost factors.

Applicability of the proposed operational method

individual items. But, as indicated in the previous section, from a normative point of view I do not advocate the use of cost-plus models for pricing without also considering demand, especially not in retail situations. Our empirical study in Chapter 3 indicates, furthermore, that in this competitive situation pricing certainly could not be accounted for by considering merely cost. Preston (1963), in his study of a similar situation in the U.S.A., reached much the same conclusion: short term variation in pricing could not to any large extent be accounted for by changes in purchase costs.

So, I contend that in the situations considered here models emphasizing cost are not adequate, *even* for descriptive purposes. This, of course, does not mean that cost considerations are viewed as insignificant. It merely means that in the present analysis they are considered as *secondary* to demand considerations.

When studying the implications of vertical cost relationships for competing firms, *relative* cost considerations are more interesting for our purpose than absolute cost. That is, if one retail firm, due to greater bargaining power, for instance, receives cost concessions from manufacturers that others do not, this may be viewed as increasing the firm's *area of freedom* or area of discretion, with regard to pricing compared to competing firms. Whether or not the firm uses this freedom will depend on demand conditions, item characteristics, consideration of manufacturers, etc.

But, the main aspect from our point of view is that this type of vertical relationship gives the firm a *relative advantage* compared to other firms, which may or may not lead to a different price-change strategy.⁹ Hypotheses concerning the relationships between relative cost-changes and relative price-change strategies could then be formulated and tested using our operational method.

4.6 Pricing organization

The effects of the pricing organization on pricing in general and on retail pricing in particular is an area which has been almost com-

⁹ Vertical cost or demand relationships due to integration between the retail and other levels of distribution, are not explicitly considered in our analysis. This is one way in which our study could be extended. An operational method for studying integration variables in marketing systems has been developed by Mattsson (1969). It is possible that his approach could be combined with ours to study the implications for retail pricing of different types of integration.

pletely neglected by writers in the economic tradition.¹⁰ In discussing our own empirical study of price-change strategies in Chapter 3, I have tried to indicate to what extent the price-change strategies of the competing firms may have been influenced by organizational factors. I believe this is an important area for future research, and in the present section I will make some additional comments and suggestions on this aspect of pricing.

In the long run it is, of course, possible that persons making pricing decisions and those who do the pricing for a firm are influenced by past pricing strategies and policy. But, in the short run the pricing organization may usually be viewed as relatively independent of them. This means that regarding short-term effects, we may focus our interest on how the pricing organization influences pricing and need not consider relationships in the other direction.

We will view price policy, i.e. general pricing aims and principles, as being set by the highest level in the organization. This level may or may not also determine on the pricing strategy of the firm, e.g. the pattern of price-changes, which determines the intended absolute price-change strategy of the firm. If the highest level determines pricing strategies, we will speak of centralized price decision making, if it does not, the decision making structure will be considered decentralized.

Of course, *realized* absolute price-change strategies may differ from *intended* strategies because price-changes decided on are not carried out in the intended fashion. This may, for example, be due to imperfect communication of price decisions or to failure of store personnel to carry out price decisions in the manner decided on.

Thus, there are at least three important organizational levels which may influence pricing in large retail firms. I believe that it is necessary to distinguish between these levels explicitly if we are to understand the influence of organizational factors in retail situations of the type that interest us.

When the price-change strategy of a firm is within the bounds of its overall price policy, we may view them for our purpose as an integrated whole and need not distinguish between the policy and strategy level. In such instances we need not view the pricing organization of the firm as a restriction in carrying out its policy on the

¹⁰ In a single-product context Cyert and March (1955) have discussed some aspects of this problem. Passing reference, usually not systematically related to any economic model, may be found also in the retailing literature, e.g. Dalrymple and Thompson (1969, pp. 149—154).

Applicability of the proposed operational method

strategy level. Normally, many different price-change strategies are consistent with a given price policy, and in instances when there is no conflict between the two we gain more information by concentrating our interest on the strategy level. Strategies, as we have defined them, are also usually easier to make operational than policies.

Often price policy is not made explicit or is expressed in very general terms. If pricing decisions are decentralized, while price policy is set by the top of the organization, it would appear likely in these instances that organizational factors other than price policy will play an important role in determining the realized absolute price-change strategy of the firm.

As has been indicated, I believe one may study certain important implications of the pricing organization for the firm's actual (realized) pricing by utilizing the operational dimensions of pricing developed in Chapter 3. It should also be possible to determine whether actual pricing is consistent with decisions made on the policy and strategy levels.

For instance, to what extent will decentralized pricing lead to low uniformity of pricing along the various dimensions? And what will be the result of decentralized pricing on the degree of pricing initiative, pricing response, pricing dependence, etc.?

Another interesting question is how a higher degree of routinization of pricing, e.g. as a result of cost-plus pricing, will influence the measures of pricing. And what would be the result using different rules of thumb?

The degree of price information a firm has, which probably depends to a certain extent on its pricing organization, will also probably influence its pricing. For instance, what will be the effect of an organized system of price follow up? Conceivably, the degree of pricing response will be higher, as perhaps the flexibility of pricing also will be. Better communication of price-changes should also tend to lead to faster pricing response.

No doubt it would be possible to formulate many more hypotheses with regard to the organizational aspects of pricing. The above are merely examples to a large extent suggested by our own empirical analysis in Chapter 3.

In different situations the above factors may well lead to different pricing results. Therefore, I believe that generalizations must be made with extreme caution. It is most important that we recognize that the pricing organization may influence the actual pricing in

ways which may be difficult for even the firms involved to observe in specific situations. But, at the same time, this type of influence must explicitly be considered by firms if realized price-change strategies are to be consistent with price policy and intended strategies. To this end, I believe there is a great need for a more differentiated view of pricing and for operational measures of pricing dimensions.

4.7 Some additional research areas

In this section I will briefly comment on some additional research areas where the operational method presented in Chapter 3 may prove useful. The examples are illustrative, and no attempt has been made to exhaust the possibilities. Only areas of application not directly in line with the main analysis will be treated in this context.

One such area concerns possible covariation between the relative locations of sales outlets and price-change strategies. For instance, will stores located close to each other tend to show greater correspondence in pricing than stores located farther apart? A technique for studying such relationships, which might be used in connection with our own analysis, has been presented by Alderson and Sessions (1962).

Another interesting question is whether differences in price-change strategies are correlated with differences in types of customers. Data similar to ours reported in Chapter 8 could be used in this connection, for instance, with regard to differences in price consciousness and price sensitivity. The difference in time between our study of price-change strategies and our buyer psychological study makes it impossible for us to draw any conclusions in this respect, but more extensive and specifically designed studies for this purpose should be feasible along the lines indicated. Other psychological differences between buyers, e.g. personality and motivation factors, or socio-economic differences might also be set in relation to differences in price-change strategies.

Possible effects of legislation aimed at regulating competition,¹¹ e.g. concerning retail price maintenance or "unfair" competition, might also be reflected in our operational measures. Particularly if

¹¹ In Sweden there is a proposal for new legislation, planned to be enacted in January 1971, prohibiting certain types of advertising and marketing practices. This will probably have a certain effect on the pricing practices of retail firms.

Applicability of the proposed operational method

legislation or the interpretation of it were to undergo change, subsequent changes in price-change strategies would be of interest. This would be the case particularly if the pricing practices of all firms were not equally affected. If, for instance, certain types of special prices are made illegal, the price-change strategies of firms which previously frequently used such practices might radically change in relation to competing firms.

5 Theoretical extension to relative price levels and to a multi-period analysis

5.1 Introduction

In this chapter I will theoretically extend our single-period analysis to apply not only to price-changes but also to price levels. I will also present the conceptual structure of our multi-period analysis. In the essentially economic analysis presented in this chapter the connection between different periods is provided by the price levels prevailing at the transitional points of time between periods. The relative point price level at the end of one period, and consequently at the beginning of the next, together with the realized relative price-change strategy of the firm during the following period, determines its relative point price level at the end of this second period and so on.¹ In this analysis only the price-change strategies of competing firms are assumed to vary. If the price levels refer to more than one item, for instance, in the case of assortment price levels, the weights associated with the different prices are assumed to be constant.

It may be possible to extend the traditional economic single-product analysis in a straight-forward way to apply to assortment price levels instead of individual prices. This possibility will be examined more closely in Chapter 6. One of the main ideas of this study, however, is that it is unrealistic to assume that in the type of situations we are interested in either buyers or competing firms react to assortment price levels in the sense such a direct generalization of microeconomic theory from individual prices to assortment price levels would imply. This is mainly a result of our modification

¹ From a mathematical point of view the relationship between price-change strategies and assortment price levels is a *function*, if purchase weights and the prices of competing items do not change, and the initial price structure is given. This means that each price-change strategy, under these conditions, is associated with a distinct assortment price level. Its inverse, i.e. the relationship between assortment price levels and price-change strategies, is, however, not a function, since many different price-change strategies may, under *ceteris paribus* conditions, lead to the same assortment price level. (cf Kelley, 1955, pp. 10—11.)

of the assumption of perfect information.

Thus, I regard the type of extension along the time and assortment dimension of pricing (ignoring psychological considerations) carried out in this chapter as of limited value in normative, ex ante applications to the strategic pricing problem of the firm. However, it should assume greater interest in ex post applications in that it may provide indications of the economic consequences to buyers of different pricing practices by firms. I believe that the extension in this chapter is also of interest in demonstrating how our single-period analysis of price-change strategies may be fitted into a multi-period framework in an economic context. In Chapter 9 I will employ a similar period analysis to integrate the economic and psychological aspects of pricing.

In our integrated analysis in Chapter 9 the concept of price image, which I view as an important determining factor with regard to buyer reaction to retail pricing, will replace the concept of assortment price level in the present chapter. The lengths of the short-run periods in this extension along the psychological dimension of pricing should be viewed as reflecting our analytical assumption of constant price image for the average buyer within each period, with changes taking place discontinuously between periods.

5.2 Definitions (see Appendix for mathematical details)

In Chapter 3 I presented a number of operational definitions which I have utilized as criteria for the price-change strategies of firms during given periods of time. All these concepts refer only to price-change strategies and not to price levels. In the present chapter I will theoretically extend this analysis to apply also to price levels.

The *relative point price level* of the assortment of a firm may be defined as its price level at a given moment compared to that of another basic firm² after the prices of the items included have been weighted together. The weights are to reflect the purchase quantities of the items by an assumed average customer.

The *relative period price level* of the assortment of a firm is defined as its average relative point price level for a given period. If this period price level is equal to the point price level at the begin-

² We can easily extend an analytical comparison of two firms to embrace a larger number by choosing one firm as a basis and comparing the other firms with it, one by one.

ing of the period complete *price level equilibrium* is said to have prevailed between the two firms during this period. Of course, complete price level equilibrium always exists if we take a sufficiently short period from the initial point of time so that no price-changes have been made by either firm.

The degree of price level equilibrium, if not complete, is defined by the extent to which the relative period price level deviates from the relative point price level at the beginning of the period. The smaller the deviation, the greater the degree of price level equilibrium between the two firms for the period is said to be. Price level equilibrium can be calculated for one item or a combination of items (for instance, the complete assortment). This may be taken as a measure of price level stability of one firm in relation to another firm, with regard to the total price variation for the relevant period. Depending on whether we want to study more short- or more long-term variations, we will alter the length of our time periods accordingly.

If we have complete price level equilibrium between two firms during a period, and if the constant weights reflect the purchase patterns of the assumed buyer, then the relative cost implications to the average buyer of purchasing in one or the other of these firms is the same with regard to the initial point in time as for the period as a whole. If this is the case, we may use the point price level at the beginning of the period as an indication of the relative cost implications to the buyer for the period as a whole. If there is a relatively low degree of price level equilibrium, the point price level at the beginning of the period will not to the same degree reflect the relative cost implications to the buyer for the period as a whole.

It should be noted that the degree of price level equilibrium may be high between two firms even if their price-change strategies are quite different, as measured along one or more of the operational pricing dimensions. The item and time distributions of price-changes as well as the magnitudes of price-changes thus may differ substantially between firms, even though there may be complete price level equilibrium between them for one or more periods.

The degree of price agreement between two firms, on the other hand, depends on the temporal and quantitative agreement between price-changes for competing items. A tendency towards greater price agreement during a period, of course, also leads towards greater price level equilibrium. As we have noted above, however, a tendency towards greater price level equilibrium may well occur without a corresponding tendency towards greater price agreement.

5.3 Applicability of the price level analysis

Economic writers have frequently pointed out that traditional micro-economic price models are essentially static (e.g. Langholm, 1968). As I have noted in our review of the pricing literature, certain attempts have been made to extend the theory in a more dynamic direction, such as Brems' application of Robinson's price discrimination model to apply to the sales of a single product over a number of periods. But, as far as I know, no attempt has been made to develop a dynamic model suited for retail applications which also considers the assortment dimension of pricing.³

In the present chapter I will try to develop a conceptual framework in an economic context which considers both the time and assortment dimensions of pricing. The definitions offered in the preceding section are intended to make possible this extension.

As noted in Chapter 1, this analysis is regarded as of limited value in *ex ante* applications by the firm, but, I feel it may have a greater potential value in *ex post* analyses of the buyer implications of different pricing practices. In this respect the analysis illustrates my belief that the economic analysis of retail pricing must be extended along the time and assortment dimensions of pricing, and it also provides a background to the more psychologically oriented analysis in later chapters.

If we regard the definitions in 5.2 as *ex post* result variables, a number of interesting empirical questions arise with regard to price level variations as a result of the price-change strategies chosen by firms:

For instance, will an increase in total realized flexibility of pricing during a period for one firm compared to a competing firm tend to be associated with a higher relative period assortment price level for the former firm and, thus, a lower degree of price level equilibrium between the firms for the period?

If such is the case, it will be relatively less price advantageous for the average buyer to make purchases in the former firm during the period.

From the point of view of the firm, it is impossible to determine the cost and profit implications without knowing how buyers react to its price-change strategy. In Chapter 9 we will analyse the implications to the firm of varying its absolute flexibility of pricing,

³ Or the psychological dimension, which does not concern us in the present chapter.

in the case of both price-increases and price-decreases, in an integrated psychological and economic framework. In the present chapter we are concerned only with economic variables.

Similarly it would be interesting to study whether in specific situations realized increases in the degrees of pricing initiative and pricing response for one firm tend to be associated with lower degrees of price level equilibrium and a consequent higher or lower relative assortment price level for the firm relative to competing firms. The organizational aspects of pricing, which we have discussed in Chapters 3 and 4 are of special interest in this connection. Further, will higher degrees of pricing dependence for certain competing firms tend to be associated with higher assortment price levels for these firms relative to other competing firms? Such dependence could, for instance, be due to oligopolistic interdependence between firms. To the extent that such increases in pricing dependence for certain firms lead to a higher degree of price agreement they will also tend to lead to a higher degree of price level equilibrium.

With regard to *absolute* assortment price levels, measured in monetary units, it would, of course, be highly interesting to try to establish possible covariation between price-change strategies and price level variations. Will, for instance, higher absolute assortment price levels tend to be associated with higher realized absolute flexibilities of pricing (measured by number of price-change)? In studying the implications of different price-change strategies for absolute price levels one would, of course, have to make adjustments for other factors such as changes in monetary value (e.g. inflation) over time.

It is no doubt possible to formulate many more hypotheses with regard to the possible empirical relationships between price-change strategies and assortment price levels. Since flexibility of pricing, pricing initiative, pricing independence and pricing response depend only on the directions and time patterns of price-changes and not the magnitude of price-changes or initial prices (which are also necessary in order to determine period price levels), no definitional relationships between these pricing variables and assortment price levels exist.

Empirical study of relationships of this type would most likely require the use of a computer. Our purpose is to indicate how our analysis in Chapter 3, which is only concerned with price-changes, may be theoretically extended to apply also to price levels. This, I believe, gives added interest to our analysis of price-changes stra-

gies and also makes possible an economic extension from a single-period to a multi-period analysis.

5.4 Multi-period analysis

So far the analysis has been applied only to a given moment of time or to a given short period. In this section I will try to extend the framework along the time dimension in an economic context by considering a multi-period analysis. In Chapter 9 a similar extension which also considers the buyer psychological dimension will be made. The above definitions provide a basis for the economic extension in the present chapter.

The structure of this extension is simple: We merely link together a number of time periods by considering the initial and final relative point price levels for the assortments of competing firms; the final level at the end of a period becomes the initial level for the next period. The higher the degree of price level equilibrium, the more accurate employing the initial point price level of a period as an indicator of the overall relative period price level becomes.

Since the price-change strategies of firms are defined for the same short-run periods as are period price levels, we may characterize each period by a strategy and a price level and observe the correlation between the two series of variables over a number of periods. Do certain types of changes in strategy, as I have hypothesized above, tend to lead to certain types of changes in relative assortment price levels? To what extent do the price-change strategies of firms tend to change from period to period? Questions of this type present themselves against the background of the time extension of our pricing analysis in the present chapter. The sales and cost implications to firms for each period and the variations over a number of periods determine the firm's profit variation over time resulting from the price-change strategies employed. The relative assortment price levels, as we have defined them, directly reflect the cost ("welfare") implications to the average buyer.

As already indicated, I believe this type of analysis would be valuable in historical (ex post) studies. However, in order to achieve predictive (ex ante) analysis of use to the firm in price decision making, I believe a psychological extension is necessary. I will utilize the same type of time period analysis in my integrated psychological and economic analysis in Chapter 9, but the concept of price image will then be substituted for that of assortment price level. Since

changes in price-change strategies for a period are assumed to lead to changes in price image, and consequently also in buyer response in the *following* period, this analysis will have a one period time lag.⁴

An application of investment theory is a natural extension of any time period analysis. I merely point out the analytical connection to my own analysis and shall not develop this subject further, as it is not in line with my purpose. Such an analysis could be carried out by discounting future capital flows, using an appropriate rate of interest, to arrive at the present value at any point in time to the firm of estimated future incremental profits, resulting from different price-change strategies.

5.5 Length of time periods

A crucial element in any time period analysis is, of course, the length of time of each short-run period. Theoretically, we may try to solve this problem in various ways. In economic theory, for instance, when the time aspect is treated explicitly, many different definitions of short-run and long-run are employed. This is only natural, as different purposes will require different definitions. More worthy of criticism are writers who speak of the short- and long-run without defining what they mean and without relating their time analysis to their specific purpose.

One common definition, particularly relevant to production theory, concerns the productive facility of the plant. Stigler, for instance, notes:

“We call the short run the period within which the firm does not make important changes in its more durable factors (“plant”), and the long run the period within which the size (and existence) of plants is freely variable” (1966, p. 181).

The period of time considered in theoretical models may also refer to, for instance, the length of time the assumed demand relationship is expected not to change, the time it takes to bring products to market, the period no price-changes are assumed to take place, etc. (cf. Langholm, 1968, p. 74).

Thus, when we wish to study historical pricing strategies for competing firms, our definition will refer to the period of time for which no essential changes in the relative strategies of competing

⁴ Cf. the statement by Adelman: “The thesis suggested here is that competition in distribution often works slowly and with a lag” (1957, p. 272).

Theoretical extension to relative price levels

firms may be assumed to have taken place. Of course, in specific instances it will be quite difficult to determine whether, for example, six months or a year is a more realistic appraisal. An operational restriction is that this period must be long enough to allow for sufficient variation in the data to make possible an analysis of the type we are interested in. Accordingly, six months was chosen as the short-run period in our empirical analysis in Chapter 3.

I will define the short-run period in the *ex ante* analysis as the competitive short-term time horizon of the decision making firm, that is, the period for which it plans its pricing strategy. Longer term considerations will involve pricing effects which last more than one period.

Long-run effects will be included in our integrated analysis in Chapter 9 by utilizing a concept of price image. Price image is assumed to be constant within each short-run period, and changes are assumed only to take place discontinuously between periods. Thus, in order to integrate these concepts we have simplified our analysis by assuming that the average buyer's price image does not change within the short-term competitive time horizon of the competing firms, which is assumed to be the same for all firms.

5.6 A note on the measurement of relative assortment price levels

The measurement of relative assortment price levels may be viewed as a special case of the general problem of constructing price indices. No general solution is available, since the purpose in each specific instance should determine the computational and observational techniques used (cf. Adelman, 1957, p. 268; Nelson & Preston, 1966, p. 15).

The difficulties in obtaining valid and reliable estimates of retail assortment price levels are well illustrated by Holdren (1960, pp. 68—70). Substantial differences in the ranking of stores may result, depending on which store is used as a base and what items are included in the index.

Changes in the weights assigned to different prices may also lead to changes in estimated relative assortment price levels. If we want to measure assortment price levels for firms with multiple stores and price variations on the same item within firms, the difficulties are, of course, compounded.

Only in the empirically unlikely instances when a retail firm sets

consistently lower or higher prices on all items for which prices are not identical compared to the prices of competing items sold by competing firms, can we arrive at conclusive results, applicable to all buyers, with regard to relative assortment price levels. Moreover, competing assortments must be divisible into non-overlapping and complete sets of competing items, if we are to achieve comparability between firms (cf. the Appendix to Chapter 1).

If both these requirements are fulfilled, no matter what combination of items and quantities of items a buyer purchases from a firm, we can determine whether the closest corresponding combinations offered by competing firms are cheaper, more expensive or identically priced at a given point of time. But, in practice it is extremely unlikely that these conditions will be fulfilled in the situations of interest to us.

Nevertheless, while no general solution exists to the problem of estimating relative assortment price levels, some general comments and suggestions may be made. In Sweden attempts to measure retail food price levels for competing firms have been carried out for some time by the Price Commission, a government agency. I will refer to the published summary of some recent investigations (P & K, 8/9 1966). The Swedish trade press has carried a considerable amount of criticism directed against these results.⁵

The Commission's measurements are based on a relatively small number of products (50), and items considered almost identical, or interchangeable from the buyer's point of view, were selected. Most of the products are "heavy" in the sense that their costs make up a substantial part of what is assumed to be the budget of a typical household.

The indices are based on quantities judged to represent a two week purchase for this typical household. In general, the results indicate that differences between assortment price levels for competing firms are relatively small, usually on the order of a few percent within the areas studied. From the point of view of the buyer the differences are thus difficult to perceive, even if he were to attempt comparisons of the type the Commission's calculations are based on.

To begin with I will indicate what I view as a positive contribution of the methodology used in these studies from the point of view of our own study:

⁵ A résumé of the criticism and the resulting debate is found in the June, 1967 issue of the Swedish food retailers journal (*Livs* 1967, No. 6, pp. 12—28).

Theoretical extension to relative price levels

1. Not only identical items are included, but also different brands, which are viewed as interchangeable, are to a certain extent treated as competing items.
2. The substitutability of items is viewed from the buyer's rather than the firm's point of view.
3. An attempt is made to weigh together the prices of different items, which to some extent may be regarded as an extension along the assortment dimension of pricing. That is, more than simply the prices of individual items is compared.

I view the following features of the above analysis as shortcomings, however:

1. The type of products included and the principles by which they are selected make it relatively easy for firms to predict in advance what products are likely to be included in an investigation of this type.
2. The relatively small number of items included and the lack of any randomness in their selection make it difficult to determine the degree to which they are representative of the total assortments of these firms.
3. I believe that there is a strong tendency, among competing firms in convenience goods retailing, for the prices of "heavy", almost identical items of the type included in these studies to be rather similar and for price-changes to take place rather seldom as a result of passive and active price competition. If this tendency is even stronger in the above instances, due to the "predictability" of what items will be included, the resulting small differences between firms' assortment price levels is hardly surprising.
4. Prices are measured at one point of time only; thus, only point price levels, not period price levels are considered.
5. Special prices, which involve price reductions for limited periods of time, to the extent they are considered, are recalculated to "normal" prices. This would not be necessary had period price levels been estimated, since the shorter duration of special prices would then be directly reflected in the calculations.

To some extent the above objections are based on ideal standards, which for reasons of cost and time may be impossible to achieve. I believe, however, that it may have been possible, despite these restrictions, to more closely approximate these standards in these investigations.

Therefore, I will make the following suggestions for what I believe is a relatively realistic and more satisfactory procedure. An attempt should first be made to obtain a classification of the assortments of competing firms which as much as possible approximates the theoretical decomposition into product sets and competing items described in the Appendix to Chapter 1. Products to be included in the assortment price level calculations should then be selected by a random procedure. Weighting of product prices could be accomplished by simulating the purchases of randomly selected buyers during appropriate periods of time.

The resulting measurements of assortment price levels would not be intended to apply to homogeneous "products" (sets of identical competing items) from the buyer's point of view. Instead, it would be up to the buyer to subjectively form quality images of the total assortments of competing firms and quality evaluations for individual items.

To assist buyers in this process detailed quality declarations for different items would be desirable. Buyers should have access to information regarding assortment price levels based on closest substitutes in the assortments of competing firms but which allows substantial differences in quality between these items. Information concerning other relevant factors such as service should also be provided.

Our empirical study in Chapter 8 indicates that it is realistic to assume that buyers can and do form estimates or images of the total assortments of competing firms with regard to other variables than price. This study also shows that to a certain extent they also believe they can compare non-price images and price images for competing firms to arrive at the combination of perceived price and other factors, e.g. quality, which they prefer.

To make possible calculations of period assortment price levels corresponding as closely as possible to the ideal procedure outlined above, legislation requiring firms to register and make available on request price-changes and prices would probably be required. However, this should not demand much additional book-keeping for most firms, especially if the periods for which records must be kept were limited, for instance, to one year back in time. Such provisions would facilitate random selection of the firms and stores to be included in price investigations as well as the collection of the price data. To increase the reliability of the resulting measures some random checking of actual store price would also be desirable.

The data collected in our empirical study seems to indicate that

Theoretical extension to relative price levels

many buyers considerably exaggerate differences in assortment price levels, even if we make reasonable allowance for the great difficulties in obtaining valid measurements. Thus, a procedure such as we have outlined could be viewed as a corrective mechanism, which might be hoped to lead to more valid price images on the part of the buyers, in the sense that price images would be more closely correlated with the ideal measurements of relative assortment price levels we have outlined. This should conceivably make it more difficult for firms to practice "deceptive" pricing and would thus be desirable both from the point of view of consumer welfare and in order to promote "fair" competition among firms.

Appendix to Chapter 5

Price level definitions

For each firm k and item i the accumulated price-change during a period n is defined as:

$$A_{ikn} = \sum_{j=1}^m P_j T_j.$$

P_j = the j th accumulated price-change during the period (= the difference between the initial price and the price after the j th change).

T_j = the number of days between the j th and the $(j + 1)$ price-change. (T_m = the number of days from the last price-change to the end of the period.)

m = number of price-changes.

The relative assortment price level R for a firm k compared to another firm o at a point of time t is defined as:

$$R_{tk} = \frac{\sum_{i=1}^d W_i N_{kt}}{\sum_{i=1}^d W_i N_{ot}}$$

W_i = the relative weight given items i .

N_{kt} = the price of item i in firm k at the moment t .

N_{ot} = the corresponding price for the competing item i in firm o .

The relative period assortment price level for firm a in relation to firm b for the period n is defined as:

$$PR_{na} = \frac{\sum_{i=1}^d W_i(N_{at} T + A_{tan})}{\sum_{i=1}^d W_i(N_{bt} T + A_{tbn})}$$

T = the number of days during the period.

N_{at} = the price of item i in firm a at the beginning of the period.

N_{bt} = the corresponding price for the competing item i in firm b .

Price level equilibrium is said to prevail during a period if $PR_{na} = R_{ta}$ where t is the initial point of time for the period.

The weights W_i are determined by the purchase quantities of an individual buyer, when seen from his point of view, or of an assumed average customer when seen from the firm's point of view.

Complete price agreement between the firms a and b is said to prevail during a period if:

$$\sum_{t=1}^e \sum_{i=1}^d \left| \frac{P_{ia}(t_1)}{P_{ia}(t_n)} - \frac{P_{ib}(t_1)}{P_{ib}(t_n)} \right| = K_{ab} = 0.$$

$P_{ia}(t_1)$ = the price of item i in firm a at the beginning of each day.

$P_{ib}(t_1)$ = the corresponding price for the competing item i in firm b .

$P_{ia}(t_n)$ = the price of item i at the end of each day. The number of days during the period is e .

$P_{ib}(t_n)$ = the corresponding price for the competing item i in firm b .

If $K_{ab} > K_{ac}$ the degree of price agreement between firms a and c is said to be greater than between a and b .

Thus, if two firms during the same day make the same percentage price-changes on competing items complete price agreement between the two firms may be said to exist regarding these items and this day.

6 Towards an extended microeconomic framework

Even when we consider retail pricing from the firm's point of view, it is, of course, necessary to make some at least sketchy or implicit assumptions regarding buyer reaction. In our integrated framework I will explicitly consider the psychological mechanism buyer reaction to pricing and set it in relation to price-change and price promotion strategies employed by competing firms. In the present chapter the economic framework will be extended, while retaining the firm as its focal point. This will be done by relaxing the traditional economic assumptions of buyer rationality and perfect information and by introducing psychological considerations. The discussion in this chapter is mainly normative and should be viewed against the background of the descriptively oriented analysis of pricing practices in Chapter 3 and the buyer psychological data in Chapter 8.

6.1 Towards an extension of the price-demand relationship of traditional economic theory

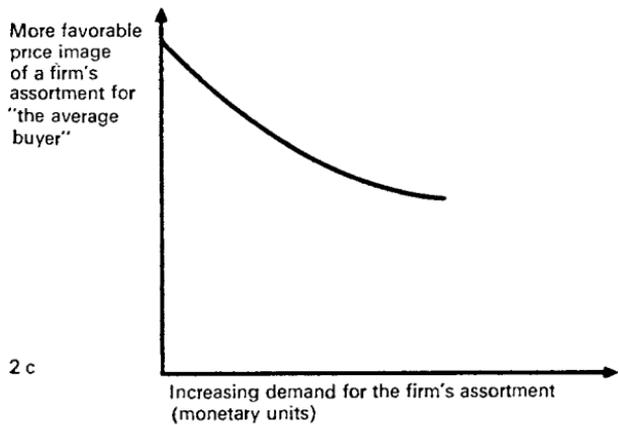
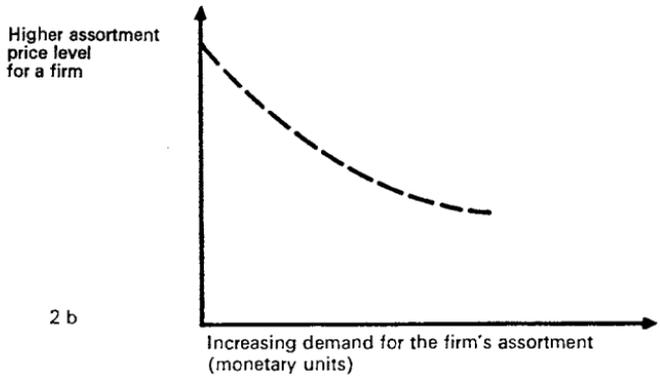
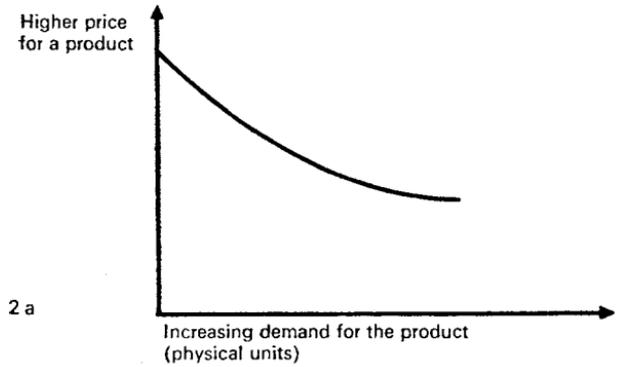
In microeconomic theory the demand for a product is normally assumed to be a negatively sloping function of its price;¹ the lower

¹ In an economic framework, where the preference orderings of buyers are assumed to be independent of price, the "behavior" of the demand curve for a commodity when its price decreases depends on income and substitution effects. For commodities other than inferior goods, i.e. those for which demand will not tend to decrease when income increases, demand curves will always be downward sloping. For inferior goods (margarin is often cited as an example) it is possible although unlikely that demand curves will not behave in the orthodox manner, namely, if the negative income effect outweighs the positive substitution effect. But, even in the case of inferior goods the demand curves will behave in an orthodox manner as long as the proportion of income spent on the commodity is small. Hicks (1962, p. 35) concludes:

"Thus, as we might expect, the simple law of demand—the downward slope of the demand curve—turns out to be almost infallible in its working. Exceptions to it are rare and unimportant."

With regard to the type of convenience goods we are interested in we may reasonably assume that the income effect is small, since the proportion of income spent on each item is small. If we wished to employ an analysis within the traditional economic framework, it would thus be natural for us to assume negatively sloping demand curves for individual items.

Towards an extended microeconomic framework



Figures 2a—2c. Successive transformation from a traditional microeconomic framework to a psychologically extended framework (The prices and price images of competing firms are assumed not to change).

the price, the greater the demand for a product becomes, all other things equal (Fig. 2a). To begin with, this is assumed to be the case with regard to demand by an individual customer, but the curve can more easily be held to be continuous over a greater interval of prices and also becomes more interesting to the firm if we aggregate to arrive at the total demand by all customers for a product. In retail applications, however, the complexity of the situation makes any such aggregation difficult, to say the least. It is then necessary not only to aggregate for the total demand by individual customers, but also for the total demand for individual items sold within the retail assortment. This demands an extension along the assortment dimension of pricing, which I regard as essential for the understanding of retail competition.

But, even if it is assumed that *individual* items in retail assortments have negatively sloping demand curves and that such curves can be measured in a meaningful way, it is still desirable for our purpose to account for at least the most significant types of interdependencies between price-changes on individual items and the demand for other items in the same assortment.² I am arguing in the present study that psychological interdependence is highly important in the retail situations of interest to us, although it is typically neglected in existing models of retail pricing.

An apparently straightforward way to extend traditional microeconomic theory along the assortment dimension without employing any psychological mechanism appears to be implicit in the direct applications of single-product models to retailing. Such extensions are interesting for our purpose mainly as an aid to a further transformation, which involves the psychological dimension of pricing and thus is not possible in a traditional economic framework. In this type of

² In an economic framework traditional substitution and complementary relationships between items may be considered by adjusting their marginal costs (Coase, 1946). Since our theoretical analysis does not explicitly deal with these types of relationships, this approach is of no *direct* interest to us. It is conceivable that the present analysis could be extended, at least in specific instances, to consider relationships of this type as well. In the retail situations of primary interest in the present study, however, I regard such extensions as of secondary importance. In other situations, involving, for instance, "occasional" or "shopping" goods, the implications could be quite different. The above type of marginal adjustment is also used by Holton (1957) to study retail complementarity in supermarket retailing. This latter type of instantaneous economic effect is of direct interest also for our purpose, although I will consider it without employing marginal analysis. Compare also Preston (1963, pp. 10—12) and our discussion of interrelated demand in Chapter 2.

economic extension the assortment price level of a firm may be substituted for the single-product price, and negatively sloping demand curves may then be postulated with regard to the aggregated demand for the total assortment of the firm as a function of its relative assortment price level. It then appears reasonable to assume that the monetary sales of a firm are higher, the lower its assortment price level in relation to those of competing firms (Fig. 2b). In order to apply this model to empirical situations it would be necessary to operationally define these price levels, for instance, as weighted averages of the different prices in the assortment, the weights reflecting average purchases by the average customer. The item prices and the absolute assortment price levels of the competing firms could then be assumed not to change or to change in a predictable way when the absolute assortment price level of the firm we are interested in changes as a result of price-changes.

The main shortcoming of such a model of buyer reaction to retail pricing in situations involving purchase interdependencies is, however, easily recognized. For one thing, the implications of a given structure of prices for the assortment of a firm will vary for each customer, depending on his particular purchase patterns. They will also vary with regard to the period of time (if price-changes take place during this period) to which the average purchase quantities apply. Even if we assume that it is theoretically possible to estimate relative assortment price levels which adequately reflect the economic implications to buyers of making purchases from different firms, another equally important problem remains to be solved. Our model still assumes that buyers are sufficiently informed about prices and have the computational facility to perform these calculations. Even in the single-product case this may be an unrealistic assumption; in the situations of main interest to us, in which many items are normally jointly purchased, it evidently diverges even further from reality.

A firm simply cannot assume that the average customer in the type of retail situations we are interested in can distinguish, even if he wants to, between relative assortment price levels with anywhere near the precision that the above type of extension of economic theory from the single-product to the multi-product case would imply.³ For

³ Holdren (1960, p. 68) states that it took him about 300 man hours of work to estimate the structure of price levels among eight competing supermarkets, and the resulting measurements were hardly conclusive. The implication of this with regard to the economic assumption of perfectly informed buyers is quite clear.

this reason I regard the transformation in Figure 2b as a construction with no other purpose than to allow a further transformation to what I believe is an empirically more valid framework for studying these situations.

If we return for a moment to the extreme single-product case of microeconomic theory, we note that the traditional concepts of price elasticity and cross elasticity of demand⁴ are used as mechanisms to reflect the extent to which price-changes on an item influence the demand for this or other items. It would conceivably be possible to generalize these concepts to refer to the extent to which changes in the assortment price level of a firm, somehow defined, influence the total monetary demand for all the items sold by a firm or its competitors.

However, if we try to extend the mechanism of price elasticity along the assortment dimension to apply to changes in sales to a firm as a result of changes in its relative assortment price level, we are faced with a problem similar to that we encounter when trying to estimate these same price levels. Both the price level and the total monetary sales of the firm depend on the quantities sold of different items. However, viewed in an economic framework, the quantities sold after a change in assortment price level depend on precisely what prices are changed. Thus, in order to estimate the effect to the firm of a change in assortment price level on total monetary sales via changes in unit sales, we need to know the item distribution of price-changes as well as the price elasticities of demand for individual items. We could conceivably by-pass this problem by defining assortment level price elasticity directly in terms of changes in total monetary sales as a function of changes in the relative assortment price level. This, however, would not solve the problem but merely make it implicit.

For these reasons I regard this approach, too, as unsatisfactory. We would still have to assume that buyers have a relatively high degree of price information and are essentially economically rational. This lack of realism would severely limit the value of any such extensions of price elasticity for our purpose. A convenience goods retail assortment normally includes thousands of items with considerable interfirm product differentiation, and the average buyer may purchase several hundred of them in various quantities during a rela-

⁴ For a marketing oriented discussion of different elasticity concepts, see Mickwitz (1959, Chapter 3, pp. 24—52).

tively short period of time. This no doubt makes it extremely difficult even for the firms themselves to make calculations of relative assortment price levels for their average buyer, let alone to estimate elasticities of the above type, and the value of such price level measurements is, as we have seen, questionable. Nevertheless, the average customer usually buys many items on any one purchase occasion and over a period of time probably to some extent develops purchasing habits with regard to his choice of store. If price-changes on individual items occasionally or regularly influence this choice, they will also indirectly influence the demand over time for other items in the assortment of the firm.

Thus, there would seem to be a need for an additional analytical mechanism for analyzing the reactions of relatively price sensitive customers to the price structures and price-changes of competing firms. Most customers are probably price sensitive to a certain degree, but the manner in which microeconomic theory reflects this does not seem very satisfactory, at least with regard to retail applications. Economic reasoning instead appears to be more applicable to the study of demand interdependencies between different items within the assortment of a given firm than to the study of competition between competing items or assortments of items in different firms. In retail situations the latter type of competition is usually more intense than the former type (cf. Cassady, Jr., 1962, pp. 124—125).

By substituting the concept of price image for assortment price level, we can retain the analytical notion of negatively sloping demand curves, while relaxing the unrealistic assumption of perfectly or well informed and economically rational buyers (Fig. 2c). Given this alteration, we do not view firms as directly competing actively or passively with their prices of individual items or their assortment price levels, as strict applications of the traditional economic framework evidently imply. Instead, we regard them as competing in terms of price evaluations by buyers for individual items and buyer price images of assortment price levels. Price-changes and price promotion are assumed to influence sales indirectly via changes in these psychological variables. Thus, in order to study the economic implications of pricing to the firm I find it useful to explicitly consider psychological, as well as economic mechanisms in an integrated framework.

6.2 The mechanism of price image sensitivity

More recent studies of the retail pricing of convenience type goods emphasize one particular aspect of interrelated demand, namely, that which is due to *retail complementarity*. This is an economic mechanism by which, in situations involving buyer purchase interdependencies, price-changes on individual items may realistically be assumed to influence the demand also for other items in the assortment of a firm. Other, more traditional types of economic interdependencies involving substitution and complementarity in use, which may be assumed to be operative once the buyer is in the store, are conceivably of less importance in many retail situations.

I will follow and extend this line of analysis by limiting our explicit treatment of what I have called "instantaneous economic effects" to retail complementarity relationships and changes in the extent of unplanned buying. This is made possible analytically by our assortment definitions. I believe there is empirical justification for this approach in the situations of interest to us. Furthermore, the analytical simplifications introduced make possible analytical treatment of another aspect of interrelated demand not dealt with in existing models, namely, the buyer psychological interaction between the item and assortment levels of pricing, which is emphasized in our study. The concept of price image and the mechanism of *price image sensitivity*⁵ play an important role in this connection.

In our theoretical analysis of the implications of pricing to the firm, price image is assumed to be constant within each short-run period for which the pricing strategies of firms are determined. Changes in price image are assumed to take place discontinuously between periods. The greater the change in price image of a firm the greater the price image sensitivity of the realized relative price-change strategy in question is said to be. Price image sensitivity is said to be *positive* if a realized price-change strategy leads to a *favorable* change in the average buyer's price image of the price-setting firm.⁶ If a realized price-change strategy leads to an unfavorable change in

⁵ There would appear to be an analytical affinity between price image sensitivity and expectation elasticity. This is defined as "... the ratio of the proportional rise in expected future prices of x to the proportional rise in its current price." (Hicks, 1962, p. 205.) Price image sensitivity may, perhaps, even be considered an extension along the assortment dimension of pricing, for our specific purpose, of the concept of expectation elasticity.

⁶ For instance, as the result of a high realized relative flexibility of price-decreases and relatively large average price-decreases, compared to the same dimensions of price-increases.

price image, the price image sensitivity is said to be *negative*.

A firm may perhaps *expect* that price image sensitivity will be positive, as the result of a particular price-change strategy decided on. Due to unexpected buyer reactions, however, it may turn out to be negative, *even* though the firm realizes its expected relative price-change strategy. In addition to this, as pointed out earlier, realized strategies may differ from expected strategies due to, for instance, organizational restraints and/or active competition. Thus, in these latter instances, even though buyers react as the firm expects them to, the realized price image sensitivity may still differ from that expected.

Price image sensitivity is employed by us analytically to reflect certain buyer psychological aspects of pricing. For this reason, and in order to isolate these aspects from organizational and active competitive factors, I have defined price image sensitivity in relation to *realized* relative price-change strategies, rather than expected strategies. This, then, also provides an analytical bridge to the empirical analysis of price-change strategies in Chapter 3, which utilizes operational definitions of realized strategies.

For obvious practical reasons it is not possible in our study to empirically measure price image sensitivity. Nevertheless, this theoretical mechanism plays an important conceptual role in our analysis. For this purpose it is sufficient to indicate the direction of change implied by the mechanism in various instances. Thus, our discussion of price image sensitivity is purely qualitative and no attempt has been made to quantify these relationships.

6.3 Pricing costs⁷

In our analysis the most interesting variable costs are the incremental costs of pricing. This naturally follows from the specific aim of our study, which is to consider the implications to the retail firm of different pricing practices.

Three types of variable costs will be considered:⁸ first, the costs which are assumed to vary with the unit sales of the firm; second, the costs which are assumed to vary with the price-change strategies

⁷ For general discussions of different cost concepts and relationships see e.g. Frenckner (1950) and Solomons (1968).

⁸ When speaking of variable costs it is important to explicitly state in relation to what variable the costs are assumed to vary.

employed; and third, the costs which are assumed to vary with the degree and type of price promotion, e.g. price advertising.

The invoice and other unit costs to the firm (e.g. handling costs) are viewed as directly proportional to unit sales. The profit and cost function relevant to our analysis may thus be summarized as:

$$p = S - \overbrace{\sum_{i=1}^n k_i x_i}^B - C_s - C_p - C \quad (6.1)$$

p = Profit to the firm during this period.⁹

B = "gross margin" to the firm.

S = Monetary sales during the period.

k_i = Invoice and other unit costs (e.g. handling costs) for item i ;
number of items = n .

x_i = Quantity sold of item i during the period.

C_s = Incremental cost during the period of the price-change strategy employed, compared to the employment of a completely passive price-change strategy, i.e. with no price-changes during the period.

C_p = Incremental cost of price promotion, e.g. price advertising during the period (compared to no price promotion).

C = Costs which do not vary with pricing or unit sales (assumed to be constant during the period).

The cost factors of main interest to our analysis are C_p and C_s . I believe it is important to try to formulate cost and demand functions which are as independent of each other as possible (cf. Andrews, 1964, pp. 60, 106). Therefore, I find it desirable for our purpose to utilize cost concepts which may easily be made operational and which are considerably more disaggregated than those commonly employed in microeconomic models. Economic writers concerned with competition in general, and retail analysts in particular, do not, in my opinion, distinguish adequately between different promotional costs, e.g. C_s and C_p in the present analysis, on the one hand, and the incremental costs of providing buyers with the

⁹ The length of the period is defined by the short-run period for which price-change strategies are determined.

items they demand.¹⁰ There would also seem to be a need for operational measurement of the pricing practices of firms along many more dimensions of pricing than are explicitly considered in the traditional microeconomic framework, in order to make possible a more disaggregated analysis of the cost implications to the firm of choosing different pricing strategies. In our study I have tried to work in this direction, especially in the analysis in Chapter 3 of price-change strategies.

Analytically our line of reasoning may be continued by assuming:

$$B = f_a(PS; PP) \quad (6.2)$$

$$C_s = f_b(PS) \quad (6.3)$$

$$C_p = f_c(PP) \quad (6.4)$$

PS refers to the absolute price-change strategy realized by the firm during the period and *PP* to its realized price promotion, e.g. price advertising. In this pricing analysis all other factors are assumed to be constant. The firm's profit for the period may then be regarded as a function of *PS* and *PP*. *B* represents the firm's "gross margin". In this analysis the invoice cost/unit, k_i , is considered given and beyond the control of the firm. Once total unit sales, Σx_i , and subsequently also *S*, are determined as functions of *PS* and *PP*, *B* is also determined (Equation 6.2). Σx_i also depends on how competitors react to the firm's pricing. Thus, Equation 6.2 holds only for a given pattern of reaction by competing firms. In Chapter 10 I will explicitly discuss variations in competitive reaction to pricing in a game or decision theoretical framework.

I shall now extend the analysis to consider what Holton (1957, p. 15) and Holdren (1960, p. 33) call "discretionary fixed costs". These are costs which the firm may voluntarily incur as a result of its choice of competitive strategy, but which costs, once the strategy is chosen, may be regarded as fixed in the relatively short run. For our purpose the essential qualification is that these costs do not vary with regard to unit sales. These costs then, once incurred, are viewed in our analysis as fixed during our short-run periods.

I will consider both C_s and C_p as discretionary fixed costs with

¹⁰ Often the only promotional costs considered are advertising costs, no distinction being made between different types of advertising. Chamberlin introduced these costs into the analysis of competition by speaking of "selling costs", for which advertising was taken to be representative (1962, p. 72).

regard to our analysis. This means that at the beginning of each short-run period the firm is visualized as indirectly determining, through a policy decision with regard to pricing, what discretionary pricing costs will be incurred during the period.

C_p , the price promotion cost, viewed as mainly due to price advertising, will be assumed to be one type of discretionary fixed cost, determined by the promotional budget decided on for the period.

C_s , on the other hand, will be analyzed as containing two components of discretionary cost. The first is the discretionary cost of collecting and communicating price information; the second, the discretionary cost of employing a more active (rather than passive) price-change strategy, e.g. a strategy involving a larger number of price-changes during the period. The pricing organization is assumed not to change in this analysis.

Thus, C_p is the discretionary fixed cost of price promotion, while:

$$C_s = C_I + C_F. \quad (6.5)$$

C_I represents the discretionary fixed cost of collecting price information, and C_F , the discretionary fixed cost of employing more active pricing. The former may be mainly the cost of employing a person to check on competitors' pricing practices, while the latter, at least in self-service retailing, will probably largely consist of the cost of remarking prices.¹¹

The analytical simplifications I will employ, following this discussion, are that C_I is a function of both the degree of pricing initiative, I , and the pricing response, R , which the firm wishes to achieve during the period, assuming that the absolute price-change strategies of competing firms do not change. C_F is assumed to be a function of the absolute flexibility of pricing, F , decided on by the firm.

Thus:

$$C_I = f_a(I; R) \quad (6.6)$$

$$C_F = f_e(F) \quad (6.7)$$

Since C_F is assumed to depend to a large extent on the remarking of prices, it seems realistic to consider this cost as proportional to the

¹¹ The cost of remarking prices is so high that in the case of short-term price reductions firms do not always do so. Instead the cashier charges a different price than is marked on the item, which may easily lead to mistakes and buyer irritation.

number of changes that will be made and Equation 6.7 thus becomes a linear function:

$$C_F = kN, \quad (6.8)$$

where N is the total number of price-changes implied by the absolute flexibility of pricing decided on for the period. This number determines the realized relative total flexibility of pricing for the firm, when the corresponding numbers of price-changes for competing firms are given. The incremental cost of remarking the price of an item is k .

The degree of pricing response, R , and the degree of pricing initiative, I , which the firm hopes to achieve, may in this connection be viewed as measures of *capacity to respond*. Since it is difficult to generalize about the nature of this process, which is a largely unexplored area of pricing, it is difficult to discuss the functional forms of Equations 6.6 and 6.7. The organizational structure and informational limitations of the firm are probably important aspects in this respect, as has been discussed in Chapters 3 and 4.

The above cost analysis would appear to be largely consistent with data available on retail cost structures in self-service situations (e.g. Holdren, 1960, pp. 27—66, McClelland, 1959, pp. 160—161). This area of retailing typically involves a high proportion of fixed costs as well as discretionary fixed costs. In the relatively short run the costs varying with sales volume appear to be approximately linearly related to unit sales within the relevant intervals.

One possible exception which I have not explicitly discussed is that of decreasing or increasing variable unit costs due to purchase conditions. The former more likely case could conceivably be due to quantity discounts. This aspect is not explicitly considered, as it could be easily included in Equation 6.1 without changing the main line of reasoning.

I have also ignored variation in inventory costs, due to the complexities this would have introduced into the analysis. From this point of view, pricing practices which lead to faster turnover of items should lead to cost advantages provided sales forecasts are reasonably accurate. This may be the result of lower interest costs, more economical order procedures, and/or lower invoice costs due to quantity discounts.

These cost factors thus may imply a differential advantage, for instance, for more active price-change strategies, and for higher levels of price promotion. Consideration of inventory costs is one direction

Towards an extended microeconomic framework

in which the present study might be extended. "Special prices", which have become quite common in Sweden, are probably based to a certain extent on inventory considerations by firms.¹²

¹² According to DLF (1969) manufacturers believed that retail firms during special promotions often deliberately increased their inventories, at lower special purchase prices, more than the sales during promotion periods justified, and made an extra profit by selling this stock at normal prices later on. Retailers on the other hand claimed that the increased inventories, they often said they were left with after special promotions, were a disadvantage to them of this type of sales activity!

7 Pricing from the point of view of the individual buyer, a theoretical framework

7.1 Introduction

Let us now focus our attention on the individual buyer and his psychological reaction to pricing. After briefly reviewing the general contributions of the economic theory of consumer demand and of more psychologically oriented work on buyer behavior, I will develop my own specific psychologically based theoretical framework. I do not propose to develop a general model of buyer behavior, but I am interested in existing models of this type to the extent they contain elements of value for our specific purpose.

The model developed in this chapter will not deal directly with the *purchase behavior* of individuals. Rather, only their *evaluations of price* on the assortment and item level as well as interaction between the two levels will be considered. In Chapter 8 I will report on some empirical data with regard to the buyer psychological aspects of pricing to provide an empirical background to the present chapter. In the integrated model in Chapter 9, the implications to the firm of purchase behavior will be dealt with on the level of aggregate demand.

7.2 The economically rational buyer

Most microeconomic models of competition at least implicitly assume that the buyer-consumer behaves in accordance with what we may call the static economic model of consumer behavior. The characteristics of what I refer to as the *economically rational buyer*¹ are im-

¹ In a theoretical sense economic rationality presupposes that the completely informed buyer is infinitely sensitive, inter alia, to price differences and price-changes and has a weak preference ordering for all possible combinations of items. This latter assumption implies that he can determine for any two combinations whether he prefers one to the other or is indifferent between them. It also assumes that all preferences are transitive. If the buyer prefers A to B and B to C than he will prefer A to C, and if he is indifferent between A and B and between B and C he will also be indifferent between A and C. The literature on the economic theory of consumer choice is vast and highly mathematical and it is neither possible nor necessary for our purpose to concern ourselves more closely with it. Edwards (1954, 1961) provides an extensive survey of this literature. Cf. also Wickström (1965, pp. 27—31).

Pricing from the point of view of the individual buyer

plied in this model. That is, the individual is assumed to maximize his welfare or "utility", within the constraints imposed by the prices of commodities and his limited financial resources. In an essentially static environment with complete information no uncertainty exists, and the preferences of all buyers are given.²

From this model we may derive the demand conditions facing the firm, usually formalized in negatively sloping demand curves, as functions of price. Changes in prices and income will affect the quantities demanded of various commodities, due to the so-called "income" and "substitution" effects. The revenue effects to the firm of these changes are summarized in elasticity concepts, for instance, price elasticity and price cross elasticity of demand.

In our own analysis, while retaining as much of the economic framework as I find valuable for our specific purpose, I will try to extend it along the buyer psychological dimension. This, I believe, will increase the empirical validity in the situations of interest to us without too much loss of theoretical control.

Economists writing about individual welfare, usually seen as closely related to the question of economic rationality, have at times expressed points of views which basically resemble the position I have taken:

"... the elements of welfare are states of consciousness..." (Pigou, 1924, p. 10).

"The individual's welfare is exactly what the individual experiences as his welfare" (van Praag, 1968, p. 3).

The type of objections van Praag raises as to the realism of the economic concept of rationality is along the same line as those we have raised in our own study and would appear to be particularly relevant in retail situations of the type we are interested in. van Praag writes:

"... to assume that an individual is able to evaluate a large number of goods, say a thousand, simultaneously is in conflict with reality. It is an *irrational rationality assumption*" (ibid. p. 5).

² Actually, we need only assume a given *scale of preferences*, if we utilize an indifference curve type of analysis. We thereby free ourselves from the need for a quantitative measure of utility (cf. Hicks, 1962, p. 18). Changes in preferences may be introduced by shifts in demand curves, but the theory then does not include the mechanism of the shifts, i.e. they are not "explained" within the framework of the theory. The traditional economic model of consumer demand has also been extended for instance in a dynamic direction and to consider uncertainty but these developments need not concern us in the present context.

van Praag proposes that at each point in time the individual evaluates only a limited set of commodities, called his "relevant set", among all possible commodities. This concept appears similar to our "observation sets" in Chapter 9. van Praag's analysis is purely theoretical, based on set theory, and is not made operational. It indicates, however, how the economic theory of consumer demand may be extended in a psychological direction, although it makes only passing reference to psychological mechanisms. Some of the general ideas presented appear to be similar to ideas utilized in our own study, despite the fact that the emphasis and problem area, individual welfare theory, is quite different from our own area of investigation.

Writers on retail competition in the economic tradition sometimes adopt a somewhat modified view of economic rationality without explicitly introducing psychological considerations. For instance, Andrews writes:

"... a man is rational if he chooses whichever alternative costs less, taking into account all aspects other than cost which affect the value in use to him of each alternative" (1964, p. 100).

Such a definition is impossible to criticize on formal grounds, since it may be taken to include any modifications we care to make in the concept of economic rationality. But, I believe that in order to achieve satisfactory empirical validity in the type of retail situation we are interested in we must *explicitly* consider psychological mechanisms and imperfect information in our models of buyer behavior.

Andrews' definition of rational behavior is valuable, however, for implying that the main question may not be whether buyers are rational, economically or otherwise, but, rather according to what dimensions their behavior may be classified as rational.

7.3 A psychologically oriented view of buyer behavior

I will begin this section by discussing what I mean by the "psychological buyer". This also requires a discussion of the concept of image. Work in marketing is usually, quite naturally, based on more psychologically oriented models of buyer behavior than are traditional economic analyses of consumer demand. Marketing studies are thus generally more in line with our analysis in this respect. I will comment both on more general, psychologically oriented frame-

Pricing from the point of view of the individual buyer

works and on attempts in the marketing literature to integrate economic and psychological aspects.

7.3.1 The psychological buyer and the concept of image³

It is tempting to substitute for the term "economically rational buyer" the term "psychologically rational buyer". But, for several reasons I will resist this temptation and speak instead of the "psychologically consistent buyer".

First, I wish to avoid the overtones of economic rationality which many readers probably will associate with the term rationality, even if psychological qualifications are made. Also, as I have indicated in Section 7.2, rationality is defined differently by various economic writers, and the line dividing what we wish to classify as rational from irrational behavior must be drawn in a rather arbitrary fashion.⁴

Of course, economic rationality, in its traditional sense, is a theoretical construction, unattainable in complex empirical situations and probably never intended to be more than an ideal standard.

In the present analysis the question of rational versus irrational behavior is relatively uninteresting. I am more interested in what determines buyer behavior than in what buyer behavior should be. In our analysis I assume that buyers, on the basis of limited and imperfect information, form expectations with regard to price on the assortment and item level, and that this to a certain extent influences their purchase behavior.

Buyers are assumed to tend towards consistency in their interpretations of environmental events. I have formalized this in the model in Section 7.7.8 by employing a mechanism of psychological equilibrium. Obviously, this is only one way in which our general approach may be incorporated in a specific model, and its usefulness must, of course, be viewed against the background of empirical data. I believe,

³ For our purpose the term "image" may be defined, on the level of the individual, as his conceptual representation (or cognitive structure) of environmental events. In other words, it is a model which the individual holds of some aspect of "reality". Often the term "image" is treated as an undefined concept by writers, but in most cases their usage would appear to be consistent with the above general definition (cf. Ramström, 1967, pp. 98 ff.).

⁴ I do not find it useful for our purpose, to make the type of distinction between rational and irrational behavior that, for instance, Boulding makes (1956, p. 54). He views rational behavior as due to conscious image, irrational as due to subconscious image. Since it is not clear how we should make this distinction operational, no considerations of differences between conscious and subconscious images are introduced into our analysis (cf. Ramström, *ibid.*, pp. 101 f.).

however, that it is a useful way of looking at our problem.

Our extension along the psychological dimension of pricing follows the general approach suggested by Boulding. In his book *The Image* (1956) he develops the basic idea that human behavior depends on the images individuals develop over time as a result of past experience (ibid. p. 6). Boulding proposes that the analytical notion of an image be used as a unifying concept in all scientific disciplines and be studied in a new scientific discipline "eiconics".

Boulding also explicitly refers to economic theory in his analysis, noting that a concept of image is latent in even the simplest theories of economic behavior. But he also notes that it is the behavior of commodities, not the behavior of men, which is the center of interest in economic studies (ibid., pp. 82—84). One economic problem which, Boulding states, cannot be solved without utilizing the idea of an image is that of competition among the few ("oligopoly") (ibid., p. 92). According to Boulding, the higher the levels of organization we are concerned with, the more indispensable the need for a theoretical concept of image becomes (ibid., p. 31).

An attempt to discuss the applicability of the concept "image" and to develop an analytical framework in which marketing problems may be studied is made by Enis (1967). Essentially, his article discusses Boulding's main idea, that images determine behavior, against the background of recent psychological theory without presenting any new empirical support for the suggested type of analysis. From our point of view, his review is most interesting for the additional theoretical support it gives the general type of analysis proposed by Boulding.

In the marketing literature a number of investigations of, for instance, store and brand image have been reported (e.g. Spector, 1961; Mindak, 1961). Their value for our purpose is limited in that they usually are not set in relation to any model of the psychological mechanisms implied. Image concepts of a fairly complex nature are typically employed, and price is usually only one component of many and, therefore, is given relatively little separate attention. I have not been able to find any empirical study of this type closely related to our own analysis. Often these studies employ the semantic differential technique. (Osgood, Suci & Tannenbaum, 1957.)

Both "price image" and "price evaluations" in our analysis are "images" in Boulding's sense of the word. I view evaluations of price on the assortment level, i.e. price images, as being generally more complex, vague as well as more difficult for the buyer to conceive

of than price evaluations on the item level. I therefore have reserved the term "price image" to refer to the assortment level. By doing so, it is also easier to maintain a clear analytical distinction between the item and assortment levels of pricing, which facilitates the analysis of possible interaction between the two levels. As will be discussed further in Section 7.7.8, the buyer is assumed to tend towards consistency between price evaluations and price images. When discussing the implications to the firm of buyer behavior (Chapters 9 and 10), I will also assume that the "average" buyer is relatively price conscious and price sensitive, on both the item and assortment level. More favorable price images and price evaluations are, in our integrated model, assumed to lead to higher probabilities that buyers will visit the stores and purchase the items in question.

7.4 A comparison between the "economic" and the "psychological" buyer

The traditional economic model of the buyer-consumer may be said to presuppose formal logical thinking on the part of individuals. Psychologists, on the other hand, tend to regard reasoning based on logic as only one possible way of reasoning (Henle, 1962, pp. 366—378).

Deductive normative conclusions are based on formal rules of logic. Descriptive studies, however, often indicate that individuals do not follow generally accepted logical rules in deriving conclusions. Economists consequently usually appear to be more normatively, and psychologists more descriptively oriented, which perhaps accounts for some of the differences in methodological outlook between them.

The two approaches, normative and descriptive, are to a certain extent linked by an interesting third view, namely, that people learn to be logical as a result of their education (Dollard & Miller, 1950, p. 120).

Psychological consistency models based on considerations of cognitive equilibrium, which have substantially influenced the present study, may be interpreted to assume that individuals tend to be logical in relation to their conceptual representations of the world. That is, these models imply that cognitive processes follow "psychological", rather than "formal-logical" principles (Abelson & Rosenberg, 1958).

Against this background the implied behavioral differences be-

tween the "economically rational" buyer and the "psychologically consistent" buyer may be attributed largely to informational imperfections which characterize the situation and to the computational ability we ascribe to the buyers. If information is highly imperfect and/or if cognitive limitations severely restrict the computational ability of the buyer, he can hardly be economically rational even if he wants to. This is the case with regard to both "strict" economic rationality and more realistic extensions of the concept within the economic framework. Since both informational and psychological restraints strongly characterize the situations of interest to us, a "psychological" model of the buyer appears more applicable to our purpose than a model more in the economic tradition.

7.5 Psychologically oriented work related to buyer behavior

In this section I will briefly comment on some of the work on buyer behavior which I find indirectly relevant to our study. Obviously, this area is so vast that it is possible to refer only to a very small portion of the literature.⁵ Studies of this type often involve the application of a psychological framework, on the level of the individual, to marketing problems, e.g. the type of pricing problem we are interested in. While this type of literature is usually psychologically oriented, penetrating applications of psychological theory are not too common. Little of this literature has been devoted to retailing as a specific field of study, and reference to retail situations is often made in a cursory and passing manner.

Starting with the general assumption that behavior⁶ depends on the interaction between the individual and his environment, many different theories of behavior have been outlined. Basic to the attempts we are interested in is that they rely on psychological factors such as attitudes, motivation, perception, expectations and learning.⁷ A great deal of work has been directed towards the definition and measurement of attitudes. The question of, for instance, to what

⁵ An up-to-date and extensive review and bibliography of buyer behavior with the emphasis on psychologically oriented work, is Sheth (1967).

⁶ I will use the term behavior to refer to overt behavior, such as different types of purchase behavior. Psychologists often use the term in a wider sense to refer to all types of responses, internal and manifest. Thus, in this usage, which I will not follow, attitudes represent one type of behavior.

⁷ Cf. the title of an article by Bayton (1958): "*Motivation, cognition, learning—basic factors in consumer behavior.*"

Pricing from the point of view of the individual buyer

extent and how attitudes influence behavior has been a highly controversial issue (cf. Fishbein, 1967; Kiesler, Collins & Miller, 1969, pp. 22—38). Much confusion has resulted from ambiguous definitions and/or usages of these basic terms, especially with regard to the terms “attitude” and “motivation”, which are therefore avoided in our own study. Important approaches to buyer behavior have been outlined by Katona (1960) and Lazarsfeld (1959). Our psychological analysis is largely consistent with the work of both these authors, but since Katona’s analysis is of a more aggregate nature and does not emphasize the structure of the individual’s reaction processes, Lazarfeld’s analysis is of greater interest to us.

Lazarfeld assumes that behavior is due to interaction between external and internal variables. The individual selectively reacts to environmental stimuli, which may influence his psychological field and, by creating “disequilibrium” (“motivation”), precipitate behavior. Our attempt to extend our pricing analysis along the buyer psychological dimension, presented in our individual model of buyer reaction to pricing later in this chapter, appears to be quite consistent with Lazarsfeld’s general model of buyer behavior, which emphasizes psychological interaction over time.

A third line of development with regard to individual decision making, which has influenced the present work more directly than the above two, is represented by March and Simon (1958). Their concept of “bounded rationality” and their discussion of cognitive limits on rationality (pp. 136—171) are of particular interest to our analysis. I find their discussion, in the context of organization theory, of selective attention and selective exposure to stimuli also relevant to buyer behavior. Thus, similar psychological processes are considered in our pricing analysis.

I believe that it is largely by considering restraints of this type, with regard to both the availability of information and the information processing capacity of the individual, that traditional micro-economic models of competition may be extended in a psychologically more realistic direction. In constructing our own model of the psychological reaction of buyers to pricing I will utilize the general framework of “cognitive equilibrium theory”, with substantial adaptations, however, to fit the present purpose. Specific references to the relevant literature will be made in connection with the presentation of the model. In this subsequent discussion I will refer also to the important aspect of post-purchase influence on

buyer behavior which the dissonance model (Festinger, 1957) explicitly considers and which may be incorporated into our model.

7.6 Attempts to integrate various models of buyer behavior

Howard (1963) is one of the first writers to outline a program for integrating elements of psychological, sociological and economic thinking in the analysis of buyer behavior. Nicosia (1966) continues and extends this line of work, especially in the direction of psychological theory. The complex nature of buyer decision processes is emphasized and set in contrast to the oversimplified image of the consumer implicit in economic theory. Both writers seem to agree that no systematic, useful theory of buyer behavior exists (Howard, *ibid.*, p. 69), and Nicosia explicitly states that the most pressing need at the present time is to develop theoretical models to guide empirical research (*ibid.*, p. 18).

Apart from supporting the methodological approach chosen in the present study and providing detailed bibliographies of research carried out in this area, the above works are considered valuable for our purpose in that they emphasize the interaction over time between the firm's action parameters and the psychological reactions of buyers. This follows from my belief that the extension of retail models along the time and psychological dimensions of pricing should be carried out by integrating elements of individual decision making into their theoretical structure.

7.7 A psychological model of individual buyer reaction to pricing

I will now present the framework of our psychological model of buyer reaction to pricing, on the level of the individual. To avoid confusion may I point out that the terms "generalization" and "discrimination" are used in special senses, specifically tailored to the purposes of our analysis. "Discrimination" is not used in the economic sense of price discrimination; rather, my definition closely confirms to the psychological sense of the word. "Generalization" is not used in the special psychological sense of stimuli or response generalization.⁸

⁸ "The term *stimulus generalization* refers to the fact that a given response can be elicited to some degree by a range of similar stimuli. *Response generalization* is a term that applies to the fact that the same stimulus can be shown to produce a range of responses . . ." (Walker, 1967, p. 61).

Pricing from the point of view of the individual buyer

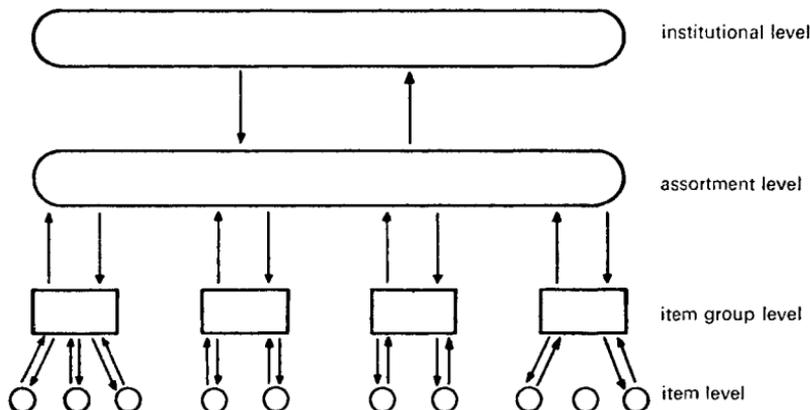


Figure 3. Generalization between different adjacent levels of analysis.

As used in this study, it refers to the generalization from one cognitive element or structure to another, in some sense related, one (cf. Nowak, 1967, p. 1).

7.7.1 Generalization between different levels of analysis

I find it convenient for our purpose to distinguish between different levels of analysis with regard to the psychological implications of retail pricing. (Fig. 3) I will begin with the institutional level. This refers to the general type of enterprise a firm belongs to, e.g. if it is co-operative or privately owned. For instance, a buyer may for ideological reasons believe that a firm of the former type generally offers lower prices than competing firms, without trying to check this himself. The next level, the assortment level, denotes the assortment of items sold by a specific store or firm. The following level refers to groups of items. Of course, various subdivisions of the total assortment are possible on this level of analysis; for example, meat and fish, dry goods, fruit and vegetables, dairy products and cereals may constitute a basis of classification. The lowest level of analysis, finally, is the item level, where each item is viewed independently of other items.

Generalization is viewed as taking place between different levels of analysis. We may, for instance, generalize from the conception that co-operative stores are cheaper than privately-owned stores to the conception that a particular co-operative store is cheaper than a particular privately-owned store without having any information as to actual prices in these stores. Similarly, we may generalize from

the conception that the total assortment of a store is cheaper than that of another store to the conception that a particular item group, e.g. meat, is cheaper in the former store than in the latter. We may also generalize from an item group to an individual item in the same manner. Obviously, generalization can also take place in the opposite direction, for instance from item level to item group, item group to store assortment and from store assortment to the institutional level. Arrows in Figure 3 indicate how generalization may take place between adjacent levels.

It is also possible, of course, that generalization may take place between non-adjacent levels, e.g. from the item level directly to the assortment level or vice versa. These are the two levels of generalization taken up explicitly in our theoretical discussion, but much of what is said can easily be extended to refer to other levels as well.

This implies that buyers' institutional conceptions regarding prices are given and constant, which seems reasonable with regard to our type of analysis. Furthermore, in the main analysis I shall not distinguish between single- and multi-store firms. Consequently, I will in the beginning disregard generalizations from the price image of the assortment of one store to assortments of other stores in the same firm. These analytical simplifications can be extended in a straightforward manner to cover the other indicated levels of analysis without changing the main line of reasoning. Later, in Chapter 9, I shall indicate some implications of our analysis for multi-store firms.

7.7.2 Price image and price evaluations

Price image is used to refer to a buyer's conception of the assortment price level of a firm. The price image of a firm is thus a relative concept, conceived in relation to the comparable levels of one or more competing firms. The lower a buyer believes a firm's assortment price level is compared to competing firms, the more favorable his price image of that firm is said to be.

The *price evaluation* of a buyer is his judgment, when considering the purchase of an item, as to whether this item is priced higher or lower than competing items. If he believes it is priced lower, his price evaluation is favorable if he believes it is priced higher, it is unfavorable. If he believes it is the same, the evaluation is said to be neutral.

The evaluation process referred to above requires that the buyer, when making direct comparisons on the item level between firms, establish correspondence relations between competing items. This

Pricing from the point of view of the individual buyer

means that he must subjectively determine what items in the assortments of competing firms are closest substitutes. In the case of identical items this should normally be a simple process, but when the sets of competing items (products) are not made up of identical items, the buyer may conceivably find it difficult to establish these relationships.

7.7.3 A psychological process of discrimination regarding prices⁹

When a buyer tries to compare an item from the assortment of one firm with its closest substitutes from competing firms in order to evaluate their prices in relation to one another, we say that he *discriminates* on the item level. He can also discriminate on this level by comparing the price of an item after a price-change with its price before it was changed. Thus, comparisons made on a given level within or between firms are viewed as discriminations, while transferrals of conceptions from one level to another are regarded as generalizations. A price evaluation may thus be more or less a function of discrimination versus generalization.

7.7.4 Two extreme cases with regard to price evaluation

It seems reasonable to assume that in retail situations of the type we are interested in both discrimination and generalization operate in combination, and it would no doubt be difficult to separate the two in specific instances. But, this would seem to be true of most empirical phenomena and poses no reason why we should not try to study them. Systematic analysis of empirical data, usually presupposes theoretical treatment of the problem. Therefore, I shall begin by analyzing the two extreme cases, although intermediate cases would seem more likely in most empirical situations.

1. Figure 4a illustrates the first case. The generalization effect dominates, and the buyer's price evaluation of the item is assumed to depend only on his price image of the total assortment of the firm. It is possible that later on, following post-evaluation of prices, a discrimination effect will occur and tend to influence price image. This, however, is a secondary effect later in time, while in the present

⁹ In this connection we are not concerned with whether or not these price images are consistent with some kind of "objective" assortment price levels or the extent to which price differences reflect quality or quantity differences between competing items. I merely assume that buyers are to some extent price conscious and that the suggested analytical framework in a reasonably realistic manner takes this into consideration.

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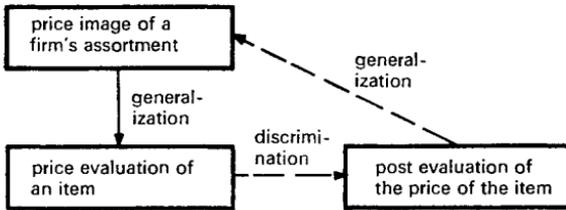
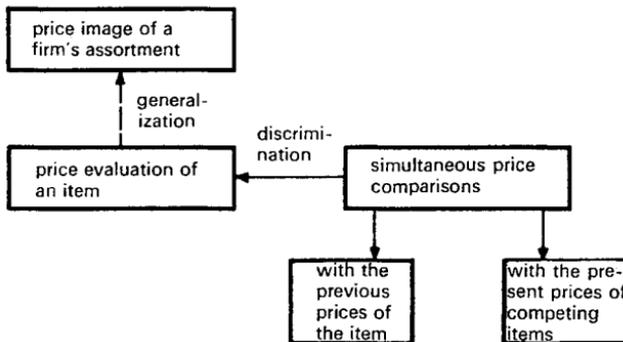


Figure 4a. Price image dominates



Figures 4b. Item specific price information dominates

Figure 4a—4b. Two extreme cases of generalization and discrimination in the price evaluation of an item.

price evaluation only price image is assumed to be effective. If, for instance, the buyer has no item specific price information on which to base his evaluation, with regard to either competing items or previous prices charged by the firm for this item, his tendency to generalize from price image should increase. This should also be the case if such information is difficult to evaluate because of, for example, considerable differentiation between competing items (e.g. private brands). If he decides to buy the item, the probability that he will observe item specific price information with regard to this or similar items in the future may well increase. In Case 1 no immediate learning with regard to price image is assumed to take place.

2. Figure 4b illustrates the second extreme case. I assume here that price image is latent and does not influence the buyer's price evaluation of the item. This may be the case if, for example, the

Pricing from the point of view of the individual buyer

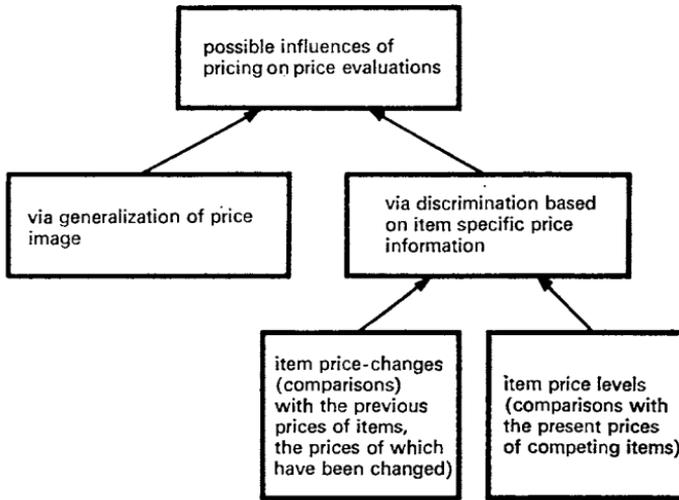


Figure 5. Possible influences of pricing on price evaluations.

buyer believes that the assortment price level of a firm is high relative to competing firms but happens to notice that the firm sells a particular item at what he believes is a lower price. This probably requires that the competing items are rather easy for the buyer to compare, i.e. identical or close substitutes. In this case learning is assumed to take place with regard to price image if other price evaluations do not counteract the tendency and if the buyer views the price of the item as representative of the assortment price level of the firm.

7.7.5 The total influence of price image and item specific price information on price evaluations

So far in our discussion I have distinguished between two possible influences on price evaluations, namely, those due to generalization of price image and/or discrimination with regard to the prices of individual items. I find it useful also to distinguish between two types of discrimination (Fig. 5). The first concerns *price-change*, when the buyer compares the price of an item with its previous price or prices. If, for instance, the price is decreased, the price-decrease in itself may lead to a favorable price evaluation. If there is an increase in price, an unfavorable evaluation may result. In both these cases the evaluations are assumed to be independent of the item price level before and after the price-change.

The second effect I will attribute to *item price level*. Here the price of an item is compared with the prices of competing items which constitute the closest substitutes from the buyer's point of view. This is the type of price influence which microeconomic theory deals with exclusively, and we do not necessarily need a psychological framework in which to analyse it. However, such a framework is required in order to incorporate the other type of price influence into our analysis.

I believe that the type of price influences on buyer reaction to pricing which economic theory does not deal with are particularly important in the retail situations studied here.

7.7.6 Hypotheses concerning the relative importance of the various types of price influence on price evaluations

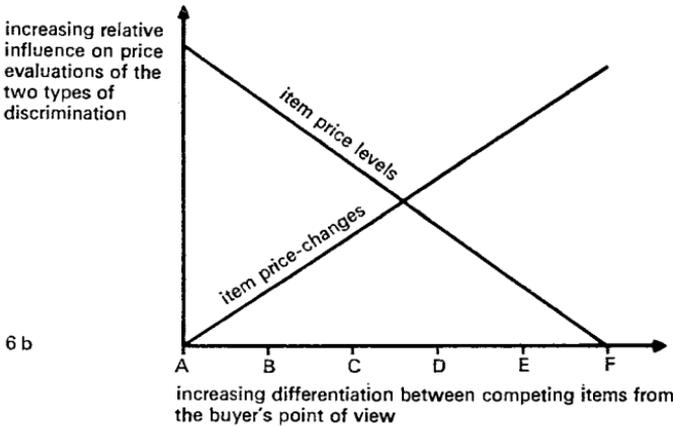
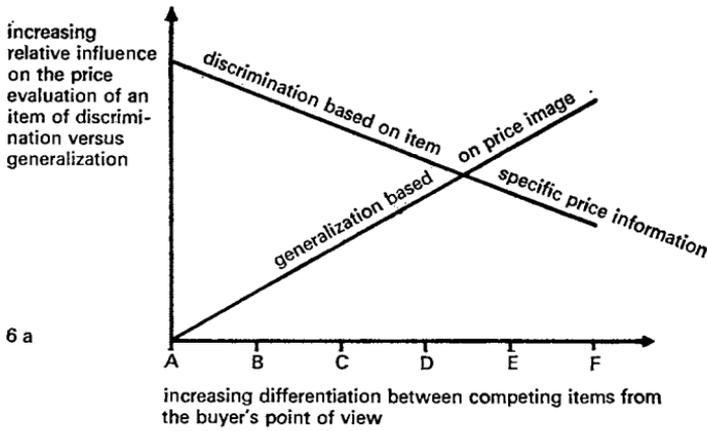
A number of hypotheses may now be formulated on the basis of the preceding discussion. To begin with, one of the ideas set forth in this study is that, at least in the types of retail situations we are interested in, price image and price-changes will often tend to be of greater importance in influencing price evaluations than discrimination with regard to item price levels, to which microeconomic theory limits its treatment.

It also seems likely that price image will tend to increase in importance with regard to price evaluations, while the importance of item specific price information will tend to decrease when, for example,

1. it is difficult for buyers to make interfirm comparisons on the item level of qualities and quantities,
2. the price or changes in price of an item is given relatively little exposure in the store, or
3. the price or change in price of an item is not advertised.

With regard to comparing qualities and quantities the economic concept of product differentiation may be psychologically extended to refer to the differences between items perceived by the customer. Figures 6a—6b illustrate this aspect. Point A in both diagrams refers to the case in which a buyer encounters no difficulties in comparing the item of which he is evaluating the price with competing items. This could be the case, for example, when the different items are identical in quality, quantity and packaging. Point B refers to a hypothetical case in which the buyer has some difficulties in comparing items, e.g. when the quantities are different. Point C indicates

Pricing from the point of view of the individual buyer



Figures 6a—6b. The hypothetical relative importances of different pricing influences, as functions of product differentiation in a psychological sense.

a situation of greater difficulty, such as the case of technically identical items sold under different brand names. Point D refers to a case of even greater difficulty, e.g. easily observable differences in technical product quality between items. The further to the right we move in the diagrams, the greater the differentiation, in the above sense, is assumed to be between the item a buyer is evaluating the price of and competing items.

Figure 6a illustrates the above hypotheses concerning the relative importance of price image and item specific price information in price evaluations. It seems likely that price image will increase in

importance relative to item specific price information, the further to the right we move in the diagram. In A, price image should not influence the price evaluation of a price informed buyer. This corresponds to Figure 4b. If the buyer knows the prices of identical competing items, it is reasonable to assume that this item specific price information will dominate over price image in his price evaluation. Correspondingly, the further to the right we move in the diagram the more applicable Case 4a would appear to be.

Thus, in Figures 6a—6b, I make the assumption, traditional in microeconomic theory, that the buyer has perfect information with regard to the prices of competing items. I do not, however, assume that he can make perfect adjustments for differences in quality, quantity and packaging. The degree of item specific price information the customers has or easily can find enters into Hypotheses 2 and 3, but in 1 and Figures 6a—6b, I do not allow for variations in this respect.

Figure 6b illustrates our hypotheses regarding the relative importance of the two types of discrimination in price evaluations. I hypothesize that the further to the right we move in the diagram, i.e. the more difficult it becomes for the buyer to compare the competing items, the more important price-changes will become relative to item price levels. When the buyer views the items as identical and has all relevant item specific price information, it seems reasonable to assume that his price evaluations will be based only on the resulting relative item price levels after price-changes have been considered, and that the changes themselves will not influence the evaluations. The more difficult the comparisons with regard to other dimensions than price, e.g. quality, become, the more influential the price-changes themselves are likely to become in price evaluations.

7.7.7 The role of buyer learning in our model

I will now view what has been said so far against the background of individual learning. I regard the changes¹⁰ in price images for in-

¹⁰ Whether the psychological mechanism, price image *formation* is basically similar to price image *change* is in itself an important research question beyond the scope of our study. It is possible that the cognitive element, which is emphasized in our analysis of price image change on the level of the individual buyer, is more influential in changing than in forming price image (cf. Kiesler, Collins & Miller, 1969, p. 345). But, above all, adequate models of price image formation probably would need to consider many factors such as assortment, quality, location, service, etc., which in our analysis are assumed not to change.

dividual buyers as the result of a learning process taking place over periods of time. The probability that an individual buyer will purchase a given item at a specific moment of time is assumed to be a function of his price evaluation of this item: the more favorable the evaluation, the greater the probability that he will buy the item. I also assume that the probability that a buyer visits a firm depends to a certain extent on his price image of it. The more favorable his price image is at a given point of time, the higher the probability is assumed to be that he will visit the firm for purchase purposes. I also assume that his total purchases will not be completely planned in advance; the amount and distribution of money spent on various items is assumed to depend to a certain extent, on how favorable his price evaluations are. This makes allowance for "impulse" or unplanned buying. Of course, factors other than price evaluation will also influence the total probability of purchasing an item; convenience may, for example, overcome a rather unfavorable evaluation of price. On both the item and assortment level quality evaluations will probably also influence purchase probabilities. In our analysis these other factors are assumed not to vary.

In Section 7.7.8 I will develop a model of the psychological mechanism of the individual buyer which considers the interdependence between price image and price evaluations, employing a framework of cognitive equilibrium. Then, in Chapter 9, I will extend and discuss the results of this analysis from the point of view of how the price-setting firm may choose its price-change strategy.

7.7.8 A psychological model based on considerations of cognitive equilibrium

I will now complete my model of the interaction between price image and price evaluations by considering cognitive mechanisms. This extension serves several purposes in our analysis. To begin with, it indicates how our model stands in relation to certain recent trends in psychological theory with strong intuitive appeal, which also have led to interesting empirical results.¹¹ It also indicates how

¹¹ Cf. Brown (1962) for a distinction between the congruity model (Osgood & Tannenbaum, 1955), the dissonance model (Festinger, 1957) and the balance model (Abelson & Rosenberg, 1958). The models are similar in many respects and may be traced back to the work of Heider (1944, 1946, 1958). For our purpose we need not distinguish closely between these approaches. These models are also called consistency models. For a general comparison and evaluation of "consistency theory", the reader is referred to Kiesler, Collins and Miller (1969), particularly Chapter 7, pp. 155—190. Cf. also Wärneryd (1967, pp. 204—211) for an introduction to this area in Swedish.

a relatively complex individual learning process with regard to price image may take place and to some extent provides a rationale for the stimulus-response formulation of learning in Chapter 9. Experimental work on price image learning by individual buyers should be feasible utilizing the conceptual framework presented in this section.

In Chapter 9 I will indicate how our cognitive model of individual learning may be developed into an aggregate model of the psychological implications to the firm of choosing different price-change strategies. This latter model is of a modified stimulus-response type, which I view as operationally desirable on the aggregate level of analysis. Thus, I consider that the two main schools of learning theory, stimulus-response and cognitive, are complementary and not competing formulations, at least with regard to their implications for our analysis.¹² One type of learning theory may be analytically more suited to applications on one level of analysis, while another type may be best suited to another level.

I define a cognitive structure as a combination of cognitive elements with relations or links between them. The elements in this structure are evaluations by an individual of cognitive objects. In our case the objects are assortment price levels and the prices of individual items, and the evaluations are price images and price evaluations.

A relation is said to be *associative* if, in the mind of a subject, two elements are linked to each other. This will be indicated in the figures by a plus sign. If they are not linked together, they are said to be *dissociated*, to be shown by a minus sign.

Equilibrium is said to exist in the model if like-evaluated objects are linked by associative bonds. Equilibrium also exists if links between positively and negatively evaluated objects are dissociative. (To begin with, I will not distinguish between degrees of positive or negative evaluation.) I assume that a lack of equilibrium, i.e. a disequilibrium state, leads to a tendency towards the establishment of equilibrium.

I now assume that the buyer is consciously or subconsciously aware that price images *in general* should be associated with price evaluations: positive (favorable) price evaluations should normally follow if price image is positive (favorable), and negative (unfavor-

¹² A good general work on learning theory is Hilgard (1956). A detailed bibliography on modern learning theory may be found in Stendenbach (1966). For a survey of mathematical learning theory see Bush (1960).

Pricing from the point of view of the individual buyer

able) price evaluations, if price image is negative (unfavorable). This is consistent with our assumption that price image is learned over a period of time as a result of price evaluations, favorable evaluations thus creating tendencies towards favorable price image and vice versa.

If in a specific instance a buyer tentatively makes an unfavorable price evaluation (Fig. 7a), in spite of the fact that he has a favorable price image, a situation of cognitive disequilibrium will result. Equilibrium may be restored in several ways. First, the buyer may believe that the price of this item is not representative of the assortment price level of the firm. Thus, the objects become dissociated in his mind and cognitive equilibrium is restored (Fig. 7b). This is a discrimination effect, according to our previous discussion, and corresponds to our extreme Case 2 (7.7.4).

Alternatively, the buyer may believe that the price of this item is representative of the assortment price level of the firm, and equilibrium may be restored through a change in price evaluation (Fig. 7c). In this case the buyer generalizes from his price image in a manner similar to that assumed in our extreme Case 1.

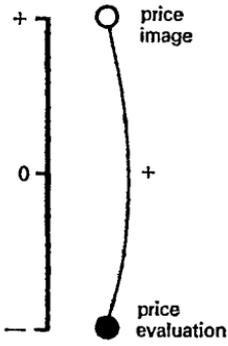
Finally, the buyer may believe that the price evaluation is representative of the assortment price level, but equilibrium may instead be restored through a change in price image (Fig. 7d). However, I regard such a case of instantaneous adjustment of price image to the price evaluation of an individual item as mainly of theoretical interest, as I believe it is more realistic to assume that changes in price image take place gradually over a period of time. In order to consider such gradual tendencies toward change in price image, and, thus, to make the model more realistic, I will change the evaluation scale to encompass quantitative differences in degree of positive and negative evaluations.¹³ Equilibrium will now demand correspondence not only in sign but also in intensity.

In Figure 7e, then, equilibrium is restored through changes in *both* price image and price evaluation. Since price image is regarded as a more complex variable than price evaluation, the change in the former are assumed to be relatively smaller than the change in the latter. I ascribe the change in price image to learning as a result of discrimination on the item level.

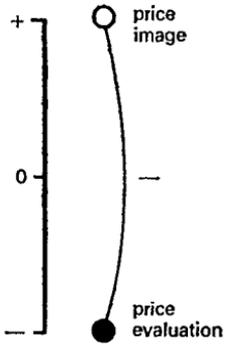
I have previously stated that I believe that discrimination with respect to the prices of individual items and generalization with

¹³ Cf. the congruity model. (Osgood & Tannenbaum, 1955.)

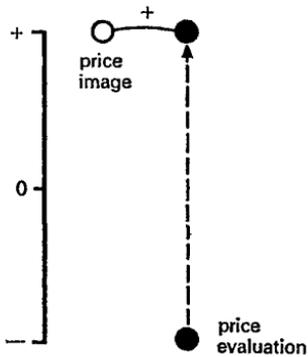
Pricing from the point of view of the individual buyer



7a Cognitive disequilibrium



7b Cognitive equilibrium is restored through discrimination

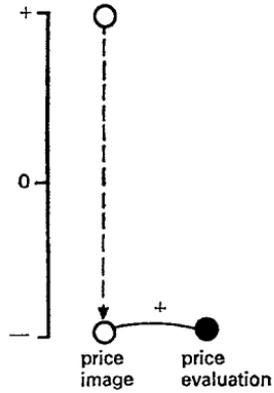


7c Cognitive equilibrium is restored through generalization

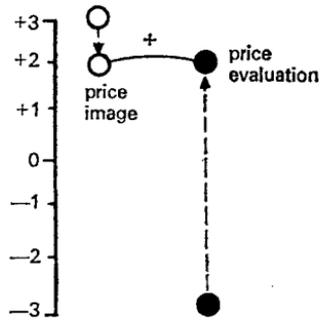
Figures 7a—7c. Cognitive equilibrium and disequilibrium.

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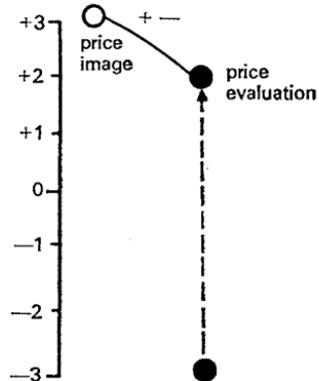
7d Cognitive equilibrium is restored through an instantaneous change in price image



7e Cognitive equilibrium is restored through disproportional, simultaneous changes in price image and price evaluation



7f Cognitive quasi-equilibrium is achieved



Figures 7d—7f. Cognitive equilibrium and quasi-equilibrium.

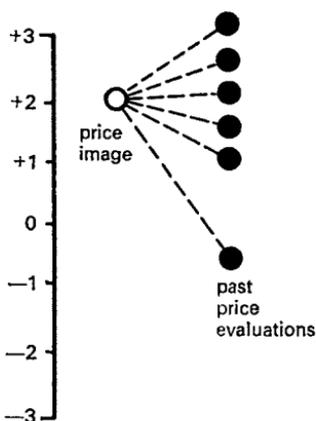


Figure 7g. Price image viewed as a complex function of past price evaluations.

respect to price image in varying degrees together influence specific instances of price evaluation. To consider this in our analytical scheme I will introduce the concept of “quasi-equilibrium”. Thus, the buyer may believe that the price of an item to a *certain extent* is representative of the assortment price level. Quasi-equilibrium, then, will be achieved by a change in price evaluation, with or without an accompanying change in price image, but not resulting in a complete correspondence in value between the two elements (Fig. 7f).

Figure 7g illustrates the concept of price image as a complex variable, in which changes due to learning take place as the result of previous price evaluation. We may, for instance, as shall be done in our aggregate model, regard changes in price image as determined by the relative proportions over time of favorable and unfavorable price evaluations which are considered representative of the assortment price level. It would also be possible to adapt our model to include a feedback mechanism based on post-evaluation of prices by introducing cognitive dissonance into the analysis. Disequilibrium would then be viewed as leading to a search for price information on the item and/or assortment level that makes price image and price evaluations consonant (i.e. in equilibrium).

It is also possible that the price image of the individual buyer will be *directly* influenced by price information on the assortment level: (this will be treated more fully in Chapter 9) for example, “price image” advertising, when a firm claims that its prices in general are lower than the prices of competing firms but cites no item specific price information. This, then, could be viewed as a type of learning

Pricing from the point of view of the individual buyer

in which the buyer shows confidence in the general statements made by the firm and does not try to independently check these claims.

In practice, some elements of direct learning regarding price image will probably be present in most situations, but this does not in principle alter our discussion of price learning via interaction between the item and assortment levels of pricing, developed in this section. It merely means that another element of possible change in price image will be present, which, by directly influencing price image on the assortment level, may modify the results of learning via discrimination on the item level.

In our individual model I have dealt only with the psychological mechanisms implied. In our aggregate model I will try in a manner consistent with the functioning of our individual model, to consider the functional relationships over time between price evaluations and price image. I will do this by utilizing a modified stimulus-response model, which considers the aggregate buyer psychological implications to a firm of choosing different price-change strategies.

7.8 Price image viewed as attitude towards price on the assortment level

Price image could be defined as buyer attitude towards price on the assortment level.¹⁴ "Attitude", however, while being perhaps the most important concept in social psychology, is also one of the most elusive. Various writers have included in their definitions of attitude different dimensions of the psychological structure and processes of the individual. It is no easy task to isolate the elements of agreement and disagreement among them. Therefore, in the present study I have avoided the word attitude and chosen instead to speak of "price image", defined as buyer conception of price on the assortment level. Still, it would be interesting to try to compare the concept of price image used in this study with what would appear to be related dimensions of more general definitions of attitude, as developed in the psychological literature.

One point of view defines an attitude as "... an enduring organiza-

¹⁴ It is also possible to regard price evaluation as a more specific attitude towards price on the item level. This, however, would serve no essential purpose for our analysis and, therefore, will not be pursued in this discussion. I regard price evaluations as the elementary cognitive elements, the interaction between which over time tends to produce changes in the more complex concept, price image.

tion of motivational, emotional, perceptual and cognitive processes with respect to some aspect of the individual's world". (Krech & Crutchfield, 1948, p. 152.)

This multidimensional definition is very complex and consequently difficult to adequately reflect both in operational measurement and in theory development. Relative to more general definitions of the above type, price image may be viewed as a more specific concept, which emphasizes the perceptual and cognitive aspects of the above definition.

Consistency models of attitude change are based on cognitive elements. Since perceptual and cognitive processes are not easily differentiated, these models would appear to be more applicable to the type of "attitude" price image represents than to the type of attitudes the above, more general definition presupposes.

We are primarily interested in *changes* in price image, which makes models of *attitude change* particularly relevant to our purpose. The emphasis on how price image changes over time also makes attitude learning of primary interest to us. Fortunately, there is little if any controversy over the supposition that attitudes are learned as a result of previous experience (Doob, 1947, p. 135; Kiesler, Collins & Miller, 1969, p. 4.). Both cognitive and stimulus-response formulations of attitude change agree on this point.

If the present approach is compared to functional models of attitude development and change, the general function we are most concerned with is the "knowledge" function (Katz, 1960, pp. 175—176), or the somewhat similar "object appraisal" function (Smith, Bruner & White, 1956, p. 41). The former functional dimension refers to the individual's need for cognitive consistency and in this sense resembles the basic mechanism of equilibrium or consistency models of attitude change. The latter functional dimension emphasizes the aid in classifying objects which attitudes may provide.¹⁵

Two functional dimensions of price image are of particular importance to our analysis: (1) structuring of buyer expectations with regard to price on the assortment level; and (2) making possible generalizations by buyers from the assortment to the item level (i.e. from price image to price evaluations). The first dimension appears to provide an analytical bridge between our analysis and economic models dealing with "expectations". This term, as used by economists, appears to reflect considerations to some extent similar

¹⁵ For a comparison of functional models of attitude see Kiesler, Collin & Miller (ibid. Chapter 7, pp. 302—342).

to the psychological concept of attitude. Ozga (1965), for example, deals with the role of expectations in economic theory and defines "expectations proper" as:

"... attitudes, dispositions or states of mind which determine our behavior, or at least accompany it" (p. 23).

The second functional dimension makes possible an extension of our analysis to consider the effects of learning on price image. The concept of generalization is crucial to all learning theory approaches to attitude change (Kiesler, Collins & Miller, 1969, p. 94). In this connection it is also possible to view price image as an implicit mediating response, or intervening variable, which is learned in response to stimulus patterns (Doob, 1947, p. 136).

From what I have said in this section it should be clear that I do not find any one definition of "attitude" adequate or sufficient for our purposes. Instead, a number of different approaches stress the various aspects of interest to our study. Our definition, operational measurement and theoretical analysis of price image reflects this position, as will become clear in our subsequent analysis.

7.9 Price-quality relationships

As indicated in Chapter 2, much of the psychologically oriented work on pricing is concerned with price-quality relationships. The main hypothesis is that buyers often impute quality from the prices charged for items, and attempts have been made to develop psychological frameworks which consider this factor (cf. the discussion in Chapter 2, pp. 47—48).

One of the most interesting approaches was proposed by Stoetzel (1954), and further developed by Adam (1958) and Fouilhé (1960). The general idea in this work is that buyers have an acceptable range of prices which they are willing to pay for a certain commodity. Above the maximum price they will find it too expensive, while below the minimum they will believe it is of poor quality.

The price ranges are assumed to be different for different buyers, but by constructing curves of minimum and maximum prices for various proportions of buyers, the firm may select the price which the smallest proportion of buyers will find either too high or too low. Of course, this price is "optimal" only in the sense that it gives the largest number or potential buyers for the assumed curves. That the price ranges for given individuals will probably vary over time—for instance, when buyers acquire familiarity with the product and/

or as a result of the pricing strategies of competing firms—presents a complication difficult to consider in this type of analysis.

While this approach is intuitively appealing, I do not believe it is particularly valuable for our purpose. It would appear more useful for the study of pricing by manufacturers in the case of new items, if they are in a position to determine or at least influence retail prices. The sales of the items in question are then of main interest to the manufacturer when considering their prices while quality is an action parameter to the firm and difficult for buyers to estimate, except as a function of price.

But, when we view pricing from the retail firm's point of view and consider the assortment dimension of pricing, other considerations appear to be more important. First, buyers may judge quality not only from item prices but also by generalizing from their *quality images* of the assortment of the firm. At the same time, the firm may try to choose items the quality of which are consistent with its existing quality image, which in turn, should tend to lead to stable quality images and a relatively high tendency to generalize from quality image to quality evaluations of individual items.

If the assortments of firms do not vary, the buyers will probably often notice that quality does *not* change when price changes. Thus, in situations where price-changes are considerably more frequent than changes in assortment, it appears reasonable to assume that buyers do not normally associate price-changes with quality changes.

Obviously, this appears more likely in the case of established firms than in the case of new firms which have not yet established a distinct quality image among their potential buyers. In our own analysis, I assume that the competing firms are established in the sense that a majority of potential buyers have developed distinct images of the price and quality levels of the firms' assortments. This appears largely to have been the case in the empirical situation described in Chapter 8.

Thus, I assume that buyers are able consciously or subconsciously to rank both price and quality images for the assortments of competing firms, and that the combinations of rankings for each firm are important determinants of place of purchase for buyers. Generalization from price and quality images to price and quality evaluations of individual items are also assumed to take place under certain circumstances, especially when buyers have a low degree of item specific price and quality information for competing items and/or when interfirm product differentiation is relatively high.

Pricing from the point of view of the individual buyer

The combinations of price and quality evaluations are, in turn, assumed to be important determinants of the purchase decisions for individual items. As we assume that the assortments of competing firms do not vary and that buyers are relatively aware of this, buyers are assumed not to associate price-changes on the item level with quality changes.¹⁶ Quality images are also assumed not to change during the periods studied. This means that no interaction between price and quality on the assortment level is assumed to take place.

Given these assumptions, which appear fairly realistic in the situations we are interested in, it seems reasonable to assume that favorable changes in price image should increase the probabilities of buyers visiting the stores in question. Similarly, favorable changes in price evaluations should tend to increase the purchase probabilities of the items concerned. In neither case will these tendencies be offset by counteracting tendencies due to less favorable quality images and/or quality evaluations based on price-quality relationships.

7.10 Our buyer psychological model in relation to traditional microeconomic theory

Traditional microeconomic theory is by definition not concerned with buyer psychological variables. Therefore, it has little place or need for a concept of price image similar to that which I have introduced into my analysis. Consequently, generalization, as I have made use of the term, also is superfluous to this economic framework. Furthermore, there is no need in it for our second type of discrimination, i.e. that based on price-changes.

Microeconomic theory, when it assumes complete information and economic rationality, presupposes perfect discrimination by buyers with regard to the prices of individual items. Learning with regard to price, i.e. the formation of expectations based on previous experience, is of course not possible and can serve no function in a static economic framework.

The usual limitation of the economic theory of competition to single-product firms together with the above assumptions would

¹⁶ Schlackman (1969, pp. 169—171) reports that, in a British study of housewives' reactions to supermarket pricing, price-decreases were normally not associated with lower quality, especially not in the case of nationally advertised brands.

Pricing from the point of view of the individual buyer

appear to make the lack of realism particularly serious in retail applications, for which the theory was originally not intended. Thus, a buyer psychological extension of the type I have proposed in this chapter would seem especially desirable in the development of models intended to apply to retail situations.

8 Empirical data on the buyer psychological aspects of retail pricing

8.1 Introduction

This chapter is intended primarily to provide an empirical background for the buyer psychological model of pricing presented in Chapter 7. Little systematic empirical work has previously been reported in this area, and our aim, therefore, is to be explorative rather than conclusive. I hope to be able to give some empirical justification for our choice of theoretical structure in analyzing buyer reaction to pricing as a basis for future research.

The emphasis in this chapter, as well as in Chapter 7, is on buyer evaluations of price on the item and assortment levels and possible interaction between these two levels of pricing. Purchase behavior, while implicitly assumed to be a function of the intervening psychological reactions of buyers to pricing, is only indirectly considered, as, for instance, in the classification of different buyer categories.

According to our buyer psychological model, the individual buyer learns to discriminate between the assortment price levels of competing firms as a result of selective exposure to pricing stimuli on the item level, e.g. prices and price-changes, promoted in various ways, such as advertising or store displays. It is also possible that price image on the assortment level may be directly influenced, for instance, through "price image advertising". The buyer's price image of the assortment price level of a firm in relation to competing firms is assumed in our model to tend to change slowly over time as a result of discrimination on the item level of pricing and/or direct influence on price image.

As indicated in Chapter 5, I do not believe it is realistic to assume that buyers in our typical retail situation can calculate and distinguish between assortment price levels for competing firms with anywhere near the accuracy implied by direct applications of the traditional microeconomic framework to retail situations. Therefore, I do not consider it an adequate approach to try to account for differences in buyers' price images for competing firms merely, as a

result of buyers making calculations of relative assortment price levels, which accurately reflect their preferences and personal purchase patterns.

Instead, I believe, most retail situations are characterized by highly uninformed buyers. This, then, would make it virtually impossible for buyers to be rational in any strict economic sense, even if they want and try to be. In our own analysis, therefore, I have assumed psychological consistency rather than economic rationality on the part of buyers. It follows from this approach that the experiences and expectations of buyers, based on imperfect information of both past and future conditions, are considered important determinants of behavior. For instance, the price image a buyer holds regarding the assortment price level of a firm is assumed to reflect his general expectation with regard to how priceworthy, in lieu of item specific price information, he will find different items to be if he visits one of its stores.

All buyers are regarded as to some extent price sensitive, albeit in a psychological sense. Against the background of our analysis this means that the more favorable price image a buyer holds with regard to the assortment of a firm, the higher we may assume the probability to be that he will visit one of its stores for purchase purposes. In our model, price image may also influence buyers' price evaluations of individual items in purchase situations. The less item specific price information a buyer has with regard to a certain product, the greater we may assume the tendency for him to generalize from price image to price evaluations for the competing items. But, over a period of time price image is also assumed to depend on previous price evaluations. Based on experience, buyers are assumed to form expectations regarding the assortment price levels of firms, in other words learning is assumed to take place with regard to price image.

Of course, item specific price information, especially when promoted through advertising, may also influence buyers in their choice of purchase place. Due to retail complementarity and unplanned buying of other items, the influence of price-changes on certain items may then be accentuated, if they lead to a change in purchase place. But the importance to the firm of these types of "instantaneous economic effects", I believe, has been overemphasized by some retail analysts and perhaps also by many retail firms. Our analysis will focus on more lasting "psychological effects", via changes in price image, which may or may not work in the same direction as the above, more instantaneous economic effects of pricing.

Empirical data on the buyer psychological aspects

In Chapter 3 a number of operational measures of price-change strategies were developed, which I believe are also relevant for our psychological analysis of buyers' reaction to pricing. In our empirical application a number of differences between competing firms were observed with regard to these measures, which consider both the time and assortment dimensions of pricing. As noted in Chapter 2, at least two American studies, have also found considerable interfirm differences between competing food retailers along somewhat similar pricing dimensions (Cassady, Jr., 1962; Nelson & Preston, 1966). The differentiated view of retail food pricing which these empirical studies point to appears to lend interest to the type of analysis proposed in our study.

In the present chapter I report some data on the buyer psychological implications of pricing, which I believe lends further empirical interest to our analysis. Differences in pricing between competing firms, of course, say nothing as to the causes of any differences we may discover in the psychological reactions of buyers. But, if indications of buyer psychological differences consistent with the predictions of our model, also are found, this at least makes our analysis empirically interesting. It also provides a basis for formulating hypotheses for future work in the area.

The data reported in the present chapter refers to largely the same firms and to a similar competitive situation as the data on price-change strategies in Chapter 3. If, as I believe, the price image of the average buyer changes relatively slowly over time and, particularly, if, as there is reason to believe,¹ the *relative* pricing behaviors of the firms in question have not changed radically in the time interval between the studies, any empirical relationships we may find between the two series of data should still be of certain interest. (The data in Chapter 3 refer to 1961, the interviews, specifically made for the purpose of this chapter, were carried out in 1968.) Whatever the case may be in this respect, it is of independent interest for us to try to study whether buyers in a typical retail situation appear to have distinctive price images for competing firms, and also the extent to which their images for different firms appear to vary.

Important aspects in this connection are the degree of price consciousness buyers evidence, and also whether or not buyers believe they can discriminate with reasonable accuracy between the assortment price levels of competing firms. If buyers appear to be hardly

¹ Cf. footnote 2, Chapter 3, p. 52.

at all price conscious or do not believe they can distinguish between assortment price levels, our analysis naturally loses empirical interest. Price consciousness, on the other hand, need not imply price sensitivity, with regard to either choice of purchase place, or purchase behavior with regard to individual items. Instead, we may regard price consciousness as a necessary but not sufficient condition for price sensitivity.

Against the background indicated above, there are a number of empirically interesting research problems concerning buyer psychological reaction to pricing:

1. To try to establish in specific instances indications of possible inter- and intraindividual differences in price image for competing firms.
2. To try to estimate the extent to which buyers visit, or claim to visit, the stores of firms which they associate with a lower assortment price level than competing firms (i.e. for which they have a more favorable price image).
3. To try to estimate how sensitive buyers are to price evaluations when making purchase decisions for individual items, as well as to measure their "price evaluation sensitivity" with regard to place of purchase, which we view as "instantaneous economic effects" of pricing.
4. To try to establish any indications of possible interaction of a buyer psychological nature between the item and assortment levels of pricing.

Our empirical analysis will deal mainly with the subject area covered under points 1, 2 and 4. Most empirical analyses carried out so far with regard to buyer psychological reaction to pricing (e.g. price experiments, cf. Chapter 2) have been on the item level of pricing, covered under point 3. We will not concern ourselves much with this area. For our purpose I have made the reasonable assumption that a more favorable price evaluation increases the purchase probability of an item.

The type of survey data utilized in the present chapter is most suitable for exploring whether a problem is interesting enough to warrant further research. Ideally, hypotheses formulated on the basis of such explorative work should be made subject to experimental tests. The levels of analysis most interesting for our purpose are the assortment level and possible interaction between the assort-

Empirical data on the buyer psychological aspects

ment and item levels. While we will start with an analysis of the individual buyer, our ultimate interest is in the aggregate implications to competing firms of buyer reaction to pricing. Of course, experimentally controlled empirical studies on the aggregate level are much more difficult to carry out than if we were instead to study individual buyer reaction on the item level of pricing, as practically all price experiments so far have done.

Since more long-run psychological effects, which typically have been neglected by most analysts of retail pricing, occupy a prominent place in our framework, any empirical analysis whatsoever is, of course, extremely difficult to carry out for our purposes. I do not believe, however, that this is sufficient reason to neglect these aspects. It does mean, on the other hand, that our empirical analysis in this respect must be understood as representing a first attempt to introduce these relationships into a systematic analysis. It is not intended to establish empirical relationships over time between the introduced variables.

8.2 Empirical background

The interview study² concerning the buyer psychological aspects of pricing, was carried out in 1968, specifically to provide a basis for this chapter. It was based on a random sample of 60 households from a population of 508. This population consisted of families living close to Solna center. They could thus reasonably be assumed to be potential buyers of food merchandise in the competing stores in the center, which is a relatively isolated shopping area for food products. The situation closely resembles our typical retail situation. Four chains have stores very close to each other and to a food market. Three of the firms³ were represented in our empirical study in Chapter 3 where the price data refers to 1961.

The interviews, preceded by test interviews, were carried out from March 11 to April 12, with the member of each household chiefly responsible for food purchasing. Each home interview, covering 18

² While these interviews were initiated and planned to as closely as possible reflect the purpose of the present study, the data collection and initial analysis was independently carried out by Wiechel (1968). Most of the specific calculations on which the present chapter is based, however, were subsequently carried out by the present author. The interviews were carried out and the data analyzed essentially *after* the theoretical model in Chapter 7 had been developed.

³ These firms B, C and D are referred to by the same letters as in Chapter 3. F, and the food market, G, represent new firms.

Table 7. Price image ranking of stores by interview persons from 1 (most expensive) to 5 (cheapest).

Stores	1	2	3	4	5	Average rank	Mode
D			5	13	31	4.5	5
C			12	23	14	4.0	4
B		3	31	12	3	3.3	3
F	14	31	4			1.8	2
G	35	13	1			1.3	1

$w=0.73$. (Kendall coefficient of concordance)

questions, took on the average 45 minutes; the percentage completed interviews was 82 %. In this chapter I will include only results which are of main interest for our study.⁴

8.3 Price consciousness and price sensitivity

A filter question, No. 7, was used to check whether those interviewed thought that they could get more for their money by regularly purchasing in one store rather than in another. All respondents were of this opinion and were then asked to rank the five stores in declining order by price level (Question 8). Question 9 instructed them to indicate how much they thought a 100 Crs. purchase in the cheapest firm would cost in each of the other firms. To determine their degree of conviction with regard to prices they were then asked what they thought an expert would state on this subject (Question 10). Question 11 was intended to determine whether they had read about any impartial price comparisons with regard to food prices. The intention was to register possible outside influence on their evaluations, since the results of a number of such studies have been published in the Swedish press in recent years.

The response to Question 8 is summarized in Table 7. The "most expensive" store received an average rank of 1.3, the second 1.8, the third 3.3, the fourth 4.0, and the fifth 4.5. The coefficient of concordance is 0.73, which indicates high interindividual agreement with regard to rank order and also makes it reasonable to use the "average ranking"⁵ to summarize the data.

⁴ The interview questions and some results not given in this chapter are found in the Supplement to Chapter 8 (S. 8).

⁵ That is, the ranking obtained by summing all individual ranks.

Empirical data on the buyer psychological aspects

Table 8. Estimates by interview persons of how much a 100 Crs. purchase in the cheapest store would cost in the other stores.

Stores	Average	Coefficient of variation, %	Median
D	101.2	2.3	100
C	103.4	5.0	102
B	106.6	5.8	105
F	113.7	8.5	110
G	117.8	11.4	115

The conclusion seems to be that the subjects interviewed had quite pronounced opinions about relative differences in the assortment price levels of the firms with relatively little interindividual variation in rankings. This is the type of situation we have hypothesized, and while our interview study does not tell us anything about the causes of these differences, it contributes to making the type of analysis we have proposed empirically interesting to the extent we can generalize the results to similar situations.

Question 9 was aimed at establishing the magnitudes of the differences in assortment price level which the persons attributed to the different firms (i.e. the quantitative differences in price image). In Table 8 it is interesting to note the relatively large differences which were believed to exist between firms and also the considerable interindividual variations with regard to the magnitudes of the differences. These differences are substantially greater than the slight differences for the respective firms arrive at in 1966 in a large impartial Swedish study of retail food assortment price levels,⁶ although the ranking is the same for the Stockholm area as in our data.

As noted in Chapter 5, I regard such assortment price level measurements as of limited value, both for predicting buyer reaction to pricing and as an indication of the buyer welfare aspects of pricing.

One possible explanation of the similarity in ranking between our data and the SPK data is that the results of investigations of this type are widely published and discussed. It is interesting to note

⁶ The "price indices", as estimated by the Swedish Price Commission for May 31, 1966, for Firms B, C, D and F in the Stockholm area (city averages) ranged from 98—103 (P & K, 1966), compared to 101—114 for the buyer estimates in Table 8. The coefficient of variation was 1.8 % for the SPK data compared to 4.6 % for the buyer estimates. In the SPK study a majority of individual stores were grouped at 100. No comparable data is available for Firm G.

that 24 of the respondents in answer to Question 11 had some memory (19 of them specific, 5 vague) of having read about some impartial investigation of food prices. (Only one, however, specifically remembered the above most recent SPK comparison for Stockholm.) In addition there is, of course the indirect effect on price image through interpersonal influence that these investigations and other similar ones probably have had. In answer to Question 15, asking whether they had heard the opinion of any other buyer on food prices, all but nine stated they had.

When asked what they thought the opinion of an expert would be with regard to these price comparisons (Question 10), 24 thought he would arrive at the same conclusions as they themselves, 10 expected that the conclusions would be different, and 15 had no opinion. Three persons believed that an expert would arrive at smaller price differences. The degree of conviction with regard to the subjective estimates of the respondents thus appeared to be relatively strong.

In interpreting the above data it must be kept in mind that our questions are intended mainly to measure price image along one dimension. In our theoretical analysis this scale is referred to as favorable — unfavorable. In our interview study the subjects were asked both to rank the firms along an operationalization of this scale and to indicate how far apart the different rankings were on their subjective transformation to a monetary scale.

It would of course have been possible, and in future studies it may be desirable, to try to measure price image along many more dimensions. To a certain extent, however, we have indirectly considered other dimensions, for instance, in the question concerning what an expert would reply. This is also the case with Questions 4, 5 and 6. Thirty-eight of the subjects stated that they made purchases more often in one store than in any of the others, and of these nine did so in the store they believed to be cheapest. Of these nine, four made at least 90 % of their purchases there, and the other five, 60—80 % of their purchases.

In our model I have assumed that price image is important in the sense that (a) buyers believe they can estimate assortment price levels with reasonable accuracy, and (b) price image is an important determinant of their choice of place of purchase and also influences their price evaluations of individual items. Our data would seem to be quite consistent with (a), while it is more difficult to relate it to (b).

Table 9. Price images of loyal buyers.

	No. of buyers with price image of favorite store		
	Below median	Above median	Total no.
Relatively loyal ¹ buyers	16	8	24
Very loyal ² buyers	10	1	11
Total no.	26	9	35

¹ 6—8 purchases out of ten in favorite store.

² 9—10 purchases out of ten in favorite store.

For both categories of loyal buyers the hypothesis that they have a more favourable price image for their favourite store, (the store most frequently visited) than other buyers is confirmed (.05 level).

Clearly, price image is not of dominating importance in choice of purchase place, which would have been highly surprising. Nevertheless, loyal customers had a significantly more favorable price image of their favorite store than less loyal customers. (Table 9). This, of course, says nothing about what causes what; do loyal customers tend to develop more favorable price images, or do more favorable price images lead to greater loyalty?

The answers to Questions 13, 14 and 23 are also of interest in this connection. With regard to Question 13, 41 persons stated that they believed it was worthwhile to visit several stores on one purchase trip because of price differences, while eight said they did not believe it was worthwhile. This could be interpreted as an indication that the former persons did not think that they could completely generalize from their price images to all price evaluations. Instead, due to perceived price differences between competing items inconsistent with the price images of these buyers, discrimination on the item level was considered worthwhile, at least in some instances.

The latter persons, however, would appear to be less inclined to believe that discrimination on the item level is worthwhile and, therefore, would likely be more inclined to generalize from their price images to price evaluations. The relatively small number of persons in the latter group as compared to the former makes it rather uninteresting to determine whether our data is consistent with this hypothesis. Future research might well be devoted to studying aspects of this type.

That price consciousness may not necessarily lead to high price

sensitivity is illustrated in the answers to Question 14. Only 20 of the 41 who thought it worthwhile to visit different stores stated that they also do so. This may be used as an indication of relatively low price evaluation sensitivity with regard to choice of place of purchase.

That this sensitivity may vary as a function of the pricing strategies of the firms is evident in the answers to Question 17. Only nine stated that they buy more in stores other than their usual one when special prices are advertised, while 23 stated they did not, and 17 had no opinion. It would appear that special prices are regarded with more suspicion than ordinary prices, which is hardly surprising. It would also seem likely that they are viewed as less representative of the assortment price levels of firms than ordinary prices.

The answers to Question 23 illuminate another aspect of pricing of interest to our analysis of factors influencing price image. In Chapter 3 I stated that I believe that it is desirable to arrive at a more differentiated view of retail pricing than traditionally has been the case. It is possible, for instance, that flexibility of pricing may influence price image more or less independent of changes along other dimensions of pricing, e.g. magnitude of price-changes. In Chapter 3 we noted in our data considerable interfirm variation with regard to flexibility of pricing, with regard both to total price-changes and price-increases and price-decreases.

It is interesting to compare this with the fact that 27 persons thought that it is cheaper to make purchases in stores which often change their prices, while two felt that it is more expensive, and 20 could see no difference. This points to the hypothesis that flexibility of pricing in itself creates a tendency to a more favorable price image, at least in a situation where the buyer cannot distinguish between the relative frequency of price-increases and price-decreases.

In reply to Question 24, which asked whether they believed certain of the stores change price more often than others, 40 replied "Yes" and 9 "No". Of the 40, 38 stated that this was true of Firm C, 1 answered Firms C and B, and 1 answered Firm G (Question 25).

We might expect those who answered "Cheaper" on Question 23 and "Yes" on 24 to have a more favorable image than the average buyer for the Firm mentioned in response to Question 25. The average price image for Firm C among the 21 persons filling this triple requirement, however, is 103.0, which is very close to the value for the total sample (103.4).

8.4 Possible interaction between the item and assortment levels of pricing

We will now turn to the question of whether our data give any indication of possible interaction between the item and assortment levels of pricing. Our analysis will be carried out against the background of the psychological model of buyer reaction to pricing presented in Chapter 7.

In Question 12 the subjects were required to compare, without being given any price information, 16 products. For each product and firm they were told to indicate by plus if the respective item was expensive, minus if it was cheap and 0 if in between. They were also asked to state the difference, in hundredths of a crown, between the cheapest and most expensive item for each product.

In order to determine whether the data is consistent with our buyer psychological model of buyer reaction to pricing, non-parametric statistical techniques were used. The reason for this is that the price evaluation data is measured along an ordinal scale.

To begin with, the intraindividual variations in the rankings of the 16 products were measured by estimating Kendall's coefficient of concordance (w). If an individual tends to generalize from his price image to price evaluations of individual items, this coefficient, which may vary from 0—1, with 1 signifying complete agreement, and 0 random variation, should take on relatively high values. We may also test whether different values of w are significantly different from 0 at specified levels (.01, .05). The higher the value of w , the more confidence we may have in the estimate of the "true" ranking, which the order of the sums of ranks for all products indicates.

If this "average" rank closely corresponds to the individual's price image ranking of the assortment price levels of the competing firms, the data is consistent with a high tendency to generalize from price image to price evaluations. It also, of course, is consistent with the hypothesis that the individual has a high tendency to discriminate, and that the results of discriminating consistently correspond to his price image ranking. For various reasons, however, this latter hypothesis seems rather unlikely in most instances.

To begin with, if we assume that price evaluations are based largely on item specific price information in the form of prices and price-changes, we typically find considerable variation between firms for different items. We cannot normally expect one firm to be consistently lower or higher in price than other competing firms, nor can we

Table 10. Intraindividual variation in price evaluation rankings for different products.

Interview person No.	w	s	Interview person No.	w	s
1	0.74	.01	26	0.31	not s
2	0.67	.01	27	1	.01
3	0.76	.01	28	0.51	.05
4	0.91	.01	29	0.59	.01
5	0.62	.01	30	0.40	.05
6	0.50	.05	31	0.86	.01
7	0.41	.05	32	0.30	not s
8	0.52	.01	33	0.35	not s
9	0.73	.01	34	0.68	.01
10	0.61	.01	35	0.87	.01
11	0.68	.01	36	0.99	.01
12	0.31	not s	37	0.52	.05
13	0.72	.01	38	0.70	.01
14	0.58	.01	39	0.56	.01
15	0.61	.01	40	0.27	not s
16	0.41	not s	41	0.56	.01
17	0.51	.01	42	0.56	.05
18	0.73	.01	43	0.82	.01
19	0.38	.05	44	0.56	.05
20	0.63	.01	45	0.58	.01
21	0.72	.01	46	0.32	not s
22	0.72	.01	47	0.34	not s
23	0.32	not s	48	0.70	.01
24	0.45	.01			
25	0.72	.01	Average	0.59	

w: Kendall coefficient of concordance.

s: Significant at indicated level.

48¹ sets of rankings

31 significant .01 level

8 significant .05 level

9 not significant .05 level

¹ 1 person did not carry out the price evaluation rankings.

expect price-increases and price-decreases to be distributed so that price evaluations based on discrimination with regard to price-changes will consistently tend to have the same rank order as price images, for all products (cf. Chapter 3). And even if we make the unlikely assumption that the pricing strategies of competing firms

Empirical data on the buyer psychological aspects

Table 11. Correlation for each individual between price image ranking and "average" price evaluation ranking.

Interview person No.	r_{s_1}	r_{s_2}	s	Interview person No.	r_{s_1}	r_{s_2}	s
1	0.98	0.97	0.05	26	0.90	0.90	0.05
2	1	1	0.01	27	0.95	0.95	0.05
3	0.90	0.90	0.05	28	0.98	0.97	0.05
4	0.98	0.97	0.05	29	0.88	—	not s
5	0.90	0.89	not s	30	0.98	0.97	0.05
6	1	0.94	0.01	31	0.90	0.89	not s
7	0.95	0.95	0.05	32	0.88	—	not s
8	1	1	0.01	33	0.98	0.97	0.05
9	0.95	0.95	0.05	34	0.95	0.95	0.05
10	1	1	0.01	35	0.98	0.97	0.05
11	0.90	0.9	0.05	36	0.88	—	not s
12	0.90	0.89	not s	37	0.78	—	not s
13	0.98	0.97	0.05	38	1	1	0.01
14	0.98	0.97	0.05	39	0.88	—	not s
15	0.90	0.90	0.05	40	0.70	—	not s
16	0.80	—	not s	41	1	1	0.01
17	0.90	0.90	0.05	42	1	1	0.01
18	0.90	0.90	0.05	43	0.98	0.97	0.05
19	0.95	0.95	0.05	44	1	1	0.01
20	0.98	0.97	0.05	45	0.88	—	not s
21	0.88	—	not s	46	0.90	0.90	0.05
22	1	1	0.01	47	1	1	0.01
23	0.98	0.97	0.05	48	0.88	—	not s
24	0.90	0.90	0.05				
25	0.98	0.97	0.05	Average	0.93	—	0.05

10 significant 0.01 level

25 significant 0.05 level

13 not significant 0.05 level

48 observations

r_s : Spearman rank correlation coefficient for each individual between price image ranking and "average" price evaluation ranking.

r_{s_1} : No correction for ties.

r_{s_2} : Correction for ties.

s : Significant at indicated level.

"Average" ranking: ranking obtained by summing all individual ranks.

are uniform in these respects, it is still unrealistic to assume perfect buyer price information on the item level.

In our interview situation, the respondents had no direct access to item specific price information. If we find high values of w and also

Table 12. Interindividual variation in price evaluation rankings for each product, and average correlation for all individuals, between price evaluation ranking and price image ranking for each product and individual.

Product No.	w^1	r_s	Number of significant r_s	
			5 % level	1 % level
1 Oranges (a)	0.69	0.78	24	
2 Broiler (a)	0.63	0.73	18	
3 Sausages (a)	0.59	0.71	14	
4 Pork chops (a)	0.62	0.73	12	
5 Green peas, canned	0.57	0.66	14	
6 Yellow onions	0.41	0.55	9	1
7 Liver (a)	0.69	0.79	20	
8 Bread, loaf	0.45	0.56	13	
9 Wasa hard bread	0.33	0.45	13	
10 Butter	0.36	0.40	10	
11 Eggs	0.51	0.64	11	
12 Flounder (a)	0.62	0.70	11	2
13 Cheese (a)	0.64	0.74	16	1
14 Milk	0.29	0.34	6	
15 Flour	0.42	0.55	14	
16 Beer (a)	0.45	0.53	13	
Average for all products	0.52	0.62		
Average for frequently advertised products	0.62	0.71		
Average for infrequently advertised products	0.42	0.52		

(a): Frequently advertised products.

w : Kendall coefficient of concordance (interindividual variation in price evaluation rankings for each product).

r_s : Spearman rank correlation for each individual and product between price evaluation ranking and price image ranking, average value for all individuals.

¹ The below values of w are significant on the 1 % level for all products (chi-square test).

high correlations between “average” price evaluation rankings and price image rankings for individuals, the most reasonable explanation, against the background of our model, is that they show a strong tendency to generalize, which is what we predicted for situations of this type in our discussion in Chapter 7.

Empirical data on the buyer psychological aspects

In Table 10 we find that w is significant at the .01 level for 31 out of 48 individuals and at the .05 level for eight more. The average value is 0.59. This apparently justifies comparing the "average" price evaluation rankings of individuals with their price image rankings. In order not to inflate the correlation values, I will include rankings for which w is not significant at the .05 level.

Table 11 shows the Spearman rank correlation coefficient for each individual between his price image ranking and "average" price evaluation ranking for all products. We see that the correlation between the pair of rankings is in 10 cases significant at the .01 level, in 25 cases at the .05 level, and in 13 cases not significant on the .05 level, when corrected for ties. This correction has been made when the value is significant without considering ties, since the effect of ties is to slightly deflate the value of w . In most of the insignificant cases the values are very close to being significant at the .05 level.

Our data on intraindividual variation in price evaluation rankings for different products compared to price image rankings is thus quite consistent with the hypothesis that potential buyers, at least in situations where no item specific price information is directly available, tend to show a high degree of generalization from price image to price evaluations. The agreement is considerably closer than would be expected from random variation.

In order to gain more information on possible interaction between the assortment and item levels of analysis, the interindividual variation in price evaluation rankings for each product was also estimated (Table 12). The Kendall coefficient of concordance ranged from 0.29 for milk to 0.69 for oranges and liver. Since tables were not available, when the number of ranked items is less than 8, for testing the significance of 48 sets of rankings, a chi-square test was used instead (Siegel, 1956, p. 236). The value of w was significant at the .01 level for all products with this test. This, then, supports the hypothesis that the 48 rankings, for each of the 15 products, are not what would be expected from random variation.

It is interesting to try to study whether this data is consistent with a strong tendency for individuals to generalize from their price images to price evaluations of individual items, as our data analysis up to now seems to indicate. One admittedly rough test⁷ is to compare

⁷ This test will be strengthened, however, by comparing the results with the rank correlations between price image rankings and price evaluation rankings for individual buyers, averaged over products. Cf. the following discussion.

the interindividual variation in price image rankings ($w = 0.73$, Table 7) with the variation we have found in the price evaluation rankings for products (Table 12). If the values are substantially higher or lower for the price evaluation rankings, the data would appear to be more consistent with a relatively high tendency to discriminate on the item level, than to generalize from the assortment level to the item level.

In the former case, for products with w -values close to 1, the discrimination could be based on a common underlying information set, i.e. equivalent perception by all individuals of prices and/or price-changes on the item level. In the latter case no such common basis for discrimination would be possible. According to our previous discussion we would also expect differences between products due, for instance, to the frequency of their being advertised or to the degree of interfirm product differentiation. Eight of the 16 products were of the frequently advertised type; the others had been infrequently advertised by the firms during the weeks preceding the interviews.

Table 12 shows a considerable variation in w between products. The advertised products show almost consistently higher values, with an average of $w = 0.62$, compared to 0.42 for those infrequently advertised. This, of course, could be due either to their having been frequently advertised or to some other factor which covaries with advertising frequency.

Such a factor could be product differentiation. Indeed, one of the main reasons for advertising certain products rather than others is probably that they are more differentiated, i.e. more difficult for buyers to evaluate. It is difficult to classify the 16 products according to degree of product differentiation. A satisfactory classification should be based directly on buyer reaction. But it would seem intuitively likely that the eight frequently advertised products, among them pork chops, oranges and fish, are more differentiated than the eight infrequently advertised, among them milk, butter and flour. If this is the case, the difference in w between the two groups of items could well be largely due to a greater tendency to generalize with regard to price image for the more differentiated group (cf. Chapter 7).

Tendencies towards discrimination based on advertised item specific price information should conceivably be less intense than tendencies to generalize in our interview situations. Not all buyers regularly read food advertisements (cf. the answers to Question 16),

Empirical data on the buyer psychological aspects

and different products are usually advertised by different firms in any given week. Information from price advertising, therefore, would usually be insufficient to allow discrimination between firms based on the prices of competing items. Information on store prices would normally also be required.

The values of w for advertised products (0.62 average) are sufficiently close to the value of w for the interindividual variation in price image rankings (0.73) to apparently reasonably well support the hypothesis that buyers show a relatively strong tendency to generalize from price image to price evaluations. This tentative conclusion receives further, stronger support, from the relatively high Spearman rank correlations (r_s) between price image rankings and price evaluation rankings for individuals, averaged over frequently advertised products (0.71 average).

Against the background of the preceding discussion, the average values of w and r_s (0.42 and 0.52, respectively) for infrequently advertised products, which possibly also are less differentiated, are more surprising. The data in this case does not indicate as high a degree of generalization as for the advertised group of products. Nor is it consistent with a high tendency to discriminate from a common underlying information set, which would require values of w close to 1.

However, the data does support the hypothesis that with regard to infrequently advertised products some individuals tend to generalize more while others rather tend to discriminate. A closer visual inspection of the data supports this line of reasoning. The group of infrequently advertised products is made up to a large extent of almost identical competing items (milk, flour, butter, eggs, etc.). These are items on which competing firms, for competitive reasons, tend to have closely corresponding prices and price-changes. Therefore, individuals who discriminate in the case of these products would, in general, appear to be better informed and to behave more in accordance with what is expected of them in most microeconomic models than individuals who tend to generalize indiscriminately.

Both traditional microeconomic theory and price decision makers in many retail firms evidently utilize a model of the buyer, which in the case of identical competing items and with regard to individuals who tend to discriminate, seems quite appropriate against the background of our analysis. Our empirical data, however, seem to indicate that, at least in our experimental situations, many individuals never, and most individuals only seldom, tended to react in a

manner reasonably consistent with such a model of buyer behavior. This appears quite natural against the background of our discussion in previous chapters.

8.5 Consistency of evaluations with actual prices

At this point it might be argued that the price evaluation rankings by buyers should be compared with the "true" rankings of prices prevailing at the time. For several reasons such an analysis is of limited interest to our purpose and has therefore not been attempted.

To begin with, in many cases it is difficult to determine to which items the true prices should refer, since only the products, not the items, were specified in most of the price comparisons in Question 12. Each individual was allowed a certain freedom in associating items with products. Those interviewed thus had to make subjective estimates of what they believed to be competing items. This is the type of reaction we wanted to elicit in view of our buyer oriented approach to pricing and in accordance with our definitions of item and product.

Furthermore, we cannot assume that the respondents had accurate price information regarding recent prices in all or even most competing stores. Most buyers claimed (Question 4) regularly to make their purchases in one store and only occasionally to visit other stores. And the price information usually found in advertisements or leaflets is a small, highly selective sample of store prices.

The relatively small values of w for those items easily compared and regularly purchased in substantial quantities (milk, flour, butter, etc.), in which instances buyers could be expected to be best informed about prices, illustrates this point. A contributing factor could be that item specific price information which influences price evaluations may well refer to prices months or even years ago. And, as has been noted, price variability in our typical situation is normally quite high, at least for many products.

Finally, in our buyer psychological model we have assumed that discrimination on the item level may take place based not only on prices, but also on price-changes. This leads to the hypothesis that normally at any given moment there will be no one "true" distribution of pricing stimuli on the item level but rather many possible distributions, which may individually and in combination influence the discrimination component of price evaluations. This could be

another reason for the relatively low values of w we have found for many products.

The possible interaction between price image and price evaluations and inter- and intraindividual variation with regard to these variables is of main interest to our purpose. I do not believe that it is a satisfactory approach (and this view is supported by our empirical analysis) to try to analyze possible differences in buyer reaction to pricing merely in terms of interfirm price differences on the item level at any one point in time. This is only one set of information usually emphasized in economical price studies, and in accordance with our stated aim I wish to consider also other sets of what I believe to be relevant information, such as the buyer psychological type of data on pricing discussed in this chapter.

8.6 Price advertising

In our analysis price advertising and other types of price promotion, such as store display of prices, are regarded as integrated aspects of pricing. Certain background information of interest to us in this respect is provided by the interview questions concerned with advertising.

One interesting, but very complex problem is the possible relationship between price advertising and price image. Do, for instance, individuals who read price advertisements for certain stores tend to have more favorable price images for these stores than do other buyers?

To begin with, only eight of those interviewed claimed never to read advertisements, while 20 said they read "somewhat", and 21 that they read "thoroughly" (Question 16). Of those who said they read "somewhat", five also said they compare advertisements, while 17 of those who said they read "thoroughly" claimed to make comparisons.

Question 17 gives us some information on the price evaluation sensitivity for advertised special prices with regard to choice of store. Nine persons stated that they more often buy in stores other than their usual one when special prices are advertised, 23 said they do not, and 17 had no response. The replies to this question thus seem to indicate rather low price evaluation sensitivity with regard to choice of store.

The answers to Question 19 and 20 give us information on whether those interviewed were aware of price advertising by the various stores as well as whether they read their advertising. Of the firms

included in our study, Firm C did most advertising in the daily press during a seven-week period around the time of the interviews, Firms B and F about half as much (in terms of advertising space), D sporadically with small advertisements, and G not at all.

The results were that 98 % were aware of Firm C's advertising, 78 % of B's, 31 % of D's and 88 % of F's. None believed that Firm G did any advertising. Eighteen percent stated that they did not read any of the advertising, and 6 % were uncertain. Seventy-one percent stated that they used to read Firm C's advertising, 49 % B's, 8 % D's and 49 % F's.

It is interesting to note whether the price image of a certain firm differs between those who claim to have read its price advertising and other buyers. Since most buyers claimed to have read Firm C's advertising while in the case of Firm D very few did so, we will restrict our attention to Firms B and F, for which approximately half of the persons claimed to have read the advertising in both cases. The average price image for Firm B among those who claimed to have read its advertising is 106.3, compared to 107.5 for those who did not. The equivalent figures for Firm F are 114.4 and 113.5. As we can see, the differences are negligible. Even if we had found differences, they could not, of course, have been attributed to the advertising. It would have been just as possible that differences in readership were caused by differences in price image as the other way around.

In Section 8.4 we discussed price advertising in relation to price evaluations on the item level of pricing. As noted in that connection, half of the products chosen in our study were of the frequently advertised type, while the other half were infrequently advertised. Here we shall make some additional comments on possible direct effects of advertising on the item level of pricing.

Question 12 asked the respondents to state not only whether competing items were cheaper or more expensive in the various stores, but also the price difference for each product they believed existed between the cheapest and most expensive store. In our calculations these differences are expressed as percent of the estimated average store price⁸ at the time for each product, in order to make comparisons between products more meaningful.

If we compare the average differences for frequently advertised and less frequently advertised products with regard to persons who claimed to read advertisements "thoroughly" on the one hand, and

⁸ Somewhat arbitrarily chosen (cf. the previous discussion 8.5).

Empirical data on the buyer psychological aspects

Table 13. Comparisons between frequently and infrequently advertised items with regard to differences in buyer estimates of percentage differences in price between competing items (for different levels of advertising readership).

Level of advertising readership	Frequently advertised items				Infrequently advertised items				
	1	2	3	4	1	2	3	4	
Product No.	Buyer estimates of percentage differences in price between competing items				Product No.	Buyer estimates of percentage differences in price between competing items			
1	16.4	17.9	30.0	22.8	5	8.1	8.5	10.6	11
2	4.8	11.1	7.0	14.0	6	7.5	5.3	6.6	12
3	5.6	2.9	6.2	8.6	8	5.6	4.3	3.0	8
4	5.8	6.9	5.0	9.8	9	4.1	2.6	1.2	5
7	6.6	6.9	6.2	10.9	10	1.9	1.3	0.6	1
11	5.1	4.7	5.2	7.9	13	1.3	1.1	0.6	2
12	7.8	15.6	6.0	16.6	14	4.4	5.1	0.6	6
16	3.4	3.6	2.2	4.9	15	9.1	6.2	2.0	8
Average	6.9	8.7	8.5	11.9	Average	5.3	4.3	3.2	7

Buyer estimates of percentage differences in price between competing items	Level of advertising readership			
	1	2	3	4
Average for all products	6.1	6.5	5.8	9.5

those who claimed to read them “not at all”, or “somewhat”, we would expect differences between the two groups if, indeed, price advertising directly affects price evaluations.

Quite naturally, stores can usually be assumed to be lower, or at least no higher, in price on items which they price-advertise than competing stores who do not advertise competing items.

Therefore, it is a reasonable hypothesis that interview persons who claim to read advertisements thoroughly and compare prices should, as a result of discrimination on the item level, attribute greater percentage differences between stores to frequently advertised products than to those advertised infrequently, and that the differences between the averages for these two groups should tend to be greater than the corresponding differences for persons who claim to read price advertisements not at all or less thoroughly.

Table 13 compares these differences for four levels of advertising

Table 14. Price image differences for different levels of advertising readership.

Level	Price image differences ¹	No. of respondents
1	28.0	8
2	47.3	15
3	34.2	5
4	47.6	21
Total		49

¹ Average, on each level, of the sum of deviations in price image from 100 for each interview person for all stores.

readership: (1) those who claimed to read "not at all", (2) those who claimed to read "somewhat", (3) those who claimed to compare but not read thoroughly, (4) those who claimed both to compare and read thoroughly.

We can note from the data that for each level of readership the average perceived price difference for frequently advertised products is considerably greater than for infrequently advertised products. That even those who claim not to read price advertisements believe that differences in price are greater for the type of products frequently advertised compared to those infrequently advertised is consistent with our previous assumptions that buyers tend to discriminate more, and store pricing tend to be more uniform for the latter type of products. Stores do not normally advertise that they sell, for instance, milk or butter at about the same price as their competitors, although this generally is the case.

For our purpose, however, it is particularly interesting that the differences between perceived price differences for advertised versus less advertised products in our data apparently increase with the extent to which interview persons claimed to read price advertisements. This is consistent with a greater tendency for buyers to discriminate in the case of price evaluations on the item level when exposed to item specific price information in the form of price advertising, if, as appears likely, firms usually advertise relatively low prices and/or price-decreases.

Another interesting question is whether those whom we have classified as reading advertisements more thoroughly tend to believe that greater differences in assortment price levels between firms

Empirical data on the buyer psychological aspects

exist than do those who have been classified as reading less thoroughly or not at all. Again, this tells us nothing about causal relationships, but it may help in formulating hypotheses if we find differences in our data.

Table 14 shows the average sum of the deviations in price image for each of the four levels of advertisement readership. If we compare those who claim not to read price advertisements with those who do in various degrees, we can see that the former tend to believe that there are smaller differences between assortment price levels than do the latter. With regard to different levels of price readership, however, the tendency is not clear. Levels 2 and 4 show almost exactly the same figures, while level 3 shows a smaller figure but still larger than level 1.

If we instead look at the differences in price evaluations for the four levels of advertisement readership (Table 13), we find that there is little difference in the average price spread for all products between the first three levels (6.1, 6.5, 5.8 % respectively), while the fourth level has a considerably higher average (9.5 %).

Thus, on the assortment level we find a pronounced difference between those who claim not to read advertisements and those who claim to do so to some extent. On the item level, however, the most pronounced difference instead seems to be between those who read thoroughly and those who read somewhat or not at all.

This is consistent with the reasonable hypothesis that discrimination on the item level, based on item specific price information found in advertising, requires thorough reading if the generalization effect is not to dominate in the case of these price evaluations. According to our model, changes in price image may, however, take place directly on the assortment level in the absence of item specific price information, and it is therefore not surprising that we find the biggest differences in this respect between those who claim not to read advertisements at all, and those who claim to do so to some extent.

The answers to Questions 18, 21 and 22 give us some information on how the respondents experienced the type of advertisements used by the 3 stores who advertised frequently. In answer to Question 21, 51 % stated that they found the advertising of a particular store especially price attractive, and of these, 88 % specified Firm C, while 8 % mentioned Firm F (Question 22). It is of some interest to note whether there are any differences in price image for Firm C between those favoring C's advertisement in this respect and other buyers. The average price image for the former group is 104.2, while it is 103.4

Table 15. Pair-wise comparisons between the advertisements representing firms B, C and F.

Advertisement pair No.	Combinations		
	<i>C—B</i>	<i>C—F</i>	<i>B—F</i>
1	8— 7	6—12	4—12
2	12— 3	10— 8	5—11
3	8— 7	12— 6	7— 9
4	9— 6	9— 9	8— 8
5	11— 4	8—10	9— 7
6	9— 5	11— 7	12— 4
7	13— 2	11— 7	8— 8
Total	70—35	67—59	53—59
No. of persons favoring the advertisements for one firm more often than for the other	11— 4	12— 6	7— 9

A advertisements representing A.

B advertisements representing B.

C advertisements representing C.

We see e.g. that of the 15 persons comparing *C* with *B*, 8 preferred *C* and 7 *B* in pair no. 1. We can also see that out of the 105 comparisons between *C* and *B* for all pairs *C* was preferred 70 times and *B* 35 times. Out of the 15 persons comparing *C* to *B*, 11 favoured *C* more times than *B*, while 4 preferred *B* more times than *C*.

for all others. This difference is so small that is negligible.

To permit a more detailed analysis with regard to buyer preferences for the price advertising of different stores, a number of paired comparisons were carried out (Question 18). Twenty-one advertisements from shortly before the interview study, seven each from Firms B, C, F, (the sets of advertisements are denoted *B*, *C* and *F* in the following) were made anonymous by excluding the names of the firms and simplifying the lay out. The items and price information, however, as well as the basic lay out were retained. Three advertisements, 1 from each set, are shown in the Supplement to Chapter 8.

Each respondent was randomly assigned one of the three possible combinations of pairwise comparisons between anonymous advertisements (involving 7 pairs of advertisements) and asked to state

which advertisement in each pair they found most price attractive. The results are shown in Table 15.

In these comparisons *C* was favored over *B* and *F* (11 out of 15 persons in the former case, 12 out of 18 in the latter), but not as overwhelmingly as in the answers to Question 21, where the respondents were asked to directly judge the firms with regard to their advertising. The comparisons between advertisements *B*, *C* and *F* in Table 15 are transitive; *C* is preferred to *F* and *B*, and *F* is preferred to *B*. The advertisements representing Firm *C* were more distinctive than those representing Firms *B* and *F* (as is the case also with the original advertisements), and it would appear likely that they were more often identified with the firm they actually referred to.

This could be part of the reason why the difference between advertisements *C* on the one hand and *B* and *F* on the other is considerably greater than between *B* and *F* (as measured in Table 15). The advertising of Firm *C* seemed to have been associated with priceworthiness to a considerable extent, both in response to the name of the firm and to the anonymous type of advertisements, *C*, used to represent Firm *C*'s advertising in our survey.

If the respondents to a large extent identified the anonymous advertisements used to represent all three firms and then tended to generalize a great deal from their price images to the priceworthiness of the advertised samples of items, the differences between the advertisements representing Firms *B* and *F* should have been considerably in *B*'s favor instead of slightly in *F*'s (cf. Tables 8 and 15). Thus, at least in the comparisons between advertisements *B* and *F* it appears likely that the interview persons attempted to discriminate between the advertisements on the basis of the item specific price information they could derive directly from them. To the extent that the advertisements, *C*, were not identified with the Firm *C*, the hypothesis that buyers attempted to discriminate on the basis of item specific price information would appear likely with regard to these advertisements also.

It is therefore interesting to discuss on what basis discrimination between advertisements *C*, *B* and *F* may have taken place on the item level. Since competing items only seldom were involved in the pairwise comparisons of advertisements, the item specific price information found in these advertisements would in most cases be insufficient for discrimination on the item level with regard to the price levels of competing items. The difference between the re-

sponses to advertisements *B* and *F* is relatively small, as noted above, and not what would be expected if generalization from price image dominated to a high degree. With regard to number and type of items in the various advertisements, *B* and *F* were quite similar. On the average, an advertisement in *B* contained 15 items and in *F* 19 items; the layout, however differed somewhat (cf. the sample advertisements in the Supplement).

The differences between advertisements *C*, on the one hand, and *B* and *F* are more substantial. The average number of items in an advertisement in *C* was considerably greater, (average $N = 40$) which, in itself, may well have created a tendency for the advertisements to be judged more priceworthy. But advertisements *C* also offered information on previously charged prices for approximately half of the items. Price-decreases were stressed with regard to these items, and discrimination with regard to previous prices charged by the store should have been greatly facilitated by this information.

Advertisements *F* provided information on previous prices for a small number of items (0—4 per advertisement), while advertisements *B* contained only information on price levels for items and did not indicate that price-changes had taken place. Thus, the difference in *B*'s favor, between buyer responses to advertisements *B* and *F*, contrary to what would have been expected as a result of identification and generalization, may well have been at least partly a result of more favorable price evaluations for items in advertisements *B*, based on discrimination with regard to previous prices, carried out on the basis of the information on price-decreases provided in advertisements *B*. The somewhat larger average number of items in advertisements *F* (19 compared to 15) may possibly also have contributed to the difference.

8.7 Non-price image

We have up till now in this chapter concerned ourselves only with price conceptions, in line with the main emphasis of our study. However, certain data concerning aspects other than price were also obtained in our interview study. These results will be discussed in the present section. Similar to generalization from price image to price evaluations, we may assume that buyers generalize from quality image on the assortment level to quality evaluations of individual items. Interfirm quality comparisons on the item level, except in the case of identical items, are conceivably more difficult for buyers to

carry out than are price evaluations. One reason for this could be the multidimensional nature of perceived quality; another, the frequent lack of detailed quality declarations for different items. Both these factors should tend to increase the tendency for buyers to generalize from quality image to quality evaluations, i.e. from the assortment to the item level. They should also tend to increase the importance of generalization in the case of quality conceptions relative to its role in price conceptions.

To simplify the analysis in our study the assumption has been made that there is no interaction between different images, with regard to price, quality, service, etc., on the assortment level. This assumption does not in itself entail that price conceptions may not influence quality conceptions for buyers. It merely limits possible price-quality associations to the item level. But, as has been discussed in Chapter 7, I believe that in the situations of interest to us it is reasonable to assume also that price-*changes* on the item level are not normally associated by buyers with quality-*changes*.

As in the case of price image, it would be possible in a straightforward extension of our analysis to regard quality image as being learned as a result of quality evaluations on the item level. In our partial analysis no such learning with regard to quality is, however, assumed to take place. Non-price aspects other than quality, e.g. service, are assumed to be operative only on the assortment level, and no such learning based on interaction between the assortment and item level may then take place in our analytical structure.

The buyer is assumed to weigh his price image of a firm against his non-price image(s) in his choice of purchase place and to choose the one for which he finds the combination of images most favorable. He is also assumed to weigh together price and quality evaluations when making purchase decisions. Interaction between the assortment and item level, due to generalization with regard to price and/or quality, may be more or less influential in these processes, according to our previous discussion. Since in our theoretical analysis only the pricing strategies of firms are assumed to vary, and price conceptions both on the item and assortment level are assumed not to influence quality conceptions, quality or other non-price variation is not considered by us in this context. However, certain background information on non-price aspects of retail competition is also of interest for our purpose and has therefore been collected in our interviews. No distinction between the various non-price aspects is maintained in this connection.

Table 16. Non-price image ranking of stores by interview persons from 1 (most favorable) to 5 (least favorable).

Store	Rank					Average rank	Mode rank
	5	4	3	2	1		
D	21	17	7	3	1	4.1	5
B	9	12	12	10	6	3.2	4—3
C	6	11	15	9	8	3.0	3
G	13	5	11	6	14	2.9	1
F	0	4	4	21	20	1.8	2
	49	49	49	49	49		

$w=0.26$ (Kendall coefficient of concordance)

The answers to Question 26 give us some information on non-price images. The respondents were asked how they would rank the five stores if they had identical prices. It is interesting to note that in spite of the intentionally somewhat vague formulation of the question, there is considerable interindividual agreement ($w = 0.26$, significant .01 level, Table 16). The agreement, however, is considerably less than the corresponding agreement with regard to price image rankings ($w = 0.73$, Table 7). This is hardly surprising when we consider the no doubt greater difficulties for those interviewed to conceptualize and operationalize the response to Question 26, the probable multidimensionality of the underlying concept, and also the probably substantial interindividual variation in preferences with regard to the evoked dimensions.

What is surprising is that the variation in rankings is not greater, especially since no comparable impartial measurements of assortment quality levels have been published, as has been the case with regard to assortment price levels. It is also possible that the stabilizing influence of interindividual communication is less with regard to quality image than with regard to price image.

It is interesting to compare the "average" ranking for all individuals with regard to price image, (Table 7) with the corresponding ranking of non-price image (Table 16). We find that while Firm D has the most favorable price image, it has the least favorable non-price image. Firm C would appear to have the most favorable combination of price and non-price image (ranked second with regard

to price image, third-ranked with regard to non-price image, although very close to second-place). Firms B and G would appear to have the least favorable combinations.

8.8 Comparisons with other studies

In this section the results of our interview study will be compared with some results of four other interview studies also concerned with the retail pricing of grocery products. Two of these were carried out in Sweden, one in England, and one in the U.S.A. Reference was made to all four of them in Chapter 2. Two of these studies, Wikström (1960) and Gabor and Granger (1961), deal mainly with price consciousness on the item level; the other two, Brown (1969) and the Swedish Price Commission study (SPK, 1969), are concerned with price consciousness on the assortment level and are, therefore, more interesting for the purpose of studying price competition between competing retail firms.

Wikström interviewed housewives in Gothenburg in 1957, Gabor and Granger, Nottingham housewives in 1958. Brown's report is based on interviews with consumers in five cities in the U.S.A. The SPK investigation was carried out in Kristianstad in November 1968 and March 1969. In most instances random sampling was employed, and the completion rates varied from 64 % to over 80 % (compared to 82 % for our random sample).

The studies by Wikström and Gabor and Granger were, as indicated above, mainly concerned with the degree of price consciousness displayed by buyers on the item level of pricing. To a certain extent attempts were also made to ascertain how correct this information was. In both cases it is concluded that the degree of price consciousness, as defined and measured, appeared to be relatively high, considerably higher than expected. This is similar to the results reached in our own study, thus providing further indication that our basic assumption of relatively price conscious buyers is realistic, at least on the item level in food retail situations.

In her main investigation Wikström found that about 1/3 of the buyers interviewed gave the correct price, 1/3 the wrong price (or the price could not be checked), while 1/3 gave no price at all, with regard to a recently purchased brand of cocoa or detergent, selected by the person interviewed. Thirty-nine percent of those interviewed claimed to be aware of price variation between stores, and it appeared that about 50 % had attempted to make interstore price

comparisons. Twenty percent stated that their choice of purchase place for this item was influenced mainly by consideration of its price. This gives us an indication of the degree of price evaluation sensitivity with regard to choice of purchase place for this item. As would be expected against the background of our own analysis, it appeared to be relatively low, but not insignificant.

Gabor and Granger in their interview study defined price consciousness as the percentage of prices remembered for items purchased within the last seven days, regardless of whether the price was correct. Fifteen grocery items were checked. They concluded that price consciousness in this sense was considerably higher than expected. Prices were given for 82 % of purchases mentioned, but the variation between commodities was considerable (63 %—95 %). A rough attempt was made to check the accuracy of the prices given for seven of the items. (Special prices were not considered, and list prices were assumed to have been followed in the stores.) They concluded that at least 57 % of the prices given were correct.

Both these studies of price consciousness are mainly concerned with the item level of pricing and do not give us much information on the assortment level. We do not, for instance, gain any information as to what extent those interviewed believed they could estimate and discriminate between assortment price levels for different stores.

These two studies are of particular interest against the background of our discussion of generalization and discrimination in Chapter 7. In that connection we assumed that to a considerable, but varying extent, buyers attempt to make price comparisons between firms on the item level. Our own interviews indicate that this is a reasonable assumption, and it receives further support from these studies. The variation in reported item specific price information for different products in the Gabor and Granger study is consistent with the findings of our own analysis.

The studies by Brown and the Swedish Price Commission are of more direct interest to us, since they are more directly concerned with price competition between firms. The data on assortment price levels is of special interest to us, whereas no data on the item level of pricing is found in these studies.

In Brown's report assortment price levels for competing food stores are ranked by buyers living in the center of a circle of such stores. These rankings are then compared to market basket indexes, based on 80 identical items, the prices of which were weighed to reflect consumption patterns. Special prices, when applicable, were consider-

ed. The resulting "objective" measures of assortment price levels are, of course, subject to the limitations noted in Chapter 5 and should be judged accordingly.

The correspondence⁹ between buyer "price perceptions" (assortment price level rankings or, in our terminology, price images) and "price reality" ("objective" assortment price levels) was almost perfect in one community, very low in three communities and intermediate in one community. Half of the respondents stated that they usually made price comparisons via advertisements, while an additional 1/4 said that they sometimes did. (In our interview study 84 % claimed to read food advertisements, and 45 % to make comparisons between advertisements.)

Thus, price image in these instances may well have been substantially influenced by advertised prices. Of course, these prices need not reflect the overall pricing of the firms in question, which may well have contributed to the low correspondence between the two sets of data. In other words, it is possible that the price image sensitivity of advertised prices and price-changes was greater than for those not advertised.

SPK in their interview study also tried to study the correspondence between their measurements of assortment price levels in November 1968 and rankings by buyers this same month with regard to their price images of these levels. About 25 % of those interviewed had ranked the stores in the same order as SPK's measurements, 15 % did not give any rankings, while the rest gave rankings which differed from SPK's result. Only those who claimed to patronize more than one of the relevant stores were included in these figures.

When asked what they had based their estimates of assortment price levels on, somewhat fewer than two out of three respondents stated that they had compared the prices between stores for certain items and generalized from these prices to assortment price levels. Somewhat more than one out of ten claimed to have compared the total outlay for a basket of items, for instance, a weekly purchase, for two or more stores. More than one-third were of the opinion that a certain store had so many special prices that it was cheaper. Finally, about one-third said they had received selective price information from leaflets, advertisements, etc., on which they had based their opinion.

Thus, only about one-tenth claimed that they had even *tried* to

⁹ Measured by the coefficient of determination. Store rankings were transformed to an interval scale (*ibid.*, p. 187).

react in a manner reasonably consistent with what is usually assumed in economic models of buyer behavior, while two-thirds or more claimed that they had reacted in a manner which apparently conforms more closely to a psychological model of buyer behavior, such as that developed in our study.

Only 6% stated that they had visited different stores in March 1969, compared to November 1968, as a result of special prices. Thus, in this study, too, price evaluation sensitivity with regard to place of purchase appeared to be low. This also indicates that the instantaneous economic effect of price-decreases, due to retail complementarity, in these situations may well be of relatively small importance to the firms compared to more long-run psychological effects, which is one of the hypotheses in our own study. It is also interesting to note that only 7% stated that distance was an important factor, while 11% claimed that price was an important factor.

8.9 Summary of Chapter 8

The interview study reported in this chapter was carried out to provide an empirical background for the buyer psychological model developed in Chapter 7. One of the fundamental assumptions underlying this model is that buyers are relatively price conscious on both the item and assortment levels. In spite of the difficulties in making price comparisons in retail situations, due to product differentiation and informational limitations, most persons interviewed appeared to be quite price conscious on both levels. They also appeared to believe to a large extent that they were successful in making reasonably accurate estimates. By and large they seemed to hold distinct and varying price images of the assortments of competing stores, with little interindividual variability. The interindividual variability with regard to non-price images was considerably higher, as might be expected.

When making price evaluations on the item level, without access to item specific price information, buyer responses were largely consistent with our discussion of generalization and discrimination in Chapter 7. This was particularly the case in our intraindividual analysis, where price evaluations correlated strongly with price image, i.e. buyers appeared to show a strong tendency to generalize from the assortment to the item level. The results were less clear in our interindividual analysis for different products, but the analysis in this respect leads to a number of interesting hypotheses for future testing.

Empirical data on the buyer psychological aspects

Information is also gained on a number of other pricing aspects of interest to our study, e.g. price advertising and store loyalty. As a whole the results of our interview study would appear to make the type of analysis proposed in our study empirically interesting with regard to buyer psychological reaction to pricing.

The results of four other studies, two of them Swedish, are also of interest in this connection. In my opinion, they tend to support our proposed type of analysis. Price consciousness, both on the item and assortment level, is found to be unexpectedly high also in these related studies of retail food pricing.

There are also indications that the instantaneous economic effect of retail complementarity may not be as important in these situations as might be believed applying the reasoning of some retail analysts. This conclusion is based on the relatively low price evaluation sensitivity on the item level with regard to choice of store, which is indicated by the data. If this conclusion is valid, it would appear to increase the relative importance of the more long-run, psychological effects of pricing emphasized in our approach, but typically neglected in most models of retail pricing.

There would appear to be additional support in these other studies for the usefulness of the psychological mechanisms, generalization and discrimination, based on imperfect price information, in analyzing this type of situation. The data on buyer reaction to pricing, found in one of these studies in particular, appears to be easier to understand against the background of our psychologically extended model, than against that of more traditional economic models of retail pricing.

9 Towards an integrated economic and psychological framework

9.1 Introduction

In this chapter I will try to integrate and present in a common framework the different economic and psychological aspects of pricing discussed so far. In line with our main purpose I will resume the perspective of looking at the problems from the decision-making firm's point of view. I will explore the normative implications to the firm of buyer reaction to pricing, particularly with regard to price image learning. In Sections 9.2 to 9.5 we will be concerned with price image learning based on discrimination on the item level of pricing. In Section 9.7 the possibility of directly influencing price image on the assortment level through price promotion, e.g. price advertising, will also be considered.

The pattern of price-changes for a firm during a period has been defined as its price-change strategy. One possible strategy, of course, is not to change prices. In this chapter I will not consider discrepancies between the intended and realized price-change strategies of firms, due, for instance, to the effect of the organization on pricing. I will instead assume that actual price-changes carried out during a period are consistent with the pricing decisions made.

The operational definitions of price-change strategies developed in Chapter 3 will be referred to in the theoretical analysis in the present chapter. Examples of such dimensions are flexibility of pricing, pricing initiative, pricing independence and pricing response. All these variables consider the time dimension of pricing, stressed in our approach and refer to the assortments of firms rather than individual items. In Chapter 3 the methodology for studying these strategies was developed in detail and an empirical application was presented. Price promotion strategies are also considered in Chapter 9, although no substantial effort is made in our study to operationally define and empirically measure this aspect of pricing. A number of more specific aspects of pricing for instance the role of special prices,

traffic and unplanned buying will also be considered against the background of our integrated analysis. Extending the analysis to multi-store firms will be discussed as well as some buyer welfare implications of our extended analysis.

9.2 The implication to the firm of individual buyer price image learning based on discrimination on the item level of pricing. A modified stimulus-response formulation

In this section I will discuss the consequences of individual buyer price image learning based on discrimination on the item level of pricing from the point of view of the price-setting firm. A stimulus-response type of model will be employed to analyze the psychological implications to the firm of employing various price-change strategies. Within the general framework of such a model, which basically states that the response or behavioral variable is a function of one or more stimuli or environmental events, many specific assumptions are, of course, possible.

In our model of individual buyer learning changes in price image are assumed to take place continuously over time as a result of price evaluations, influenced by pricing stimuli, prices and price-changes, on the item level of pricing. To achieve analytical simplicity and greater operability, I will not distinguish between different degrees of favorable and unfavorable price evaluations in this formulation. Neutral price evaluations will be regarded as not affecting price image. Price evaluations not viewed by buyers as representative of the assortment price level of the firm are regarded as neutral in this connection. Since it is desirable that more recent price evaluations weigh more heavily than those more distant in time, I will use the following formulation of individual learning over time:

$$pi_t = \alpha \left(\frac{n_t^+}{n_t} \right) + (1-\alpha) (pi_{t-1}) + c \quad (9.1)$$

The above equation will be employed in our integrated analysis as a hypothetical formulation of how price image changes over time as a result of price evaluations, the mechanism of which has been viewed against a background of cognitive equilibrium in Chapter 7. pi_t stands for an index of price image at point of time t , n_t is the total

number of favorable and unfavorable price evaluations made during a visit to the firm, n_t^+ , the number of favorable price evaluations made during this visit, and c is a constant which refers to the influence of factors other than price evaluations on price image. Since changes in price image over time are emphasized in our study, this constant may be disregarded as its derivative is zero. In this formulation no direct influence on price image, e.g. due to price image advertising, is assumed to take place.

α is a parameter reflecting the rate of decay in price image over time ($0 \leq \alpha \leq 1$). The higher the value of α , the more the most recent price evaluations will influence present price image at any point of time; if $\alpha = 1$, only the most recent evaluations will be effective. The lower the value of α , the more previous price images will influence the present price image. Thus, if $\alpha = 0$, the price image at point of time t will be the same as that at $t-1$, i.e. the most recent price evaluations will not influence the present price image at all.

Thus, the above equation describes changes in individual price image as an exponentially smoothed function over time of price evaluations, which in turn are assumed to be a function of pricing stimuli, prices and price-changes, on the item level of pricing. At any point in time all past price evaluations will to some extent influence present price image (provided that $\alpha \neq 1$), but at a decreasing rate over time.

The basic mechanism of this model would appear to be consistent with the hypothetical process of learning, as assumed in most learning models and generally confirmed by experimental data. There are two reasons in our specific model for considering a rate of decay over time in learning. One, of course, is the process of forgetting over time. Secondly, if we assume some degree of price consciousness on the part of the individual, he should be aware, especially if frequent changes in price have taken place during his observation period, that more recent price evaluations are more representative of the *present* assortment price level than price evaluations further back in time, and that the former evaluations, therefore, should be given greater weight in estimating price image.

The buyer psychological dimension of pricing enters into this model in at least two ways. First, the parameter α reflects this aspect, as indicated above. Second, the set of price evaluations which at each specific visit becomes effective is assumed to depend on psychological factors. I will call the set of price evaluations at a specific

visit the "observation set" (s). This is a subset of the total set of possible price evaluations (S). This latter set is a function of the assortment set, and there is a one-to-one correspondence between them, since every item can be subjected to a price evaluation by a buyer at any visit to the store.

The probability of a stimulus element such as a price or a price-change leading to a price evaluation is assumed to depend both on item characteristics and on the price-change and price promotion strategies employed by the competing firms. In our analysis only pricing strategies are assumed to vary. By virtue of their influence over the probabilities of favorable or unfavorable price evaluations,¹ as well as the probabilities that stimulus elements will influence price evaluations in the observation sets of buyers, the pricing behaviors of firms, according to our analysis, directly influence the psychological reaction of buyers to pricing and indirectly also their purchase behavior. Price-changes on some items, for instance, are viewed as more likely to lead to price evaluations, which means that these stimulus elements will be more likely to influence price evaluations in buyer observation sets than price-changes on other items. Buyer psychological considerations such as selective attention, selective perception and other perceptive or cognitive limitations may also be viewed as influencing the probabilities of stimulus elements influencing price evaluations in buyer observation sets. This makes our model consistent with certain recent work in organization theory on individual decision making, and elements from this approach may be considered in applications of our model (cf. March & Simon, 1958; Cyert & March, 1963).

In the next section we will turn to the aggregate implications to the firm of price image learning over time, based on discrimination on the item level of pricing.

9.3 The aggregate implications of price image learning to the firm based on discrimination on the item level of pricing

In the transformation from individual buyer learning of price image to the aggregate implications of price image learning to the firm, I find it necessary to employ certain analytical simplifications.

¹ It would, of course, be theoretically possible, but operationally more difficult to weigh the relative influence of different price evaluations in changing price image.

To begin with, I have assumed in our analysis on the level of the individual buyer that changes in price image take place continuously over time. In our aggregate analysis I will instead assume that they take place in the transition from one short-run period, with regard to which the pricing strategies of the firms are defined, to the next short-run period. Thus, a discontinuous analysis is employed here with regard to the aggregate learning of price image by the combined customers of a firm.

I will carry out the transformation from the individual to the aggregate level in our theoretical analysis by referring to an assumed "average buyer". This, together with the time analysis employed, makes it analytically desirable to employ a concept involving the total number of favorable and unfavorable price evaluations which the average buyer makes during a short-run period, instead of referring to his observation sets for specific visits to the firm. I will call this period concept the buyer's "extended observation set".

It is now possible to extend Equation 9.1 to refer to the aggregate effect of price image learning to the firm.

$$PI_T = A \left(\frac{N_T^+}{N_T} \right) + 1 - A(PI_{T-1}) + C \quad (9.2)$$

PI_T now refers to an index of price image for the average buyer, N_T^+ is the number of favorable price evaluations made by the average buyer during the period T . N_T is the total number of favorable and unfavorable price evaluations during this same period. C refers on the aggregate level to the influence of other factors than price evaluations on price image. A is the value on the aggregate level of the parameter α .

This formulation is, of course, consistent with our model of individual learning of price image. We now achieve on the aggregate level exponential smoothing of "average" price image over a number of short-run periods. Thus, all the historical pricing strategies of a firm will with decreasing weight over time influence the firm's present aggregate measure of price image. $1-A$ may be said to refer to the stability of the firm's price image over time, i.e. its resistance to "stimuli-variation" due for instance to changes in the pricing strategies of the firm. The closer the value of this expression is to 1 (and subsequently α to 0), the more stable the price image will be.

By substituting *expected values* in the ratio of price evaluations, $\frac{N_T^+}{N_T}$ and measuring price image at the beginning of each period, it

would be possible to use the above equation to predict changes in price image due, for instance, to changes in price-change strategies. To do so, we may assume that the ratio is a function of the relative price-change strategy of a firm during a coming period and substitute in Equation 9.2:

$$\frac{N_{T^+}}{N_T} = f(PS_T) \quad (9.3)$$

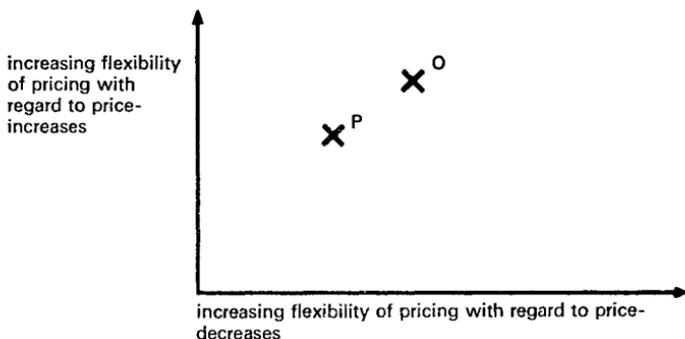
where PS_T is the *expected* relative price-change strategy of the firm during the coming period. In order to utilize this formulation, we thus must be able to anticipate competitive reaction to the price-change strategy employed. This aspect will be discussed further in Chapter 10.

It may now be assumed that variation in pricing, for instance, in the realized relative price-change strategy of a firm, leads to variation both in the *number* of elements in the extended observation set of its average buyer and in the *ratio* of favorable to unfavorable price evaluations in this set for the period in question. Increases in pricing initiative may, for instance, be hypothesized as leading to higher probabilities that the items on which the leading price-changes are carried out will be subjected to price evaluations, and, consequently, as increasing the expected value of N_T for the period. Increases in pricing initiative may also conceivably lead to tendencies towards a larger proportion of favorable to unfavorable price evaluations. Similarly, changes along other pricing dimensions, such as flexibility of pricing, pricing response, etc., may be assumed to influence in various ways the number of elements in the extended observation set, the ratio between favorable and unfavorable price evaluations and indirectly also price image. In our example in Section 9.4 I will make a number of such assumptions, which should be better understood against the background of the aggregate model of price image learning developed in this section.

9.4 An illustration of a simple strategy with variation only in flexibility of pricing

I will begin with flexibility of pricing and illustrate how a simple price-change strategy, varying along this dimension only, can be analyzed.² This discussion is intended mainly as an analytical sim-

² Thus, we assume that it is possible to vary the flexibility of pricing without any changes taking place along other pricing dimensions. In practice this would most likely be difficult, but not impossible to achieve, cf. the discussion in Chapter 3.



The point P refers to the price-change strategy of the firm with regard to the flexibility of pricing period 1, the point Q to the same in period 2

Figure 8. Varying the relative flexibility of pricing of a firm (expectation parameter)

plification to serve as a basis for the study of more complex price-change strategies, which consider variations along several dimensions of pricing. These latter strategies are empirically more interesting, but, of course, much more difficult to analyze.

A firm's relative flexibility of pricing, with regard to its assortment or some part of it, reflects the number of times during a specified period that a firm changes its prices, in relation to competing firms. It can be calculated either for price-increases, price-decreases or total number of price-changes regardless of sign. Relative flexibility of pricing, as well as the other relative dimensions of pricing previously defined, are thus functions of *both* what a firm does during a period *and* what its competitors do.

Figure 8 illustrates diagrammatically various combinations of relative flexibility of pricing for a firm with regard to price-increases and price-decreases. The higher the value on the vertical axis, the higher the relative flexibility of pricing for price-increases is during the period, and the further to the right along the horizontal axis, the higher the relative flexibility of pricing during the same period, with regard to price-decreases.

I will now assume that a firm during an initial period of time, say six months, has employed a price-change strategy which is characterized by the point P , with regard to the realized total relative flexibility of pricing. This thus indicates a fairly low value compared to competing firms.

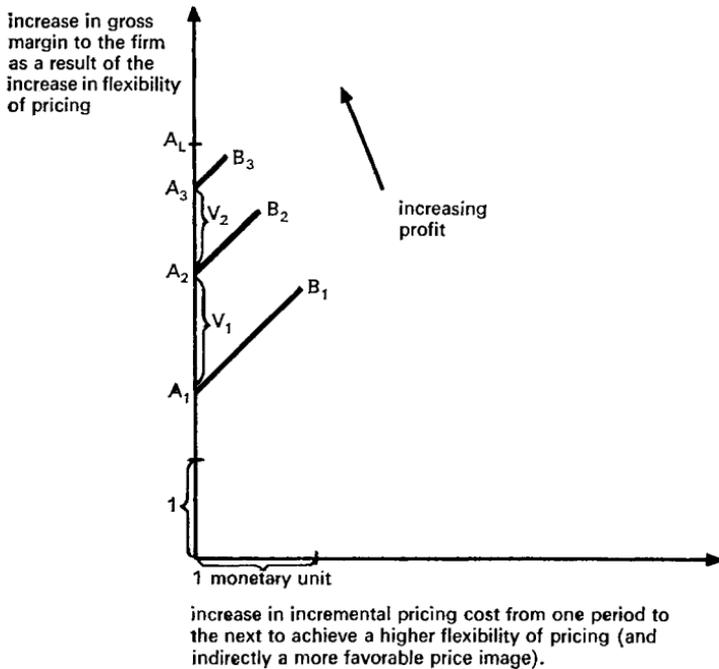
If we now assume that the monetary sales of the firm are a function of the price image of its average buyer and that this image is a

function over time of this buyer's price evaluations of individual items, according to our previous analysis in this chapter, our discussion can proceed as follows:

By increasing the number of price-decreases viewed as an action parameter in the next period, and hoping that competitors will not increase their corresponding number, the firm may hope to realize during this second time period a higher relative flexibility of pricing with regard to price-decreases (expectation parameter). If these price-decreases are made on such items in such ways that the price evaluations of buyers are primarily based on discrimination on the item level, we can assume according to our previous discussion, that the price image of the firm held by the average customer should tend to become more favorable over a period of time. Price-increases, on the other hand, are assumed to be made on such items and in such ways that they will not influence price evaluations. Price image sensitivity with regard to price-increases is thus assumed to be zero. This should, according to our assumptions, tend to lead to increased monetary sales for the firm in periods following that in which the favorable change in price image takes place. If the incremental costs of increasing the number of price-changes is less than the resulting increase in gross margin it should also tend to lead to increased profits. On the other hand, if the unit sales for the items, the prices of which are decreased, are insensitive to these changes in the short-run, the firm will experience an almost instantaneous tendency, in the same period that prices are decreased towards lower monetary sales, gross margin and profit.

To handle these two counteracting tendencies, with different aspects of timing involved, a combination of discontinuous and continuous analysis will be employed. To begin with, I will, as before, divide time into specific intervals, the lengths of which we for the moment will leave undetermined. Within each such period I will assume that the price image of the firm held by the average customer is constant, while it may change from one period to the next. I will further assume that *within* each period the only influence of price-changes on the sales of a firm is via the instantaneous, discrimination effects of microeconomic theory. This means that the price image sensitivity within each period for any price-change strategy is zero, while it may take on various values between periods.

Returning now to Figure 8 we shall assume that as a result of the price-decreases the firm expects a decrease in monetary sales and gross margin in the initial period due to an assumed short run in-



A_i-B_i isoprofit curve during period i (considering only instantaneous economic effects of pricing).

V_i psychological effect of change in price image on gross margin in the period, $i + 1$, following the period i in which the change in flexibility of pricing has taken place.

A_L limiting value, when the firm, *ceteris paribus*, can no longer increase its profit by increasing its flexibility of pricing.

Figure 9. Illustration of a simple strategy of increasing the flexibility of pricing

sensitivity of unit sales to price-decreases. In order to counteract this tendency the firm may decide also to increase the number of price-increases and to try to do this in such a manner that the decrease in gross margin due to the price-decreases, plus the incremental cost of the total increase in flexibility of pricing, will be made up by the increase in gross margin, resulting from the price-increases and an assumed short-run insensitivity of unit sales also for price-increases. Point Q in Figure 8 indicates the relative flexibility of pricing for the firm with regard to the second period for price-increases and price-decreases.

In terms of Figure 9 this means that the firm will, starting in the position A_1 , be able to move along the isoprofit curve A_1-B_1 , where each point indicates equal profit to the firm within the time

period. The arrow in the diagram points in the direction of increasing profits for subsequent isoprofit curves.

However, if the firm's expectations with regard to achieving a higher relative flexibility of pricing are realized, the firm may expect an improvement in price image from this period to the next with regard to its average customer. This will be the case if the firm has managed to make the price-increases in such ways and on such items that the price evaluations for the items involved are primarily a function of price image (generalization), and the price-decreases on such items and in such ways that the price evaluations are primarily a function of item specific price information (discrimination). The probabilities that price-decreases will influence price evaluations in observation sets and that the resulting price evaluations are viewed as representative of the assortment price level should also be high. From the firm's point of view the above may be expressed by saying that a positive price image sensitivity is desirable for the indicated price-change strategy.

A resulting more favorable price image will, according to our assumptions, lead to increased monetary sales, gross margin and profit in the period following the variation in price-change strategy. This is illustrated in Figure 9 by a jump to the point A_2 on the higher isoprofit curve A_2B_2 . In the following period the firm may be able to repeat the process and jump to A_3 , etc.

Ceteris paribus it would seem to be reasonable to assume that each repetition will lead to decreasing returns, tending toward a limit A_L somewhat higher than A_3 . In the same manner, it would seem that the isoprofit curves for each period should tend to become shorter, i.e. that the firm would have less latitude for increasing its relative flexibility of pricing within a period without experiencing a loss of profit during this same period. This could be the case especially if the firm initially had a relatively low total relative flexibility of pricing during the preceding period. Hypothetically, when the firm tries to increase its flexibility of pricing in the manner indicated above, it will become more and more difficult to do so without arousing negative customer reaction to price-increases, with a resulting decrease in sales due to instantaneous economic effects.

In other words, a short-run insensitivity of unit sales to price-changes may be assumed to turn to sensitivity when we exceed certain threshold limits with regard to frequency and magnitude of price-changes. (In our initial, simplified analysis we are concerned only with the frequency of price-changes.)

Similarly, it may be assumed that the influence of increased relative flexibility of price-decreases via changes in price evaluations in changing price image which we have attributed to learning also tends to become less, as does perhaps to an even greater extent the influence of changes in price image on monetary sales. The highest marginal increases may well tend to occur when the price image of a firm initially does not differ substantially from the price images of competing firms; successive favorable changes in price image would then tend to be progressively less attractive to the firm due to the decreasing returns with regard to sales and profits.

9.5 Extending the analysis to more complex price-change strategies

In order to illustrate the main line of reasoning, and to allow a relatively simple discussion of the implications to a firm of varying its price-change strategy, the preceding discussion was limited to variation along one dimension only, flexibility of pricing. I will not attempt to analyze any more partial strategies with regard to other dimensions of pricing, even though this could, no doubt, be done in a similar manner. Instead, I will try to indicate how the effects of a more realistic pricing strategy with variation in several pricing dimensions could be analyzed. As pointed out in Chapter 3, a firm would probably have great difficulty in actually realizing independent variation of one dimension at a time, even if we, in our analysis of relative strategies, assume that competing firms do not change their absolute strategies.

It would appear that the application of mathematical programming is analytically suited to this problem, as we have introduced various restraints: economical, with regard to sales and profit, and psychological, with regard to buyer reaction. I will not try to develop such an approach mathematically, but shall merely indicate the general direction.

The magnitude of price-changes could be introduced into the analysis in the following way: the firm is assumed to vary its absolute flexibility of pricing³ with the restriction that price-increases must never be more than a certain percentage of the initial price, and price-decreases never less than a certain percentage. Ideally, of course, these percentages should vary for different items. We make

³ Which, of course, given the absolute price-change strategies for competing firms, also determines its relative flexibility of pricing.

this extension of the simple case, to begin with, because we must somehow introduce the magnitude of price-changes as well as their frequency into a more realistic analysis. Furthermore, empirical evidence points to the existence of psychological thresholds with regard to minimal changes required to produce buyer reaction (cf. Behrend, 1966, p. 288).

We could also introduce similar restraints with regard to the maximum relative and/or absolute flexibility of pricing allowed on price-increases and the minimum with regard to price-decreases—considerations which could also be based on estimates of psychological thresholds with regard to buyer perception and reaction to pricing stimuli.

Another important dimension of pricing, namely, pricing initiative, can also be introduced into our analysis rather easily. We may do this by assuming that a price-change has a greater effect on price evaluations, and thus, indirectly, on the learning of price image, if it precedes rather than follows similar changes by competing firms. If follows, then, that price-decreases are more favorable to a firm if initiated by it and price-increases more unfavorable, which would seem to be a realistic assumption with regard both to what firms in general believe and buyer reaction to price-changes.

9.6 Price-changes versus price levels

Our approach to and analytical treatment of pricing emphasizes the importance of price-changes, relatively independently of item and assortment price levels. In Chapter 5 I have indicated in a theoretical analysis how the analysis of price-changes may be extended to consider price levels also, but our analysis of the consequences to the firm of different pricing practices has been mainly concerned with the patterns of price-changes, not the levels of prices.

There are several reasons for this choice of focus. First, we are primarily interested in the competitive behavior of competing firms in relation to each other as well as relatively short-run changes in this behavior. The main interest is not in studying hypothetical, long-run equilibria with regard to relative price levels. Thus, initial price levels are regarded as given, and our attention is focused on how different patterns of price-changes (and price promotion) may *change* the relative competitive situations of competing firms in terms of buyer reaction, and on the resulting economic implications for the firm studied.

Secondly, I have previously argued that there are certain factors in our type of retail situation which appear to emphasize the role of price-changes, more or less independently of price levels. Buyers' interfirm comparisons of the prices of competing items are, for instance, made difficult by the relatively high degree of product differentiation, which also makes it difficult in many instances for buyers to determine *what* items compete with each other in the assortments of competing firms.

The normally large number of items in the assortments also makes it psychologically difficult for buyers to remember and compare prices. With regard to assortment price levels, the calculations of which ideally require the weighing together of individual prices, comparisons between firms based on discrimination on the item level apparently becomes overwhelmingly difficult.

This, of course, does not mean we can leave price levels out of our analysis completely. Firms can, for instance, conceivably vary their promotion of price levels and thereby change their competitive situation.

An interesting question in this connection is whether it is more profitable for the firm to concentrate on a passive price-change strategy, involving, among other things, a relatively low flexibility of pricing, than it is to try to achieve a more active price-change strategy, involving for instance a higher flexibility of pricing. In the former case price promotion might involve claims of relatively low item and assortment price levels; the latter strategy might stress price-decreases.

The economic implications to buyers, measured by period assortment price levels, could well be the same in both cases. Complete price level equilibrium between two firms is possible during a period, even if one firm has employed a relatively active strategy, concentrating on price-changes, and the other a relatively passive one, concentrating on maintaining stable price levels.

Buyer reaction to these different pricing strategies could, however, be quite different. If we assume that buyers cannot estimate assortment price levels accurately and allow for imperfect price information on the item level, the effects on price evaluations (and subsequently on price images) of the two strategies could easily be substantially different.

We cannot, employing our analysis, say a priori which type of pricing strategy in a specific situation will be most influential in favorably changing price image. The possibility of significant dif-

ferences is, however, in itself of enough interest to warrant empirical investigation.

One aspect important to the firm, of course is, the relative incremental costs of achieving a certain favorable increase in price image by concentrating on price levels versus price-changes. In the former case higher costs might be incurred in price promotion, for instance, in price advertising. In the latter case the total cost of, for instance, remarking prices would probably be considerably higher.

From the point of view of effectiveness in favorably changing price image, relative to cost, I hypothesize that the success of more active price-change strategies, involving more frequent price-changes, will depend more on skill than the success of more passive price-change strategies. The uncertainty with regard to results may conceivably also be greater in the former case.

The organization of the firm will probably also play an important role in this connection. Successful active price-change strategies will probably require greater organizational flexibility and better communication of price-changes within the organization than successful passive price-change strategies concentrating on price levels.

In Sweden at the present time the implications of price-change strategies concentrating on price levels versus price-changes, both to firms and to buyers, is of great empirical interest. Some firms, often for ideological reasons, e.g. co-operative firms, emphasize price levels in their advertisements, while other firms emphasize price-changes.

It would appear likely, but by no means certain, that the relative price-change strategies of the latter firms also are more active, involving for instance higher relative flexibility of pricing and higher degrees of pricing initiative. Whether the absolute period assortment price levels of these firms also tend to be higher and monetary sales and/or profits greater is a highly interesting empirical question.

9.7 The role of advertising strategies

Our study is concerned only with advertising strategies dealing with price. Against the background of our psychological analysis we may distinguish between two such types of advertising strategies:

1. Advertising strategies focusing directly on prices and price-changes for individual items (item specific advertising); and
2. Advertising which refers directly to the assortment price level of

a firm and tries to create the impression that a certain firm is in general cheaper than competing firms (price image advertising). We may study the former type of advertising strategy using the methodology described in Chapter 3. For instance, do firms employ different price-change strategies with regard to advertised items compared to items not advertised?⁴ Do firms usually aim at and realize higher relative flexibilities of pricing with regard to these items? And, do they typically decrease prices when the items are advertised and increase prices again when they are no longer advertised? With regard to "special prices" with specified short duration, e.g. one week, this is normally the case. But is it also the case with regard to advertised items when no open statement is made by the firm that the lower prices are intended to apply only during limited periods of time?

Other interesting questions in this connection are whether the degree of pricing initiative for a firm tends to be higher for advertised items, as might be expected, and whether the degree of pricing response also tends to be higher. The degree of pricing dependence could also be expected to be higher for advertised items (due, for instance, to greater oligopolistic interdependence with regard to price-changes) than for non or less frequently advertised items.

An interesting question with regard to the economic implications of pricing to buyers is whether the degrees of price level equilibrium between competing firms are greater for advertised items than for non-advertised items. If this is the case, and buyers take the prices of advertised items as representative for the assortment price levels of firms, as our psychological model in Chapter 7 and the empirical data in Chapter 8 indicate they may do, their price images will reflect the prices of advertised items to a greater extent than the prices of other items in the firms' assortments. Price images will, then, be more favorable for firms with relatively high assortment price levels if they advertise relatively low prices than would be the case if buyer price images were based on price evaluations for all items in their assortments, and not mainly on price evaluations for advertised items.

Item specific price advertising by firms will be regarded in our analysis as intended to directly influence future price evaluations in

⁴ Retail firms typically do not advertise the same items as competing firms. They apparently try to avoid this, which is quite natural against the background of our discussion (cf. the Supplement to Chapter 3, S.3.5).

a favorable direction for the firm. This type of advertising is thus assumed to operate through the discrimination effects of pricing, and, consequently, the strategic problem to the firm lies in selecting and emphasizing certain subsets of its total assortment in its pricing strategy. According to our analysis favorable price evaluations over a period of time will also tend to favorably affect the price image of the firm, albeit indirectly.

The second type of advertising, price image advertising, does not involve emphasizing the prices and/or price-changes for individual items.⁵ Instead, it is aimed *directly* at creating the impression among buyers that the assortment price level of a firm is lower than the corresponding levels of competing firms. In our model this amounts to trying to influence price image on the assortment level without initially influencing price evaluations on the item level.

In Sweden especially the co-operative stores, part of whose stated goal it is to maintain a low and stable assortment price level, have practiced price image advertising. Their statement in connection with labor wage increases in 1969, that they will not raise prices, with the implicit supposition that competitors will increase prices as a result of this cost, may be regarded as a type of price image advertising. Advertisement of an annual dividend to members on all purchases may also be seen as a type of price image advertising.

Whether or not the actual pricing by firms, as measured along the dimensions utilized in our study, are consistent with their price image advertising is, of course, an interesting empirical question. Or, in other words, are the economic implications of pricing to buyers reasonably consistent with the price image advertising of firms? (cf. the discussion Chapter 5.)

From the point of view of the firm the choice of advertising strategy also involves consideration of effectiveness in relation to costs, if the firm is interested in trying to maintain or increase its profit. The instantaneous effects of different types of advertising on sales and profit may be quite different from the more long-run implications, which greatly complicates the analysis.

Price image advertising conceivably may be less influential in the short run and more influential in the long-run. Against the background of our model, changes in price image will tend to influence sales of the whole assortment during relatively long periods of time,

⁵ In extreme cases it may even involve avoiding marking and displaying item prices in the store, as well as avoiding their advertisement. One such instance was reported to the author in an interview.

while such item specific advertising, which does not indirectly influence price image, is assumed to be effective only on the item level for the duration of the advertising.

Favorable price evaluations, if not viewed by the buyers as representative of the assortment price level, will be considered in our analysis to influence only the sales of the items *in question* until reevaluation of their prices takes place. Such reevaluations may be expected to take place quite soon with regard to advertised items, since their prices are often lowered for the periods in which they are advertised. Many buyers also suspect that advertised prices are "special prices" even if not advertised as such, and that these prices will be shortly raised again.

The incremental costs of price image versus item specific price advertising should, of course, also be considered by the firm in its choice of advertising strategy. In addition to the advertising cost itself, item specific advertising will, if it involves more frequent price-changes, also incur other costs, e.g. costs of remarking prices, which may be substantial.

The question of whether price image or item specific advertising is more effective in changing price image takes on added interest against the background of modern research on communication effects (Cohen, 1964, p. 6—8). Should the firm concentrate on telling buyers that its assortment price level is low compared to the price levels of competitors without citing evidence, or should it merely advertise the prices of specific items and let the buyers draw their own conclusions about assortment price levels? This seems closely related to the question whether implicit or explicit argumentation is more effective in changing attitudes. More recent research indicates that no general conclusion to this problem exists. Instead, either type of argumentation may be more effective, depending on the circumstances.

If we assume for the moment that price image advertising leads to changes in price image, while item specific advertising leads only to changes in price evaluations for the items advertised, an interesting question is whether price image advertising tends to become more attractive to the firm than item specific advertising when the number of items in its assortment increases.

A tendency in this direction would appear to result from the fact that the number of items to which generalization from price image may take place increases. On the other hand, the immediate effect of item specific advertising in attracting customers to the store for

the specific purpose of purchasing these items may be greater than the immediate effect of price image advertising in drawing customers to the store. This, then, would apparently create a tendency for the relative attractiveness of item specific advertising to increase in the short run when the number of items in the assortment increases.

Hypothetically, this could be due to a "traffic effect", i.e. customers when in the store tend to purchase other items as well (retail complementarity and unplanned buying). The larger the number of items in the assortment, the smaller the proportion of items specially priced and advertised conceivably would need to be to make possible an attractive advertisement.

Thus, when the number of items in the assortment increases, there would appear to be a more long-run tendency favoring price image advertising, and a more short-run tendency favoring item specific advertising, given the assumptions I have made above. Of course, this does not imply that either type of advertising is more efficient per se, it merely indicates how the relative attractiveness to the firm of one type of advertising over the other may change when the number of items in the assortment increases.

In the discussion in this section I have assumed that advertised prices are followed in the store. In practice this is not always the case, especially with regard to multi-store firms, for instance, when joint advertising is carried out by different stores in a chain. (cf. Alderson, 1963, p. 4.)

In order to simplify the discussion I have also assumed that either price image or item specific advertising takes place in isolation. In practice, of course, a firm may combine the two types even in the same advertisement and make both a general statement about assortment price level while also giving item specific price information. However, recent food advertising in the Stockholm area has quite often been concerned with one or the other type in isolation, and one type usually dominates in specific advertisements.

9.8 The role of special prices and traffic in our analysis

This section contains some additional comments on "special prices" and "traffic", which often seem to create analytical difficulties for retail analysts. I do not view these aspects of pricing as inconsistent with our general approach or, for that reason, warranting special attention. The importance usually attributed to these factors in our

typical retail situation, however, merits some discussion of how they fit into our general framework of pricing.

Special prices refer to prices which are lowered for limited periods of time, often one week, and usually advertised and displayed as special bargains. These open statements represent an alternative to the strategy of lowering prices and hoping that buyers will discover this fact themselves, without being told directly. The distinction between explicit and implicit strategies, which we have discussed in connection with price advertising (Section 9.7), thus would appear to be relevant also in this connection. Against the background of our buyer psychological data and psychological analysis of buyers reaction to pricing, it is reasonable to hypothesize that implicit strategies are more effective than explicit strategies in changing price image, while explicit strategies are more likely to directly and immediately influence price evaluations for the items of which the prices have been changed. Since more long-run psychological effects are much more difficult to measure than instantaneous economic effects, it is not surprising, if the above hypothesis holds true, that retail firms in our situations apparently favor explicit strategies, e.g. special prices, over implicit strategies, which involve reducing prices without special promotion.

From the buyers' point of view, it would appear from our discussion of price image learning based on discrimination on the item level of pricing (Sections 9.2—9.3) that greater instability of prices, due, for instance, to special prices, should also tend to lead to unstable price images, and to make accurate buyer price learning more difficult. The tendency towards unstable price images should, however, be weakened to the extent that buyers do not view price evaluations of items specially priced as representative of assortment price levels. It should, however, be noted that instability in price image, according to our analysis, should tend to be greatest for radical *changes in relative pricing strategies*. For instance, a change from an active to a passive strategy⁶ should hypothetically cause greater in-

⁶ Hypothetically, the ratio $\frac{N_T^+}{N_T^-}$ (Equation 9.2) should be most stable over time when a firm continues a passive strategy over a number of periods, less stable when a firm continues an active strategy, and least stable when a firm changes from a passive to an active strategy. The argument to this effect is based on the reasonable hypothesis that generalization from existing price image is relatively most important in the case of passive strategies, while discrimination is most important in the change from passive to active. In the continuation of an active strategy generalization should be relatively less important than in the former case but more important than in the latter case.

stability than the continuation of an active strategy, which in turn should cause greater instability than the continuation of a passive strategy.

From the firm's point of view a strategy involving special prices will allow greater flexibility of pricing, with a given assortment price level, than more permanent price-changes of the same magnitude. They are therefore typically used by firms who stress the active role of pricing as a means of competition (for instance, Firm C, cf. Chapter 3). A risk to the firm is that special prices may be regarded in public opinion and by legislators as misleading, especially if so-called "loss leaders", i.e. items sold below invoice cost, are involved.

Against the background of our example in Section 9.4 of the implications to the firm of price image learning, a higher *total* relative flexibility of pricing, due for example, to special prices, may in itself be advantageous to the firm. According to our example, this will depend on (a) if price-decreases are more likely to lead to favorable price evaluations than price-increases to unfavorable ones and (b) whether or not the price evaluations are viewed as representative of assortment price levels. This, of course, will depend partly upon how the price-changes are promoted, which is under the control of the firm. If period assortment price levels are not changed by the increase in flexibility of pricing, the economic implications to the average buyer will be the same, whether or not the flexibility of pricing is increased. In practice, whether this is the case will be extremely difficult to determine.

As indicated, the choice of items to be specially priced is an important strategic decision. To a certain extent this choice is determined by consideration of pre-retail levels, which to an increasing extent in Sweden give financial support for short-term special promotion of branded items. But, currently in Sweden the initiative appears to be held mainly by retailers, who may choose among different offers and also practice this type of pricing without financial support, e.g. in the case of non-branded items. Certain types of items, e.g. coffee, are usually favored for special prices apparently due to their estimated direct effect in attracting buyers to the store. That is, in our terminology, their price evaluation sensitivity with regard to choice of purchase place is evidently believed to be high, and considerations of retail complementarity and unplanned buying accentuate the perceived importance to the firm of the increased traffic. Against the background of our analysis, the firms should reasonably also try to consider more long-run psychological effects in choosing

items for special prices. But, although awareness of this aspect of pricing exists among price setters, it is no doubt seldom explicitly considered due to measurement difficulties and the lack of an adequate theoretical framework in which to analyze this problem (cf. DLF, 1969).

If we apply our proposed model of cognitive equilibrium on the level of the individual buyer (Chapter 7), some tentative implications appear in this connection. To begin with, if we do not consider pricing ethics, when decreasing price the firm should choose items, the prices of which are viewed by buyers as representative of its assortment price level.

Price-increases, on the other hand, should be made on items, the prices of which are not to the same extent viewed by buyers as representative of the firm's assortment price level. Both cases, of course, require some grounds for the belief that differences between items in this respect exist.

One reasonable hypothesis is that buyers view price evaluations of luxury items, such as smoked salmon, as less representative of assortment price levels than price evaluations of everyday items, such as coffee. Another hypothesis is that price evaluations for private brands are viewed as less representative than price evaluations for better known, national brands. Price evaluations of items seldom purchased, which weigh lightly in the buyer's budget, should conceivably have less influence on changing buyers' price images than price evaluations of frequently purchased items. The higher the unit price, the more accentuated this tendency should be. The degree of interfirm product differentiation is probably an important factor in this connection. The more nearly identical competing items are, the higher the tendency may be for buyers to regard the price evaluations of those items as representative of assortment price levels. Price evaluations of items the prices of which vary frequently, e.g. of seasonal items, will probably also be viewed as less representative than more stable prices. Special prices typically are not promoted by firms, nor are they generally viewed by buyers as representative of assortment price levels. (cf. Chapter 8.)

Part of the cost to the firm of achieving a more favorable price image lies, however, in the immediate loss in margin to the firm should unit sales be insensitive to price-decreases in the short run. Thus, this factor should be weighed by the firm against the possible more long-run benefits of a more favorable price image, when considering a pricing strategy which there is reason to believe will lead

to a high, positive price image sensitivity.

It is often alleged that the use of "loss leaders", (items sold below unit variable cost) constitutes "unfair competition" and is an example of "deceptive" pricing. To the extent that buyers are led to believe that the prices of these items are representative of the assortment price level of a firm, while in fact they are lower priced, and thus led to buy other, higher priced items in the belief that these items are also lower priced, this charge would appear to be legitimate. It is also a good illustration of how our buyer psychological model of discrimination and generalization of price conceptions may "explain" a type of buyer reaction to pricing not amenable to analysis within a traditional economic framework.

The same type of objection, however, would apply to any item sold at a lower price than that which is implied by the relative assortment price level of a firm unless it is specifically stated by the firm that the lower price is an exception. As we have already noted, however, assortment price levels are extremely difficult to define and measure in a satisfactory manner, and the resulting ambiguity means that the prices of *all* items usually may be suspected of being unrepresentative of a firm's assortment price level. Theoretically, moreover, prices *both* higher *and* lower than those which are representative of assortment price levels are undesirable! Higher prices mean that the buyer is paying more than is indicated by the assortment price level, lower prices that the buyer risks making an invalid generalization concerning prices on the assortment level based on the item prices in question. There would thus appear to be little need to single out items sold below unit variable cost for separate attention. It is understandable that from a superficial point of view unit variable cost data on the item level may appear to be "objective", and that it is therefore tempting to use this type of cost data as a basis for "fair" prices. But, when we consider the assortment dimension and realize the interdependence of both cost and demand for different items, the rationale for doing this becomes highly questionable.

According to our buyer psychological analysis, the risk that buyers will be misled by the pricing practices of firms increases with the degree of interfirm product differentiation. We have hypothesized that when quality on the item level is difficult for buyers to compare between firms, buyers will show a greater tendency to generalize from the assortment to the item level, instead of attempting to discriminate on the item level. We also propose that it is more likely

in these instances that price image is based upon price-changes, which are not reliable indications of relative prices, rather than item prices.

The best way to prevent buyers from being misled by "loss leaders" or any other pricing practices would appear to be to provide more detailed, relevant price and quality information, particularly on the item level, and not only for a selective sample of identical items. This should facilitate buyer discrimination with regard to price and quality on the item level as well as make more reliable and valid generalizations to the assortment level on the part of individual buyers possible.

From what has been said, the practice of employing "special prices", in contrast to what is often claimed, does not appear to be particularly objectional if, as is normally the case, the duration and conditions of the offers are clearly stated. From our interviews it appeared that quite many buyers were suspicious of the extent to which these prices were representative of the assortment price levels of firms. Some indication of unfavorable generalization, i.e. concluding on the basis of special prices that prices in general were relatively high, was even noted.

From this point of view, advertising prices which have not been reduced in the hope that buyers will believe they have been, or promoting price-decreases heavily and then secretly increasing prices again after a short time would appear more objectional. The same is also true of the practice of trying to increase product differentiation, e.g. through packaging, in order to make discrimination on the item level more difficult and thereby increase the pricing freedom of the firm.

Since retail firms in the situations of interest to us evidently most often react to short-term price-decreases made by competitors by decreasing their own prices on other, non-competing items (cf. Chapter 3) special prices should tend to increase interfirm differences in price for competing items.

But, as several writers have pointed out (e.g. Holdren, 1960, p. 137), identical prices on identical competing items, contrary to what is implied by the single-product traditional economic model of perfect competition, may well in the multi-product case be assumed to be the result of active competition between firms rather than the lack of competition. Therefore, there is little reason in the latter case to assume that identical prices for competing firms are desirable per se, for instance from the point of view of buyer welfare, if we

hold the generally accepted view that competition between firms tends to lead to lower prices than would exist in the absence of competition.

If we extend our analysis along the assortment dimension, special prices and probably consequently greater interfirm price differences on the item level appear in a different perspective. Our main concern is with the *total* economic implications to firms and buyers of all items sold or bought over a period of time. Interfirm price differences may well be a sign of active competition and whether or not the prices of *individual* items cover their unit variable costs is of secondary interest to both firms and buyers.

The role of traffic may also be analyzed in our integrated framework. If, for instance, price reductions lead to increased traffic in a store, and to increased sales as a result of an increase in unplanned buying, this is an example of what we have called the "instantaneous economic effects" of pricing. In our type of analysis this may be attributed, for instance, to an increase in the realized relative flexibility of pricing, which perhaps may be due to special prices.

According to our previous analysis, this type of price-change strategy may be assumed to lead to a greater *number* of favorable price evaluations in buyer observation sets. This, then, will tend to lead to a short-run increase in monetary sales, due to discrimination on the item level.

But, more long-run implications of this type of strategy may also be dealt with in our analysis. Special prices and the resulting increase in traffic may also change the *ratio* of favorable to unfavorable price evaluations in buyer observation sets among regular buyers as well as increase the number of persons attracted to the store, who may be exposed to the pricing stimuli inside it. In both these cases changes in price image based on discrimination on the item level may occur over time. According to our analysis, this will indirectly tend to influence sales, via choice of purchase place and generalization from price image to price evaluations.

According to our analysis, *increased* traffic may even, paradoxically enough, tend to lead to *decreased* sales for the firm in the longer run. This could result if the increase in the number of non-neutral price evaluations in observation sets, due to the increase in traffic, are predominantly unfavorable. This is conceivable if, for instance, as in our illustrative example in Section 9.4, the firm realizes a higher relative flexibility of pricing, with regard to both price-increases and price-decreases, and the price image sensitivity

of the total price-change strategy turns out to be negative. This could be either due to buyers observing a higher proportion of price-increases than price-decreases with a consequent tendency towards a higher proportion of unfavorable to favorable price evaluations in observation sets, or to buyers regarding the price evaluations of items for which prices have been increased to a greater extent representative of the assortment price level of the firm, with a corresponding tendency towards a lower proportion of favorable price evaluations in observation sets. In both cases the increase in traffic may be expected to lead to an unfavorable change in price image and to decreased sales in the longer run.

In summary it may be said that pricing strategies involving special prices are evidently viewed by many retail firms as an economically attractive form of pricing. The increasing reliance on special prices is also one of the most radical changes which has taken place in Swedish food retailing in recent years, and this type of pricing is also used frequently in the U.S.A. among other countries. At the same time the consequences to both firms and buyers have not been analyzed adequately. Such an analysis, I believe, can hardly be carried out within an essentially economic framework. Particularly the more long-run psychological effects of this as well as other pricing practices deserve apparently much more empirical and theoretical attention than has so far been devoted to them. The present section has dealt with some directions in which our proposed type of analysis could be utilized for this purpose.

9.9 Price evaluation sensitivity versus price image sensitivity

In our theoretical framework "instantaneous economic effects" of pricing have been attributed to price evaluation sensitivity with regard to (a) choice of purchase place and (b) purchase decisions for individual items.

Due to retail complementarity, price evaluation sensitivity with regard to choice of purchase place takes on added interest in convenience goods retailing. Since many items are normally purchased at one visit to a store, a change in purchase place due to a favorable price evaluation for one or more items may influence the demand also for other items in the assortment of a store. This type of interrelated demand within assortments has been emphasized by a number of retail analysis in the economic tradition (cf. Chapter 2)

and would appear to be an important consideration of many retail firms in their choice of pricing strategy. Our empirical data in Chapter 8, however, points to the tentative conclusion that this type of pricing effect may well be overemphasized. This data indicates that price evaluation sensitivity with regard to choice of purchase place is relatively low in the situations studied.

The other type of instantaneous effect of pricing which may accentuate the effect of price evaluation sensitivity regarding choice of purchase place is price evaluation sensitivity with regard to the purchase of individual items. This also appears to be a highly important factor in convenience good retailing due to unplanned buying ("impulse" buying).

Holdren (1960) deals with these types of instantaneous economic effects by referring to "transfer" and "budget" effects. The former refers to the "change in the sales of a store which results from the transfer of patronage from one store to another without any change in the pattern or quantity of consumer commodity purchases" (ibid., p. 122). The latter term denotes "a change in the sales level of a store which is the result of a change in the pattern or quantity of consumer commodity purchases out of a given income" (ibid., p. 122). Modifying Holdren's discussion to fit our analysis, we may hypothesize that the price evaluation sensitivity for an item with regard to choice of place of purchase will tend to be relatively high if:

1. Buyers have a high degree of item specific price information for the item and competing items.
2. Price-changes and/or differences in price between competing items are large enough to be readily perceptible to buyers.
3. The subjective weight which buyers give to the item is relatively high (for instance, due to large purchase quantities and/or high unit price).
4. Buyers do not associate price-changes and/or price differences with quality differences.
5. The firm heavily promotes the price and/or a change in price for the item outside the store, e.g. through price advertising.

Price evaluation sensitivity with regard to purchasing an individual item may be assumed to be high:

1. When price-changes take place frequently for the item, and are relatively large especially if interfirm price comparisons on the

item level are made difficult by a high degree of product differentiation.

2. When "special prices", i.e. openly stated short-term price reductions, are employed.
3. When the unit price of the item is relatively high in relation to the buyer's budget.

Holdren discusses transfer and budget effects for individual items only. His type of analysis takes on added interest for our purpose if it is extended along the assortment dimension to consider combinations of items. Different realized price-change strategies may then conceivably lead to different instantaneous economic implications to the firm via retail complementarity and varying degrees of unplanned buying. For instance, it is conceivable that a realized change in the price-change strategy of a firm to a higher relative flexibility of pricing for price-decreases will tend to lead to increased sales for the firm due to instantaneous economic effects, even if relative period assortment price levels do not tend to change. Similar results may be achieved by an increase in the relative magnitude of price-decreases, which also may be achieved without change in relative period assortment price levels. The item distribution of price-changes will probably influence these relationships as well as the relative effect of the two types of instantaneous economic effects. Price-changes on some items, e.g. coffee, may, for instance, be particularly effective in inducing buyers to change their place of purchase, while price-changes on other, more exclusive items, e.g. cocktail mix, may be more influential in increasing the rate of unplanned buying for these items.

From what has been said so far in this section it would appear that a more fruitful analysis, even if we restrict our attention to the instantaneous economic effects of pricing, should be made possible by an extension along the time and assortment dimensions of pricing. But it would appear to be of even greater interest to extend the more traditional economic analysis of retail pricing also along the psychological dimension and to compare the more long-run psychological implications of our type of analysis with the instantaneous economic implications.

According to our previous analysis, the price image sensitivity of a price-change or, more realistically, a pattern of price-changes is high if price image changes substantially from one period to the next as a result of the relative price-change strategy realized. Different price-change strategies may thus lead to different price image sensi-

tivity, which, in turn, may be modified by price promotion.

In some instances price-changes strategies, for which the favorable instantaneous economic effects to the firm are high, may also be characterized by high positive price image sensitivity. According to our analysis, this may result if price-decreases lead to a larger *number* of favorable price evaluations which are viewed by buyers as representative of the assortment price level of the firm. In this situation the favorable instantaneous economic effect to the firm may well be accompanied by a more long-run favorable psychological effect, following our analysis of price learning, if the *ratio* of favorable price evaluations to total number of price evaluations in buyer observation sets also increases. Thus, in this case both the instantaneous economic and more long-run psychological effects work in the same direction, and if we are not interested in the magnitude of change, we may consider them to be a single favorable effect of the realized price-change strategy.

In other instances, however, the instantaneous economic and more long-run psychological effects may well operate in opposing directions. For instance, if special prices are employed, buyers may not view these as representative of the assortment price level of the firm. Indeed, as our interview data in Chapter 8 indicates, they may even regard these special prices as an indication that normal prices are relatively high. Price image sensitivity for the price-change strategy employing special prices may thus be negative and lead to unfavorable long-run consequences to the firm. Nevertheless, the short-run instantaneous effect may be favorable if buyers visit the firm to purchase the specially priced items, or if regular buyers buy more of these items. Thus, both price evaluation sensitivity with regard to choice of purchase place and purchases of individual items may be relatively high. If the firm in this hypothetical case considers only the short-run effects of pricing, which are easiest to estimate, the choice of pricing strategy may be different than if the more long-run implications are also considered.

Finally, in some instances consideration of instantaneous economic effects may conceivably lead to the choice of a price-change strategy which is neutral with regard to price image sensitivity. For instance, price-changes may be made on items for which the resulting price evaluations are viewed as in no sense representative of the assortment price level. No generalization from price evaluations to price image will then take place according to our previous analysis. Thus, while the instantaneous economic effects may be considerable for the

price-change strategy in question, no long-run psychological effects will occur. In this situation the firm might be motivated, if aware of the relationships, to try to achieve a favorable long-run psychological effect as well as favorable instantaneous economic effects of pricing.

In summary, it may be said that in some instances according to our theoretical analysis the instantaneous economic effects of pricing may work in the same direction as the more long-run psychological effect. In such cases we need not consider these effects separately if we are interested only in the qualitative aspects of pricing. In other instances they may work in opposite directions, i.e. tend to offset each other, and if we are interested in the net effect, we must try to estimate the relative importance of the opposing tendencies which requires explicit consideration of the time dimension of pricing. Finally, only one of these effects may be present, which theoretically, and in the case of instantaneous economic effects also empirically, greatly simplifies the problem. To achieve a comprehensive analysis which considers all these possibilities, it appears to be necessary to integrate consideration of the assortment, time and buyer psychological dimensions of pricing.

9.10 Extension to multi-store retail firms

So far, in our integrated analysis, the discussion has been carried out in terms of single-store retail firms. I believe, however, that the principal findings are also applicable to multi-store firms. Because of the importance of chain stores and other multi-store organizations in present-day retailing, I will in this section comment briefly on some special implications of multi-store firms for our integrated analysis.

The functional relationships in our cost equations (Section 6.3.) will probably be somewhat different for multi-store firms, but for our purpose I believe they will in the main still be applicable. Due to economics of scale in advertising beyond the reach of the individual stores, price advertising will probably be more attractive from the point of view of cost for firms with more than one store. It is also conceivable that unit variable costs (invoice costs), due, for instance, to larger purchase quantities and a stronger bargaining position, will be lower for multi-store firms than for single-store firms. But these types of costs benefits will most likely be a consequence of the *size* of the firm, and not primarily of the fact that it has more than one sale outlet.

When we introduce psychological variation into the analysis, however, a unique possibility of competitive advantage for multi-store firms appears. If we assume that price image is generalized between stores within a multi-store firm, the importance of price image for sales should conceivably tend to increase with an increase in the number of stores in much the same way as we have hypothesized that it will tend to increase with an increase in the number of items in the assortment (cf. Section 9.7.). Thus, the benefit to the firm of achieving a more favorable price image should tend to be greater, the greater the number of stores a firm has. This, then, should also accentuate the cost advantage of price advertising to multi-store firms due to economics of scale.

The importance of achieving a favorable price image should increase particularly in the case of firms expanding with regard to the number of stores, especially if the expansion takes place in a geographically concentrated area. A favorable price image for a firm should then tend to generalize to new stores, and facilitate the development of favorable price images for them.

This would be an example of *psychologically increasing returns to scale*; the larger the number of stores, the greater the value of a favorable price image to the firm. If we compare these results with the implications to the firm of variation in assortment, similar psychological increasing returns to scale should also tend to result as the number of items sold by a firm increases.

9.11 Some buyer welfare implications of our integrated analysis

Against the background of our integrated analysis and our discussion of assortment price levels in Chapter 5 it is possible for us to formulate some tentative hypotheses with regard to the buyer welfare implications of pricing in relevant retail situations.

To begin with, the basic assumption in this connection is that from a buyer welfare point of view the price images of buyers should show as high correlations as possible to relative assortment price levels, ideally measured. This means that for each buyer in each decision period these price images should reflect his personal purchase patterns and subjective estimates of what items are closest substitutes in the assortments of competing firms.

The following hypotheses, for example, appear reasonable against the background of our integrated analysis:

1. *Price images should tend to show higher correlations to ideally measured relative assortment price levels in the long-run than in the short-run.*

This assumes that learning of price image takes place based on discrimination on the item level of pricing, and that buyers have some memory of previous prices. ($0 > \alpha < 1$, Equation 9.1.) The smaller the variation in relative price-change strategy for a firm over time, the stronger the above tendency should be. If relative price-change strategies change radically over time, the above tendency should become stronger, when the relative importance of discrimination to generalization in influencing price evaluations increases. The more price conscious buyers are on the item level of pricing, the stronger the above tendency should also be. With regard to the price image of the average buyer, the smaller the turn-over in combined customers the stronger the tendency should be.

2. *The more price advertising a firm does compared to other firms, the more favorable its price image should tend to become, even if relative period assortment price levels do not change.*

The more price advertising a firm does the less should be the extent to which changes in its price image are due to discrimination on the item level, based on pricing stimuli in the store. It would appear to be a reasonable assumption that prices and price-changes in the store more often are representative of relative assortment price levels, than advertised prices and price-changes. To the extent that buyers are exposed to price advertising and form price evaluations which they view as representative of assortment price levels, on the basis of information in price advertisements, the above hypothesis appears reasonable.

3. *The more item specific price information buyers are exposed to, and the less the degree of product differentiation between firms, the higher the correlation between price images and ideally measured relative assortment price levels should tend to become.*

This should be particularly the case when competing firms employ active pricing strategies with high absolute flexibilities of pricing, especially if this leads to a low degree of price level equilibrium between these firms. In Chapter 7 we have hypothesized that the more item specific price information buyers are exposed to, and the less

the degree of product differentiation between firms, the greater the extent to which buyers will tend to discriminate when making price evaluations. According to our previous analysis this means that price image will be based on more recent, and therefore more relevant, price information, than if generalization were more influential in determining price evaluations. If prices have changed frequently, and price level equilibrium between firms is low, the above hypothesis appears more likely. In these instances the closer the value of α is to 1, (Equation 9.1.), that is the more image is based on recent discrimination on the item level of pricing, the stronger the above tendency should be.

In this connection we may also hypothesize that the more frequently a buyer visits competing stores and the larger the number of such stores he visits, the more item specific price information he will be exposed to. This should be the case, also, the more item specific advertising the buyer is exposed to. As we have noted, however, item specific price information in advertisements probably tends to be less representative of assortment price levels than item specific store price information. To the extent buyers are not aware of this, a relative increase in buyer exposure to such price information from advertisements should tend to lead to a lower correlation between price images and relative assortment price levels (cf. Hypothesis 2).

9.12 Towards an integrated framework

The main distinction in the present study is not between price competition and non-price competition. I believe that such a distinction is difficult to maintain and utilize analytically, at least in an operational context, because of strong empirical interdependence in many instances as regards buyer reaction to price and non-price variables.

Instead, our study examines price competition against a buyer psychological background, and in principle, all action parameters which the firm can and does vary in the relatively short run and which may influence price evaluations and/or price images are regarded as pricing variables.

In this section I will try to bring together into a common framework pricing as seen from the viewpoints of the firm and the individual buyer. In our analysis the price setting firm is assumed to try to *increase* its expected profit in a somewhat long-run per-

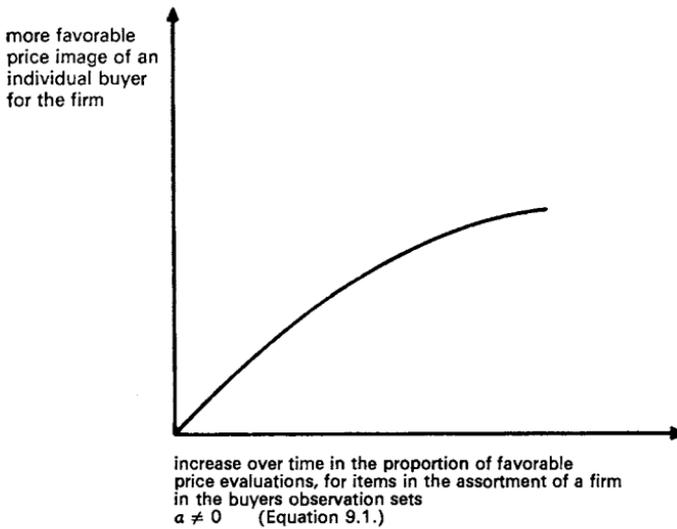
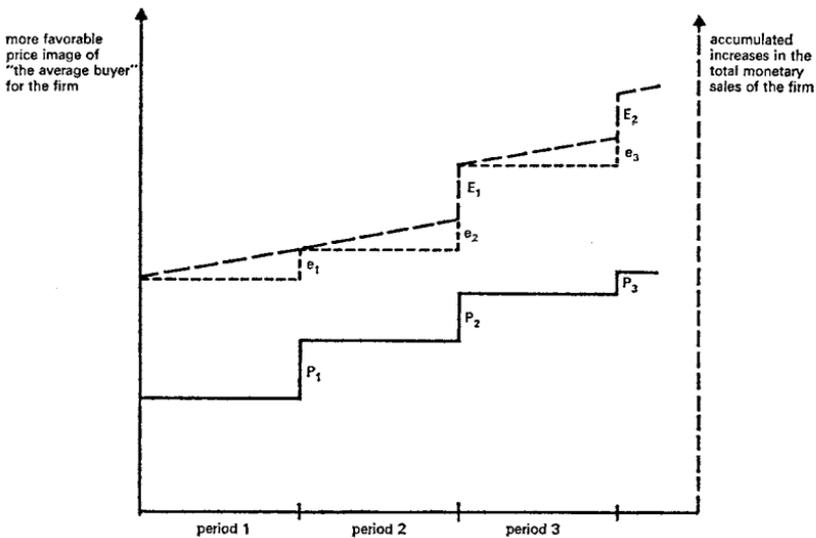


Figure 10. Continuous process of individual learning, due to discrimination on the item level of pricing

spective (i.e. a period longer than the short-run period for which pricing strategies are determined). The buyer is assumed to be psychologically consistent in the sense that he *prefers* to make his purchase in the firm for which he has the most favorable price image, provided no other factor dominates. Similarly, he is considered more likely to buy an item, the more favorable his price evaluation for it is.

The individual buyer's price image of the assortment of a firm is assumed to be learned continuously as a result of the price evaluations he makes (Fig. 10). It is also possible that price image may be directly influenced by price promotion on the assortment level, e.g. price advertising, which then will modify the learning process due to discrimination on the item level. The buyer is assumed to make price evaluations, which refer to the prices of individual items in relation to the prices of competing items (in the assortments of competing firms), as he makes purchase decisions regarding these items. These price evaluations may be based on generalization from price image and/or on item specific price information (from store pricing or price advertising). Evaluations may or may not lead to decisions to buy the items in question. Regardless of whether or not this takes place, price image is assumed to tend to change over time as a result of price evaluations made.

Towards an integrated economic and psychological framework



- P_i change in price image as a result of the firm's pricing strategy for period i .
 E_i accumulated change in monetary sales to the firm during period $i + 1$ as a result of the change in price image, P_i .
 e_i accumulated change in monetary sales to the firm during the period i as a result of the instantaneous economic effects of its pricing strategy for this period.

Figure 11. An integrated economic and psychological view of pricing

To study the aggregate implications of price image learning to the firm, an "average buyer", whose reaction in principle follows the above pattern, has been introduced into our analysis. In this more aggregate analysis, however, price image learning is assumed to take place discontinuously in the transition from one period to the next.

This transformation is carried out in Figure 11, where the price image of the average buyer and the monetary sales of a firm are shown on different vertical axes. These curves may be viewed as functions of price image, the learning of which is based on discrimination on the item level of pricing, which the firm is assumed to be able to influence through its choice of pricing strategy. Price promotion, e.g. price advertising on the assortment level, may also be assumed to modify these curves by directly influencing price image, but this will not alter our main line of reasoning.

We will now assume that the firm, for instance by employing a more active price-change strategy, succeeds in improving its price image from one period to the next, but at a decreasing rate over

time. We may assume that within each period the firm succeeds in increasing its monetary sales somewhat, due to what has been called instantaneous economic price effects. But the greatest increases in sales in this example are assumed to result from the favorable changes in price image, which take place in the transition from one period to the next.

Thus, in order to carry out the transformation from Figure 10 to Figure 11, we must move from the continuous curve of individual price learning to the discontinuous curve of sales as a function of time. This may be achieved analytically by shortening the time periods until they approach a time period of zero. Due to the effects of aggregating buyers it would appear to be empirically desirable to work with fairly long time periods, so that individual variations do not wash out more long-run tendencies in the aggregate behavior, which is of main interest to the firm.

In an analytical sense we have thus achieved an integration in our approach between instantaneous economic and more long-run psychological implications of pricing. The details of our proposed type of analysis are worked out in appropriate places elsewhere in our study. Needless to say, the contours are vague, and much more work of both a theoretical and an empirical nature is needed to fill in the picture.

9.13 Analytical implications of our integrated model

The integrated economic and psychological model outlined in this chapter may be viewed primarily as a frame of reference. Thus, it is intended mainly to unify the disparate elements presented in earlier chapters. Hopefully, it may also provide a guide to the future collection of empirical data and make possible systematic analyses of pricing data in a wider perspective than commonly is employed. The lack of more comprehensive pricing studies is due more to the lack of an adequate theoretical framework, I believe, than to a lack of recognition of the importance of the problems involved on the part of retail pricing analysts.

One important aim in the development of our general approach is relatively independent of the immediate possibility of empirical documentation: namely, to demonstrate what I believe is a need for multi-dimensional criteria for both descriptive and normative studies of the pricing practices of retail firms. Without a more differentiated

framework than normally is employed in studies of retail competition, I believe it is impossible to develop realistic models of retail pricing, which may benefit from psychological contributions to the study of buyer reaction to pricing, which I feel are of central importance in this area of investigation.

In this respect our precise formulation is of secondary interest and may be viewed primarily as a basis for future adaptation and improvement. What is of primary interest is the general approach and the ideas upon which it is based.

I have tried, however, to make our psychological models of buyer reaction to pricing as easy as possible to operationalize in order to facilitate empirical measurement and experimentation. A tentative attempt to measure some buyer psychological aspects was presented in Chapter 8. Our proposed method for studying the relative pricing behavior of competing firms, which provides an operational basis for part of our theoretical framework, was empirically illustrated in Chapter 3. Both these chapters illustrate the fundamental proposition advanced in this study that normative models must be based as much as possible on operational concepts in order to be of practical value to decision makers.

Appendix to Chapter 9

Formalization of the integrated economic and psychological analysis. Aggregate level of demand to the firm

$$S_{\alpha(N)} = f_1(PI_{\alpha(N)}; PS_{\alpha(N)}; PP_{\alpha(N)}; C) \quad (A 9.1)$$

$$PI_{\alpha(N)} = f_2(PI_{\alpha(N-1)}; PS_{\alpha(N-1)}; PP_{\alpha(N-1)}) \quad (A 9.2)$$

$$PS_{\alpha(N)} = f_3(PC_{\alpha(N)}; PC_{\beta(N)}; PC_{\gamma(N)}) \quad (A 9.3)$$

$$PC_{\alpha(N)} = f_4(M_{\alpha(N)}; T_{\alpha(N)}; D_{\alpha(N)}; A_{\alpha(N)}) \quad (A 9.4)$$

$S_{\alpha(N)}$: Monetary sales of the Firm α during the period N .

$PI_{\alpha(N)}$: Price image of the average buyer during the period N for the assortment of the Firm α (constant within periods, variable between periods)

$PS_{\alpha(N)}$: Realized relative price-change strategy of the Firm α for the period N .

$PP_{\alpha(N)}$: Realized relative price promotion strategy of the Firm α for the period N .

- C : A constant which refers to all other factors which may influence sales and which do not vary in our analysis (assortment, quality, service, location, etc.)
- $PC_{\alpha(N)}$: Realized pattern of price-changes (absolute price-change strategy) for the Firm α during the period N (α , β , γ , competing firms).
- $M_{\alpha(N)}$: Size distribution of price-changes for the Firm α during the period N .
- $T_{\alpha(N)}$: Time distribution of price-changes for the Firm α during the period N .
- $D_{\alpha(N)}$: Item distribution of price-changes for the Firm α during the period N .
- $A_{\alpha(N)}$: Distribution of price-changes on advertised and non-advertised items for the Firm α during the period N .

The time, size and item distributions of price-changes, (M_{α} , T_{α} , D_{α}), together with the distribution of price-changes on advertised and nonadvertised items (A_{α}), are treated as *action parameters* of the Firm α in our pricing analysis. This, of course, also means that the absolute price-change strategy, i.e. the realized pattern of price-changes (PC_{α}) is an action parameter on a higher level of analysis. The realized relative price-change strategy, (PS_{α}) on the other hand, is an *expectation parameter* to the firm, which depends also on the absolute price-change strategies of competing firms. The absolute price promotion strategy of the Firm α may also be viewed as an action parameter, but in the above formulation only the realized relative strategy (PP_{α}) (expectation parameter) is included as an argument.

According to Equations A 9.1 and A 9.2, the monetary sales of a Firm will depend on its realized relative pricing strategies for both the present and past periods. The former relationship is assumed to be directly due to instantaneous economic effects of pricing, the latter indirectly due to more long-run psychological effects (via changes in price image).

To the extent that independent variation takes place along them, the operational dimensions of price-change strategies developed in Chapter 3 (relative flexibility of pricing, average relative price-changes, etc.) may be substituted for PS in the above equations. This means that we employ a number of operational, more disaggre-

gated parameters, instead of a non-operational, more aggregate one. If the absolute price-change strategies of competing firms do not change from one period to the next, or change in a predictable way, these operational, expectation parameters may be viewed as action parameters of the firm. Various restraints, e.g. of an informational or organizational nature, will in practice limit the extent to which the pattern of price-changes is an action parameter to the firm.

By combining the above equations with equations relating pricing costs to the pricing behavior of the firm (cf. Equations 6.1—6.8 in Chapter 6), we may analytically determine the incremental profit to the firm of different pricing practices. In order to consider more long-run psychological effects a multi-period analysis is then necessary. By employing a discount factor we may in an investment theory application evaluate the economic implications of these psychological effects at the decision point. If Equation A 9.2 (cf. Equation 9.2, Chapter 9) is assumed to be an exponentially weighted function we may also consider a rate of decay in price image over time by setting an appropriate value for the smoothing constant A .

10 Active competition, interfirm reaction to retail pricing

10.1 Introduction

Although implicit in the analysis, the element of active price competition, that is, interfirm reaction to retail pricing, was not explicitly considered in the preceding chapters. Instead, it was assumed that firms react in a predictable way to one another's pricing strategies. In the present chapter we will be concerned with *how* competing firms react to each others price-changes and how they may consider the degree and type of active price competition in determining their own pricing behavior. This, of course, is the familiar problem of oligopolistic interdependence in a retail setting, viewed against the background of our integrated microeconomic and psychological framework. I will begin by discussing the applicability of the traditional reaction function type of analysis. I will then discuss the usefulness to our purpose of a game or decision theory framework and present an illustrative example of how such an analysis might be carried out.

Relative price-change strategies reflect the behavior of *both* the decision making firm and its competitors. Operational dimensions of these strategies, e.g. relative flexibility of pricing, pricing initiative, pricing response, etc., therefore represent *expectation parameters* to the firms. The patterns of price-changes for individual firms, on the other hand, as reflected, for instance, in the absolute flexibility of pricing, are action parameters which may be assumed to be directly under the control of these firms.

As we assumed in earlier chapters that firms can correctly predict the absolute price-change strategies of competing firms, we made no distinction between expected and realized relative price-change strategies.¹ In the present chapter we will explicitly consider this aspect of pricing.

No operational methodology for studying the price promotion strategies of firms has been developed in our study; in this chapter,

¹ Except, of course, in the case of deviations between the intended and realized patterns of price-changes, e.g. due to the effect of the pricing organization (cf. the discussion Chapter 3).

therefore, we will concern ourselves only with price-change strategies. In principle, the discussion could be easily extended to refer also to price promotion, e.g. price advertising.

Chapter 10 focuses on the normative implications to the firm of its choice of price-change strategy. But normative approaches can be of little practical use to decision-makers unless they are based on a descriptive methodology. Therefore, the present chapter as well as previous normatively oriented chapters are based as much as possible on the operational concepts developed in the descriptively oriented chapters.

10.2 Reaction functions

In our review of the pricing literature in Chapter 2 I briefly commented on the writing concerned with oligopolistic pricing. As I pointed out in that connection, there does not exist any one solution to this problem. Depending on what assumptions are chosen with regard to the behavior of firms, we may develop any number of different models which lead to quite different implications.

Most early work in oligopoly theory, starting with Cournot's duopoly model (cf. Chapter 2), has been concerned with a reaction function type of analysis. In these approaches it is assumed that each firm chooses its output or price to maximize profit, given the price or output of its competitor(s). In the earliest models (Cournot's output variation and Bertrand and Edgeworth's price variation models) the quite artificial assumption is made that each firm believes its rival will not change its output or price, even if it becomes evident that this is what the rival in fact does. The conjectural variation, i.e. the anticipated reaction of the rival to changes in the firm's own variable, is then zero. In more realistic models the conjectural variation² may differ from zero, which essentially leads to the same type of analysis, but the results are generally less conclusive.

As noted in Chapter 2, the reaction function type of analysis has been severely criticized for its artificiality by Fellner among others. In more complex models of this type, e.g. dynamic models based on relatively realistic behavioral assumptions, stable solutions usually do not result. Recent attempts have been made to incorporate learn-

² This concept was formalized by Frisch (1951), although it is implicit in Bowley (1924). It is a convenient way of summarizing the behavioral assumptions in classical oligopoly models and has therefore been employed by many subsequent writers, e.g. Allen (1938) and Fellner (1959).

ing and expectations in duopoly models (Ferguson & Pfouts, 1962; Cyert & De Groot, 1968). The latter work utilizes a Bayesian approach to the problem.

For the purpose of our own analysis, price reaction functions could conceivably be applied to the problem of interfirm reactions to pricing. However, I have not been able to find any attempt to develop a pricing model based on price reaction functions suited to retail applications.³ Since I do not believe it would be empirically rewarding to pursue such a line of research, I will not try to construct any such model. I will, however, comment a bit on the possible implication of such an approach.

To begin with, I do not believe it is realistic to assume that firms behave in accordance with a reaction function analysis in which the functional relationships do not change, even if we allow for different values of conjectural variation. And, if the functional relationships change in an unpredictable manner, the analysis becomes meaningless. The possibilities of introducing changes over time in the expected patterns of reaction into these models in an empirically meaningful way do not appear to be great. Theoretically, it may be possible to use a Bayesian analysis to attack this problem, as Cyert and De-Groot (*ibid.*) indicate, but unrealistic and restrictive assumptions then become necessary.

On the other hand, it might be realistic to assume that in our typical retail situations competing firms do *not* react to at least *some* dimensions of pricing, which customers react to. The reason for this could be the complex nature of retail pricing, when we consider the assortment and time dimensions, and the fact that price information in the resulting situation is relatively highly imperfect.

For instance, an increase in the number of price-changes by one firm during a period may not be noticed by competing firms, which would result in an increased realized relative flexibility of pricing for the former firm. Similar reasoning may be realistic with regard to other pricing dimensions, e.g. pricing initiative and magnitude of average price-changes.

Thus, it would appear desirable to extend our pricing analysis along the psychological dimension of pricing to apply also to the behavior of the price decision makers in the firms. For instance, it

³ An attempt to empirically test for the existence of Cournot reaction curves in the retail food market is reported by Alderson (1965, pp. 221—225). The results were inconclusive, which is hardly surprising against the background of our own discussion.

Active competition, interfirm reactions to retail pricing

is realistic to assume selective attention and selective perception on the part of price-setters with regard to the pricing behavior of competing firms.

Thus, it may be reasonable to assume that with regard to certain dimensions of pricing little or no active competitive interaction takes place, while for other dimensions the interaction may be considerable. What dimensions fall into which category may, of course, vary from situation to situation, due, for instance, to the pricing organization of the firm with regard to the collection and processing of price information.

With respect to pricing dimensions along which no active competitive interaction may be shown to take place, the problem of oligopolistic interdependence would no longer exist.⁴ In the case of other dimensions price reaction functions could possibly be used to account for the interaction, although, as I have stated, I do not believe this to be a very fruitful approach. However, were the price reaction function to be employed with a more differentiated concept of pricing, considering a *number* of operational pricing dimensions, I believe it would result in a *more* realistic analysis than the traditional type which refers to only one operational dimension, namely, the prices of the competing firms at given moments of time.

In our own analysis we are not interested in establishing equilibrium positions for profit maximizing firms. Instead, we are interested in predicting how firms interested in *increasing* their profit,⁵ but not necessarily in maximizing it, may react to the price-change strategies of competing firms, and also what grounds they may have for choosing between alternative price-change strategies. One example

⁴ Cf. Baumol's position with regard to oligopolistic interdependence: "I shall take the position that in *day-to-day decision making*, management often acts explicitly or implicitly on the premise that its decisions will produce no changes in the behavior of those with whom they are competing" (1967, p. 28). As pointed out by F. Kristensson at a seminar, it may be more a question of organizational restraints limiting the degree of oligopolistic interdependence than the element of day-to-day decision making (cf. also our discussion, Chapter 4, pp. 11—14).

⁵ For instance, from an unsatisfactory to a satisfactory level. Compare the distinction between satisfying and maximizing goals (March & Simon, 1958, pp. 140—142). Since we are working towards greater psychological realism in our models, I favor the type of goals emphasizing satisfying, rather than optimizing behavior. Observe, however, that the differences in implications between the two formulations tend to be less clear when we explicitly consider imperfect information. If we, in an environment of imperfect information, include search costs in the analysis, satisfactory solutions may well be, in theory at least, the optimal solutions as well. See also Odhnoff (1965) for a comparison between the two techniques.

is whether or not they should attempt to increase their relative flexibility of pricing and this will partly depend on whether or not competing firms can be expected to react along this dimension and to what extent. I believe that strategic decisions involving oligopolistic interdependence are better handled in a game or decision theory framework than in a reaction function type of analysis, and therefore, we will turn our attention to how ideas from this area may be applied to our problem. I will assume that collusion does not take place either implicitly or explicitly, and consequently we will not concern ourselves with models involving cooperation between firms. The discussion in this chapter will be carried out on the model level, but the reasoning will be based as much as possible on the descriptive methodology for studying price-change strategies and buyer response to them presented in previous chapters.

10.3 The usefulness of a game or decision theory framework

10.3.1 Introduction

I will now indicate how I believe a game or decision theory⁶ framework may be of value in studying the implications to the retail firm of active price competition. The theory of games was originally proposed by von Neumann and Morgenstern (1944) and almost instantly became recognized as a novel and highly promising approach to the question of strategic interdependence, e.g. the oligopoly problem. Rather soon, however, the possibilities of using game theory to understand competitive behavior began to be viewed in a much less optimistic perspective, and Miller (1963) has gone so far as to deny its relevance for practical decision making in this area.

⁶ There is no need here to distinguish between game theory and decision theory. Since equilibrium positions for the opposed parties are not considered in our approach, it most closely resembles "games against nature", which some writers (e.g. Schelling, 1963) consider to be part of game theory. Other writers, at least implicitly, assume that game theory proper includes only games of strategy, i.e. situations in which all parties are assumed to consider each others courses of action simultaneously. I believe that it is more realistic in most competitive situations to assume that competitive reaction, if any, occurs with a substantial time lag, which then renders our approach more appropriate. Thus, a firm's reassessment of its price-change strategy based on competitive reaction to previous price-change strategies may be assumed to take place at the beginning of each short-run period. In other words, the firm is assumed to learn about how competing firms react to its own behavior.

Active competition, interfirm reactions to retail pricing

On the other hand, Baumol states: "It must be emphasized that there still remains a very important role to be played by the theory of oligopolistic interdependence and its analysis with the aid of tools like those provided by game theory" (1967, p. 32).

Only in the case of two-person zero or constant sum games, i.e. when one opponent loses what the other gains, has there been developed an adequate and generally accepted theory.⁷ In the case of two-person, non-constant sum games and all n-person games, there are many solutions possible and little basis to choose among them. In this respect the situation resembles traditional oligopoly theory. I agree with Miller that most business competitive situations fall in this latter category, which greatly diminishes the practical usefulness of game theory in this connection. Considerations of threats and cooperation between players, and the type of rationality postulated as well as the degree of information available further complicate the matter.

But this merely means that usually we cannot *directly* apply game theory reasoning to arrive at unique equilibrium solutions of practical usefulness to, for instance, price decision makers. It does *not* mean that we cannot in specific situations fruitfully apply a game or decision theory framework to structure our problem and thereby improve our understanding of the competitive mechanism. It is in this latter respect that I believe game and decision theory may prove to be of value in studying the type of competitive interaction we are interested in.

Since we are dealing with a very elusive and complex problem, it will be necessary to make a number of approximations to achieve manageability. But this does not, as I see it, *destroy* the applicability of the analysis; rather, it is but a necessary step in the problem solving process, which resembles that carried out by actual decision makers. The only valid criteria of success, in my opinion, is that we achieve a better understanding of the problem than would otherwise be possible. The number of objections raised against an approach may well be a measure of its value, as important questions might otherwise never have been raised. To a considerable extent I believe this is true with regard to game theory, although I by no means view the criticism with regard to its applicability and practical usefulness as unfounded.

⁷ A clear and concise summary of developments in game and decision theory is Luce and Raiffa (1957).

10.3.2 An illustrative example

The following example illustrates the manner in which I believe game or decision theory may prove to be of practical use to price decision makers. At the same time, this discussion will indicate how it is theoretically possible to add another dimension, namely explicit consideration of active competition, to our previous pricing analysis.

First, in order to simplify the discussion, I will transform our analysis to a two-person structure. Since competitors in actual situations usually do not observe and react to the pricing behavior of all competing firms, at least not to the same extent (cf. Chapter 3), this will not necessarily restrict the realism of our analysis unduly.

We may achieve this transformation in several ways. Our viewpoint is that of an individual firm, and we may, for instance, take its counterpart to be the competitor it views as most important,⁸ which in many situations is probably a realistic assumption. Or, employing a more psychological type of analysis, we may instead view the counterpart as the firm's "image" of the average competing firm.

Although any assumption which reduces the structure of the analysis to two parties is acceptable for our purpose, I have chosen the "average competing firm" as the competitive counterpart in my analysis. This means that the pricing actions of all competing firms, to the extent they are observed and considered relevant by the firm focused on, will be indirectly considered in our two-person framework.

I am not interested in trying to establish equilibrium values, but merely in whether a firm should or should not undertake certain types of pricing action, if it is motivated to try to increase its profit in a somewhat long-run perspective. Therefore, it is not necessary for our purpose to deal with pay-off matrices for more than one firm. It is sufficient to indicate the implications for the firm which is the focus of our study. Similar analyses might then be performed from the viewpoints of the other competing firms.

In order to stress the fact that we are dealing with partial analyses, reflecting only one set of forces which may influence the outcome for the firm in question, I will use tendencies in our pay-off matrix. A figure in one of the boxes in a matrix thus indicates the number of monetary units that the sales margin or profit of the firm is assumed to change as a result of changes in the parameter studied, if no other changes take place that affect these outcomes.

⁸ Cf. the "dominant firm" in economic theory and price leadership discussions based on this concept (Markham, 1951).

I will assume, as before, that the decision making firm is motivated to try to increase its profit in a somewhat long-run perspective. No threats or cooperation between firms will be considered in our example; such factors could conceivably be considered in a similar context in other examples. I am mainly interested in illustrating the feasibility of studying active retail price competition by means of the chosen approach without entering into an exhaustive analysis. I also wish to further substantiate my claim that a more differentiated framework than normally is employed is needed as a basis for studying retail pricing.

Thus, I believe that static strategies of raising or lowering the prices of individual items, such as those normally used in game theory illustrations of pricing, are so oversimplified as to become empirically uninteresting, at least in the situations we are interested in. Instead, I believe that pricing strategies should be described along many more operational dimensions of pricing, including both the time and assortment dimensions.

For this reason, I believe that an operational methodology of the type developed in Chapter 3 is of value as a descriptive basis for game theory applications in the area of retail pricing. This, of course, also means that the firm's choice of pricing strategy becomes a complex multi-dimensional problem. Nevertheless, I believe that such a development is desirable if we are to make progress in studying active competition between firms in retail situations.

To make the study of complex strategies analytically feasible it is, of course, essential that we arrive at operational measures of pricing which are not only relevant to what we want to study, but which also may be varied relatively independent of one another. This has been attempted in developing our own methodology, and while our operational dimensions of pricing take on added interest in relation to each other, it is theoretically possible to vary pricing along one of the chosen dimensions relatively independent of the values along the other ones, although in practice this will be difficult to achieve.

Therefore, I feel justified in limiting our theoretical illustration in this chapter to variations along only one dimension, namely, flexibility of pricing. I will assume that the decision making firm is interested in changing its absolute flexibility of pricing, for instance, through adopting a policy involving short-term special prices.

The problem we are interested in, then, is how this will affect the sales and profits of the firm in the foreseeable future. This will in part depend on how buyers react to the increase in the absolute

flexibility of pricing and partly on how competitors react. Of course, other factors—both those under the control of the firm, e.g. other operational dimensions of pricing, and those beyond the control of the firm, such as certain cost increases—will also affect results. But, as we have already noted, our pay-offs only reflect tendencies towards changes in the variable studied which may be attributed to changes in the realized relative flexibility of pricing for the firm studied.

As defined, the total flexibility of pricing in our analysis depends on the number of both price-increases and price-decreases. Buyer reaction to realized changes in total flexibility of pricing will, thus, conceivably depend not only on the total number of price-changes in relation to competitors, but also on how the price-changes are distributed between price-increases and price-decreases. Ideally, we should allow for variation in flexibility of price-increases as well as of price-decreases in our analysis, but to achieve simplicity I will consider only price-decreases in our example and make special assumptions about price-increases.

This I will do by assuming that the firm, as assumed in our example in Chapter 9 (9.4), increases its total flexibility of pricing, which it hopes will tend to lead to a long-run increase in gross margin and profit, provided it succeeds in achieving a more favorable price image. At the same time, it hopes *not* to experience a short-run decrease in gross margin and profit due to the instantaneous economic effects of the price-changes. If the firm succeeds only in increasing its absolute flexibility of price-decreases, but not its relative flexibility, it will be assumed to experience a tendency towards a short-term decrease in gross margin, due to an insensitivity of unit sales to price-decreases in the short-run and this will not tend to be offset by any long run psychological effect.

In our example the firm will also increase its absolute flexibility of pricing with regard to price-increases. The price-increases are assumed to be carried out on such items and in such ways that they do not influence the price evaluations of buyers. Whether or not competing firms react to these price-increases, their effect is assumed to offset the above short-run decrease in gross margin, after considering the incremental pricing costs. Since the price-increases are assumed not to influence price evaluations, neither will they, according to our buyer psychological model, influence price image in the longer run. In other words, their price image sensitivity is assumed to be zero. In this connection the strategy with regard to

Active competition, interfirm reactions to retail pricing

price-increases is thus not determined at the beginning of a period, but rather successively implemented during the period as a result of sales feedback.

After making these assumptions with regard to flexibility of price-increases in our analysis I will not further explicitly consider this aspect in our example. Instead, the behavior of competing firms with regard to price-decreases becomes crucial to our analysis, and I will in the present context only discuss how the firm may consider this aspect when deciding on its absolute flexibility of price-decreases for a coming period.

In our example in Chapter 9 it was assumed that the decision making firm could predict the pricing behavior of competing firms for the coming period, and that these firms during this period would retain the same absolute flexibilities of price-increases and price-decreases as for the previous period. In our partial analysis the firm thus may realize a higher relative flexibility of price-decreases by increasing its absolute flexibility in this respect. This will be assumed to tend toward a more favorable price image⁹ for the firm in the following periods, as a result of the buyer psychological mechanism we have previously introduced into our analysis (Chapter 7).

In the present chapter we are interested in studying the implications of different types of active competitive reaction to price. For this purpose we will utilize two outcome matrices in a game theory or decision theory framework. The outcomes in the first type of matrix refer to tendencies towards change in gross margin, conditional on the realization of different relative price-change strategies. Similarly, the outcomes in the second type of matrix refer to tendencies towards changes in profit.

In both cases the values are assumed to be discounted back to the time point of the decision, using an appropriate rate of interest. The total time period considered extends to the planning horizon of the firm, which is assumed to be at least two short-run time periods from the decision point. As before, a short-run period is the period for which pricing strategies are defined and during which price image is assumed not to change.

The outcomes in both types of matrices are influenced by both short-run instantaneous economic effects and more long-run psycho-

⁹ This means that the increase in relative flexibility of price-decreases is assumed to lead to a higher proportion of favorable price evaluations, which are viewed by buyers as representative of the assortment price level of the firm (cf. our discussion in Chapters 7 and 9).

Active competition, interfirm reactions to retail pricing

Matrix 1a Gross margins

		B	
		Increase flexibility of price-decreases	Retain flexibility of price-decreases
A	Increase flexibility of price-decreases	+2	+10
	Retain flexibility of price-decreases	-5	0

Matrix 1b Gross margins

		B	
		Increase flexibility of price-decreases	Retain flexibility of price-decreases
A	Increase flexibility of price-decreases	+2	+5
	Retain flexibility of price-decreases	-2	0

Matrix 2a Profits

		B	
		Increase flexibility of price-decreases	Retain flexibility of price-decreases
A	Increase flexibility* of price-decreases	-3	+5
	Retain flexibility of price-decreases	-5	0

(cont.)

Figure 12. A game or decision theoretical illustration.

* Dominant strategy solution for A in case 1.

Active competition, interfirm reactions to retail pricing

Matrix 2b Profits

B

		Increase flexibility of price-decreases	Retain flexibility of price-decreases
A	Increase flexibility of price-decreases	-3	0
	Retain flexibility of price-decreases**	-2	0

** Dominant strategy solution for A in case 2.

All matrices refer to the payoffs for the firm A

B="average competing firm"

Pay offs=tendencies in monetary units

All strategies refer to the *absolute* flexibilities of price-decreases

Transformation between gross margin and profit matrices is achieved in both cases by assuming that the incremental cost of changing the absolute flexibility of price-decreases is 5 monetary units.

Case 1 (1a—2a) The price image of the average buyer is influenced by a realized increase in relative flexibility of price-decreases.

Case 2 (1b—2b) The price image of the average buyer is not influenced by a realized increase in relative flexibility of price-decreases.

Figure 12. A game or decision theoretical illustration. (cont.)

logical effects of pricing. Employing reasonable assumptions as to the incremental costs of pricing, the profit matrices are then derived from the gross margin matrices.

I will illustrate the choice of price-change strategy by the firm against the background of two different assumptions with regard to buyer reaction to realized changes in the relative flexibility of price-decreases. The matrices 1a—2a in Figure 12 refer to the case when the firm succeeds in changing the price image of its average buyer, *if* it realizes a higher relative flexibility of price-decreases. The matrices 1b—2b describe the case when the firm does not succeed in the same situation.

Conceivably, whether or not the firm will succeed in its efforts will depend on the way in which price-changes are promoted (cf. Chapter 9) as well as on the item distribution of price-decreases. For instance, increased flexibility realized through "special prices" may

not be successful in changing price image in a favorable direction, while increased flexibility achieved through unpromoted price-decreases may be. The general image of the firm, for instance, if it is viewed as unreliable in its price claims, may also influence the outcome, as may many other factors. Some of these are under the control of the firm (for instance, price promotion and the item distribution of price-changes), while others (for instance, the psychological constitution of buyers) are not. In the present example all factors other than price-change strategies are assumed not to vary.

In Matrix 1a I have made assumptions as to changes in the gross margin for Firm A as a result of the absolute flexibility of price-decreases the "average competing firm" B chooses. Should A increase its absolute flexibility of price-decreases in the coming period or retain its value for the previous period? In general this will depend on what Firm A believes Firm B will do.

In Case 1a I have assumed that if Firm A succeeds in increasing its realized relative flexibility of price-decreases, it will also succeed in achieving in the next period a more favorable price image in relation to B. This, then, according to our buyer psychological model in Chapter 7, will create a tendency in subsequent periods towards increased gross margin as a result of both increased traffic in the store and more favorable generalizations by buyers from price image to price evaluations. This more long-run psychological tendency may be increased or decreased as a result of instantaneous economic tendencies due to discrimination on the item level of pricing. If the firm shows skill in its pricing, the firm may well avoid a net decrease in gross margin or may even show a net increase, considering these short-run effects alone.

In our present example I will assume that there is a slight increase in gross margin due to the instantaneous discrimination effect and a larger increase due to the more long-run generalization effect, provided that Firm A succeeds in increasing its relative flexibility of price-decreases. In our illustrative example 1a, a certain increase in absolute flexibility of price-decreases for Firm A is assumed to produce a tendency for its gross margin to increase 10 monetary units, provided Firm B does not increase its absolute flexibility of pricing. In this case the relative flexibility of price-decreases for Firm A increases. The increase in gross margin is the combined net result of the instantaneous change due to discrimination of price-changes and the more long-run change due to generalization of price image, discounted to the point of decision.

Active competition, interfirm reactions to retail pricing

If, on the other hand, Firm B also increases its absolute flexibility of price-decreases so that no substantial change in relative flexibility of price-decreases takes place, Firm A in our example will only experience a tendency towards an increase of two monetary units in gross margin. This we ascribe to the instantaneous economic discrimination effect¹⁰ with regard to the price-decreases. But, in this case no long-run increase in gross margin due to a favorable change in price image is assumed to take place in subsequent periods.

If, on the other hand, A retains its previous absolute flexibility of price-changes, while B increases its, a decrease in gross margin for A may be expected, both due to instantaneous economic effects and, in the longer run, due to an unfavorable change in price image. In our example I have indicated this tendency by—5 monetary units. If neither firm changes its absolute flexibility of pricing, no change in gross margin for A is assumed to occur.

We must now transform our matrix of gross margin to a profit matrix by considering the incremental costs of increasing the absolute flexibility of price-decreases (cf. Chapter 6). I assume that after making these calculations, we arrive at the values in Matrix 2a. This incremental cost is assumed to be five monetary units, in all cases considered.

Regardless of whether the firm chooses to minimize its maximum possible decrease in profit (— 3) or maximize its possible increase (+ 5), in our example it should choose the strategy of increasing its absolute flexibility of pricing, when we assume that an increase in relative flexibility of price-decreases will lead to a more favorable price image for the firm.

In a similar way we may analyze the effects to the firm of increasing its absolute flexibility of pricing, given the assumption that an increase in the relative flexibility of price-decreases will not lead to a more favorable price image for the firm. In this case the only operative effect will be the instantaneous discrimination effect on the item level of pricing.

The increase in gross margin in this case may be assumed to be considerably smaller (+ 5 in our example) if A increases its absolute flexibility, while B does not. If both increase their flexibility, the result should be the same as in 1a, since the situation is equivalent. If A retains its flexibility of pricing, while B increases its, the de-

¹⁰ Buyers are in this instance assumed to increase their combined purchases in all competing firms, primarily due to an increase in unplanned buying, as a result of the increase in price activity by all these firms.

crease in A's gross margin should be smaller (-2 in our example) in 1b, where B's price image is assumed not to change, than in 1a, where B's price image is assumed to become more favorable (and, thus, A's less favorable) as a result of a realized increase in relative flexibility of price-decreases.

If we assume that the incremental cost of making the change in flexibility of pricing is 5 also in this case, we will arrive at the figures in Matrix 2b, when we make the transformation from gross margin to profit. In this case the strategy of *not* increasing the absolute flexibility of pricing will dominate over the strategy of increasing it, and B will choose not to make the increase.

Thus, this example shows that by utilizing a game theory structure and making reasonable assumptions concerning situations of active competition it is possible to arrive at different solutions, depending on the assumptions we make about buyer reaction to pricing. In my opinion, this demonstrates the need for simultaneous treatment of the elements active competition and buyer reaction to pricing as variables in models of retail pricing.

10.4 Summary of Chapter 10

In this chapter I have tried to indicate how a game or decision theory approach may prove useful for studying some of the implications of active pricing in retail situations. In the example we have discussed how the time, assortment and psychological dimensions of pricing may be considered when determining what price-change strategy the firm should choose under specified conditions.

I do not, of course, claim that this simplified example is an accurate description of how firms actually behave, although elements of the type discussed probably are often considered at least intuitively by firms in actual retail pricing situations. Neither do I claim that this example, at the present stage of development, represents a specific recommendation as to how firms should behave. But I believe that it indicates a worthwhile approach to the problem, valuable at present mainly as a framework for further analysis.

It should also be possible in specific instances to construct more complex and realistic models of active price competition along the lines proposed in this chapter. Like the proposed extensions of our partial model in Section 9.4, these models could conceivably also consider other operational pricing dimensions, such as the degree of pricing initiative and the average magnitude of price-changes.

11 Summary and implications for future research

11.1 Summary

Since interim summaries have already been provided for many of the chapters, and since Chapter 9 in itself is a summary of our integrated approach, a more detailed summary of the present study in this final chapter is superfluous. Some of the main ideas will, however, be summarized again to emphasize their importance.

1. Retail pricing in the the present study is treated as a *relatively independent action parameter* of the firm. Competition *between* firms is emphasized and demand interrelationships *within* the assortments of given firms are considered only to the extent they affect the competition between firms.
2. Pricing is treated as a *psychologically extended variable* and distinguished from other variables not by employing traditional economic classifications, but by considering buyer reaction to pricing.
3. Not only *instantaneous short-run economic effects* of pricing, but also more *long-run psychological effects* are considered. It is pointed out that from the firm's point of view these effects may counteract each other. When this is the case, since the short-run economic effects are easier to observe and analyze, the price-setting firm may conceivably overemphasize the relative importance of these economic effects when making pricing decisions.
4. In contrast to traditional microeconomic competition theory, which, quite naturally, emphasizes the *item level* of pricing, and those related economic models of retail pricing which emphasize the *assortment level* of pricing, the main interest in the present study is on the *interaction* between the item and assortment levels.
5. Instead of emphasizing *economic* demand interdependencies, as do those economic models of retail pricing which consider demand interdependencies within an assortment, the present study emphasizes *psychological* demand interdependencies.

6. Our psychological analysis of pricing is based on *discrimination* by buyers of pricing stimuli *on* given levels of analysis and *generalization between* different levels of analysis. This makes it possible to extend our analysis over time by considering *price learning* on the assortment level.
7. The need for *empirical* analysis of pricing from both the firm's and the buyer's point of view is stressed. This has made the development of a system of *operational concepts* necessary. Both our empirical and theoretical analysis demonstrate the need for *multi-dimensional* descriptions of pricing by firms as well as buyer reaction to pricing along a larger number of dimensions than are normally employed in pricing studies. This is particularly the case if we want to consider the assortment, time and psychological dimensions of pricing in an integrated context.

11.2 Implications for future research

The present study has focused on a relatively specific competitive situation, convenience goods retail pricing in metropolitan areas. The reasons for this have been developed in the Introduction in Chapter 1. They are mainly the importance of this type of retailing in the economy, and the fact that traditional microeconomic theory and closely related models of retail competition appear to be particularly inapplicable in this area. Also, I believe that it is more fruitful at the present time to work from more specific to more general models of competition than in the other direction, particularly when we are interested in the implications of pricing to the individual firm and its customers.

This, of course, does not mean that the main ideas in our study cannot be applied to other areas of retail and perhaps also to non-retail pricing. There would appear to be many other situations which exhibit, although perhaps to a lesser degree, the relevant characteristics of the situation I have chosen to study. But, before applying the suggested approach a careful study should be made of the extent to which this is the case and appropriate modifications made in our suggested type of analysis.

This is also true of the competitive variable, pricing, emphasized in our study. Although our extended view of pricing considers many aspects, e.g. price advertising, which in more traditional economic studies are regarded as an example of non-price competition, it should be possible to extend our analysis to apply also to such

Summary and implications for future research

aspects as quality variation. Empirically, this would be more difficult than in the case of pricing, but theoretically, as has been indicated to a certain extent in the present study, such an extension is feasible.

The empirical analyses carried out in our study, while of an explorative nature, I believe support the development of pricing models along the lines suggested. More careful testing of hypotheses than have been possible in the present study should, of course, be carried out. Perhaps the empirical contribution of the present study lies mainly in facilitating future testing along the lines suggested. Ideally, field experimentation should be employed for this purpose, but for practical reasons laboratory experiments will probably be the only possible technique for more comprehensive testing of the hypotheses concerning buyer reaction to pricing. With regard to pricing behavior by firms direct observation of the pricing process together with an analysis of price data of the type suggested in Chapter 3 could be employed to test such factors as the organizational aspects of pricing. Simulation techniques (cf. Cyert & March 1963; Langholm 1969) might also be employed, particularly when investigating price level variation over time as a result of different pricing practices.

S.3 Supplement to Chapter 3

S.3.1 Data collection

All firms which were asked to participate in the investigation were very cooperative and gave all possible help.

Firms B and D provided the price-change data directly from their book-keeping. With regard to Firm D, we went through their monthly price lists and checked this data against delivery cards for all items. This gave us exact dates for all price-changes and indicated price-changes not evident in the price lists.

Firm A's recommended prices were directly obtained from their price lists, which were checked against price-change supplements, which gave exact dates for the price-changes. Firm C's price-changes were more difficult to obtain, due to their book-keeping routines. Certain items were noted on delivery cards, and price-changes for these items could be checked against price-change notices. However, price-changes for meat and vegetables could be obtained only from the price bulletins issued to stores once a week and daily, respectively.

As an additional check, a representative for Firm A reviewed all price-change diagrams, and suspected mistakes were again checked at the firms involved.

With regard to potatoes and sugar, which different firms sold in different weight units, the prices were adjusted to kilo prices. Potato prices were followed for last season only (Swedish potatoes, as long as they were sold by all firms), and tomato prices were followed only for Canary Islands tomatoes (most sold during the time period) as long as they were on the market. Liver wurst prices were for technical reasons unobtainable for Firm D.

With regard to ginger cookies, Firms A and B had no price-changes on any brands during the period. For this reason no brand specification for these firms is found in the item specification (S.3.4). No weight adjustments for ginger cookies were carried out although differences in weight between different packages were substantial, since no price-changes for any of the brands studied are found in the data.

S.3.2 Choice of products and items included in the investigation

Products were chosen to reflect as much as possible the total price-change strategies of the firms studied. Since for practical reasons it was impossible to employ random selection of products, a number of criteria were instead used to ensure that different product characteristics which might reasonably be associated with interproduct differences in pricing would be considered in our sample. We tried to include:

- a) Products accounting for both large and small proportions of monetary sales to the firm.
- b) Products frequently advertised during the period and products infrequently advertised.
- c) Products differing from each other with regard to handling costs, sales margins, and interfirm product differentiation.
- d) Products for which the degree of active price competition had varied during the period.

The choice of products and competing items, following the criteria set up, was based on our preliminary interviews with price-setters, a specially conducted investigation of price advertising during the period and the classification of products employed by the organization issuing recommended prices (Firm A).

Regular price advertising during the period was carried out only by Firms B and C, who had weekly advertising. The results of our advertising investigation are given in S.3.5. This diagram shows the number of times during the period that the products listed were advertised by either firm. The products included were those that appeared to be most frequently advertised by the firms when we made a preliminary examination of the advertisements.

With regard to the degree of active price competition during the period we followed the classification by Firm A between regular and special price recommendations ("stjärnpriser"). These latter comprise items which were considered particularly sensitive to price competition and which therefore were listed below what have been the case if normal calculation norms had been applied. In S.3.3 the extent to which both "normal" and "special" recommended prices issued by Firm A were followed by associated firms is viewed against the background of available data.

Naturally the criteria employed could not be followed consist-

ently in our choice of products. Each product may be classified according to all the above dimensions. Therefore, the criteria served mainly as a general guide in the selection process. For instance, ham and pork chops were included, partly because they are important products in that they represent a large portion of carcass weight, and partly because a price investigation (P & K, 1960) showed substantial differences between listed and advertised meat prices for these very products. Furthermore, according to our own investigation of advertised prices, these products were the most frequently advertised meat products during the period.

Milk, butter and margarine were included in our investigation because they were non-advertised, "heavy" products. Liver wurst was included as a "small", non-advertised product; bananas, as a "large" product in the fruit group, infrequently advertised. Mayonnaise, ginger cookies and corn flakes were selected as small products, with varying characteristics, frequently advertised during the period. Eggs were included partly because they were advertised only by Firm C during the period. Among canned goods collops was chosen as frequently advertised, and pineapple, as not at all advertised.

During the selection process we tried to include products with varying characteristics: fresh and dry goods, fruit, dairy products, meat, canned goods, cereals, etc. Among items "sensitive to price competition", frozen spinach, hard bread, wheat flour, margarine and our investigated brand of cocoa were included.

With regard to competing items we primarily followed the rule that when identical items were not found in the competing assortments, the largest selling brand was chosen for each firm. A check was made that from other points of view as well, these items were sufficiently close to each other to qualify as substitutes. Since only data on price-changes were analyzed, greater differences in unit price and weight may be accepted than in price level investigation. Ideally, of course, competing items should be directly determined by considering buyer reaction, but this was not possible within the time and cost limitations of our investigation. In S.3.4 a detailed specification of the competing items is given.

S.3.3 The extent to which recommended prices by Firm A were followed in the Stockholm area on September 15, 1959

Certain information on the extent to which the recommended prices issued by Firm A were followed by associated stores in the Stockholm area is available. This data (P & K, 1961), collected by the Swedish Price Commission, refers to prices on September 15, 1959, while our data on price-changes refers to the first six months of 1961.

In the figures referred to only the frequency of departure from listed price are included, not the magnitude. Products studied, which were also included in our selection, are margarine, hard bread, wheat flour, coffee, cocoa, sugar (loose weight), and collops. Thus, of the 18 food products, the prices of which were studied, seven were also included in our investigation of price-changes. It was expected that the extent to which recommended price were followed in the Stockholm area would differ from other areas; results in fact showed that recommended prices were followed to a lesser extent in the Stockholm area.

The extent to which recommended prices were followed was studied both for stores with access to Firm A's listed prices and for other privately owned stores.

For the firms in the former category 65 % of sales of the items in question were carried out at prices exactly corresponding to recommended prices. (Compare 90 % for the rest of Sweden.) This could have been partly due to the fact that recommended prices were on the average lower in the Stockholm area than in other areas. This was especially the case with regard to "special listed prices" ("stjärnpriser"). These were often exceeded by stores in Stockholm (see below). Among firms charging prices lower than those recommended some of the largest chain stores were found. (Firm C is an example of a large chain-store, a member of the pricing organization, Firm A, but using A's price lists only as a source of information.) With regard to firms without access to Firm A's price lists, i.e. non-members of the pricing organization, only 23 % of sales were carried out at prices exactly corresponding to recommended prices. (Compare 50 % for the rest of the country.)

With regard to individual products also included in our price-change investigation, the extent to which recommended prices were followed in the Stockholm area for all private stores was:

	exceeds list price, %	follows list price, %	below list price, %
Margarine ¹	46	27	27
Hard bread ¹	85	15	0
Wheat flour ¹	60	30	10
Coffee	0	82	18
Cocoa ¹	84	16	—
Sugar ¹	0	48	52
Collops	28	59	13

¹ Products with "special list prices" ("stjärnpriser").

S.3.4 Item specification

Product	Unit	Representative items for Firm:				
		A	B	C	D	E
1. Bananas	1 kilo	—	"Fyffes" Quality 1	"Fyffes" Quality 1	"Fyffes" Quality 1	—
2. Potatoes	1 kilo	—	Old, "SMAK- märkt"	Old, "SMAK- märkt"	Old, "SMAK- märkt"	Old, "SMAK- märkt"
3. Tomatoes	1 kilo	—	Canarian	Canarian	Canarian	—
4. Sausage	1 kilo	"Falukorv"	"Falukorv"	"Falukorv"	"Falukorv"	"Falukorv"
5. Ham	1 kilo	—	Fresh, bone- less "skinka"	Fresh, bone- less "skinka"	Fresh, bone- less "skinka"	—
6. Pork chops	1 kilo	"Fläskkotlett"	"Fläskkotlett"	"Fläskkotlett"	"Fläskkotlett"	"Fläskkotlett"
7. Liver wurst	1 kilo	"Leverpastej"	"Leverpastej"	"Leverpastej"	no date avail- able	—
8. Ginger cookies	package	all brands	all brands	"Gylle", 500 g.	"Göteborg" 150 g.	"Peppo" 500 g.
9. Hard bread	1/4 kilo	"Wasa Husmans"	"DM-bröd"	"Wasa Husmans"	"Wasa Husmans"	"Wasa Husmans"
10. Corn flakes	12 oz.	"Kellogs"	"Kellogs"	"Kellogs"	"Kellogs"	"Kellogs"
11. Wheat flour	2.5 kilos	"Extra kärn- vetemjöl"	"Extra kärn- vetemjöl"	"Extra kärn- vetemjöl"	"Extra kärn- vetemjöl"	"Extra kärn- vetemjöl"
12. Mayonnaise	350 g.	"Findus", jar	"Findus", jar	"Findus", jar	"Findus", jar	"Findus", jar
13. Milk	1 liter	Standard, "Tetrapac"	Standard, "Tetrapac"	Standard, "Tetrapac"	Standard, "Tetrapac"	Standard, "Tetrapac"
14. Butter	1/2 kilo	"Mejerismör"	"Mejerismör"	"Mejerismör"	"Mejerismör"	"Mejerismör"

S.3.4 Item specification (cont.)

Product	Unit	Representative items for Firm:				
		A	B	C	D	E
15. Margarine	1/2 kilo	"Milda"	"Eve"	"Milda"	"Milda"	"Milda"
16. Cheese	1 kilo	"Svezia, 45+"	"Svezia, 45+"	"Svezia, 45+"	"Svezia, 45+"	"Svezia, 45+"
		3 months	3 months	3 months	3 months	3 months
17. Eggs	1 kilo	Grade A	Grade A	Grade A	Grade A	Grade A
18. Collops, canned	500 g.	"Ica"	"Kvickman"	"Esseli"	"Kalmar läns"	"KBS"
19. Pineapple, canned	30 oz.	"Del Monte"	"Libby's"	"Libby's"	"Del Monte"	"Libby's"
20. Spinach, frozen	375 g.	"Findus"	"Björnekulla"	"Findus"	"Findus"	"Findus"
21. Coffee	400 g.	chopped	chopped	chopped	chopped	chopped
		"Gevalia"	"Cirkelkaffe"	"Premiär"	"Premiär"	"Gevalia"
		vacuumcan	vacuumcan	vacuumcan	vacuumcan	vacuumcan
22. Cocoa	100 g.	"Marabou"	"Marabou"	"Marabou"	"Marabou"	"Marabou"
23. Sugar, loose weight	1 kilo	"K5 SSA"	"K5 SSA"	"K5 SSA"	"K5 SSA"	"K5 SSA"
24. Beer	330 g.	"Fagott"	"Vårby"	"Fagott"	"Fagott"	"Fagott"
		kl. II	kl. II	kl. II	kl. II	kl. II
25. Soft drink	600 g.	"Apotekarnes sockerdricka"	"Vårby sockerdricka"	"Apotekarnes sockerdricka"	"Apotekarnes sockerdricka"	"Apotekarnes sockerdricka"

— Not listed (Firm A) or the product is not in the assortment (other firms).
Swedish terms and brand names are given within citation marks.

S.3.5 Investigation of advertised products

Date	4/1	13/1	20/1	27/1	3/2	10/2	17/2	24/2	3/3	10/3	17/3	24/3	7/4	14/4	21/4	28/4	5/5	12/5	19/5	26/5	2/6	9/6	14/6	21/6	30/6	Sum	
Product																											
Apples																										14	16
Oranges																										14	18
Radishes																										5	6
Salad																										5	12
Cucumber																										5	6
Tomatoes																										7	5
Bananas																										0	3
Potatoes																										15	8
Sausage																										6	7
Side pork																										2	4
Ground meat																										4	5
Smoked pork chops																										4	3
Pork chops																										4	4
Bacon																										3	4
Shrimp																										11	12
Ham																										11	4
Breadloaf																										8	4
Ginger cookies																										1	4
Bisquits																										5	2
Corn flakes																										0	3
Hard bread																										0	2
Swiss cheese																										7	0
Port Salut cheese																										5	3
Eggs																										0	6
Mayonnaise																										3	4
Meat balls																										5	5
Collops																										3	3
Canned peaches																										1	4
Coffee																										14	10
Tea																										0	3
Cocoa																										6	3
Frozen articles																										7	7

Number of times a product was advertised during the period

 Admitted by Firm B at the indicated date
 Admitted by Firm C at the indicated date

S.3.6 Price-change diagrams (no price-changes during the period for coffee, margarine and cookies)

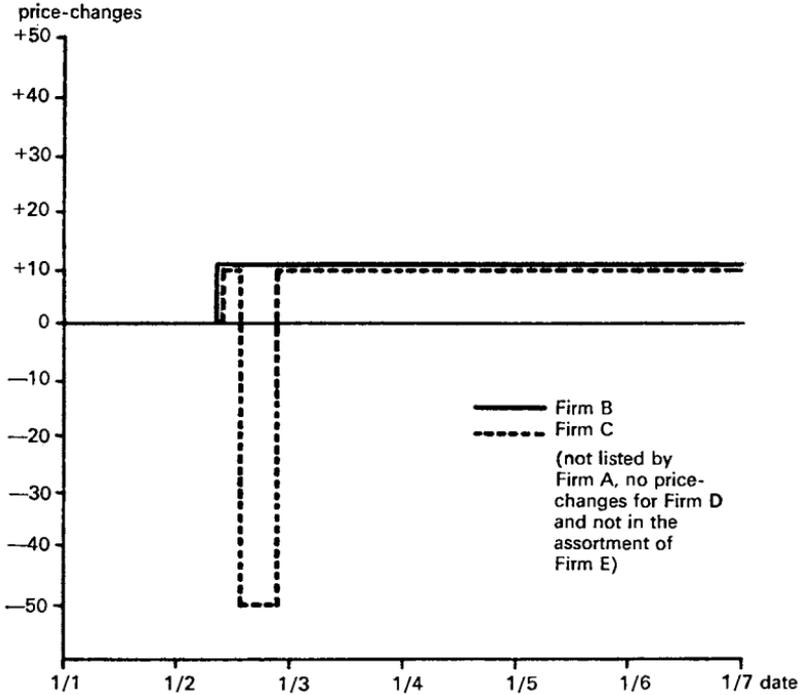


Diagram 1. Bananas.

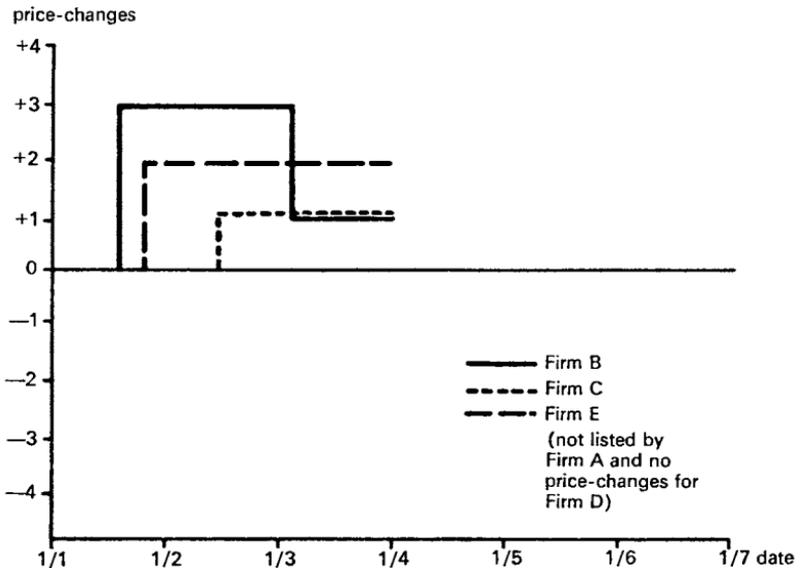


Diagram 2. Potatoes

Supplement to Chapter 3

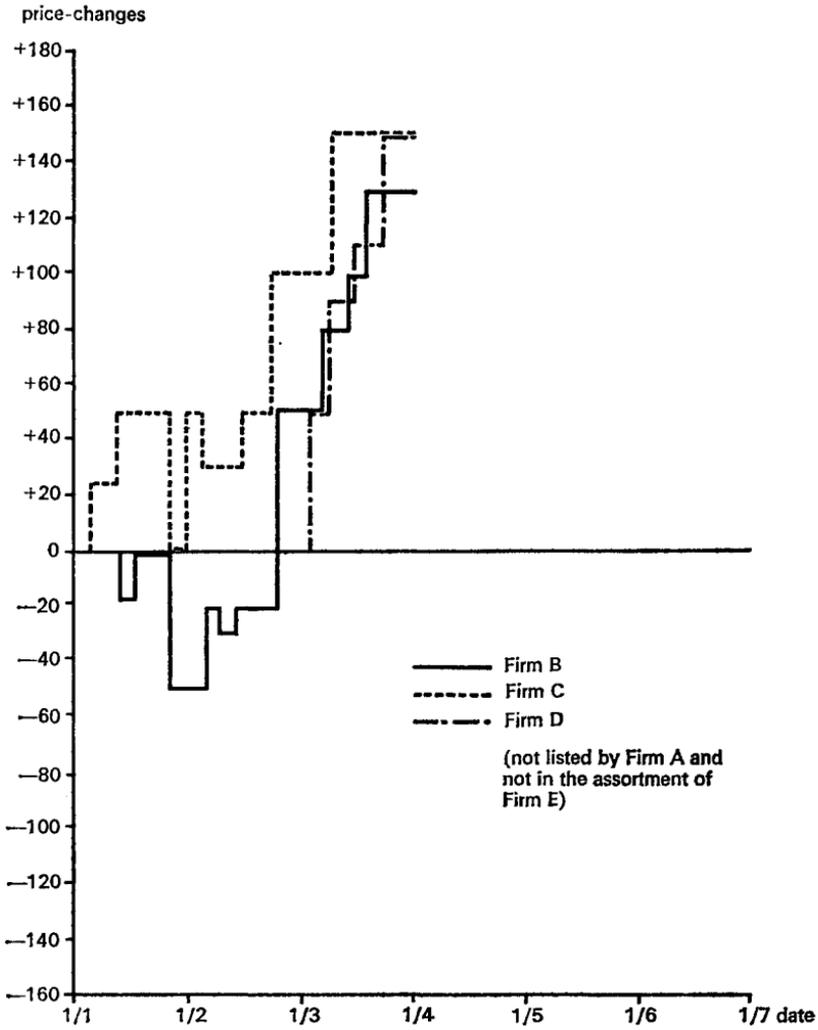


Diagram 3. Tomatoes.

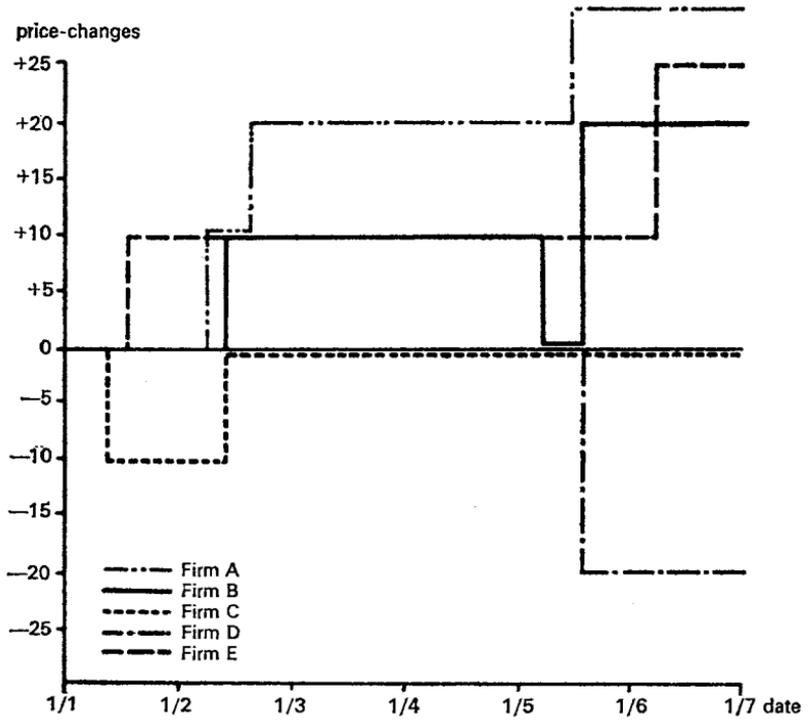


Diagram 4. Sausage.

Supplement to Chapter 3

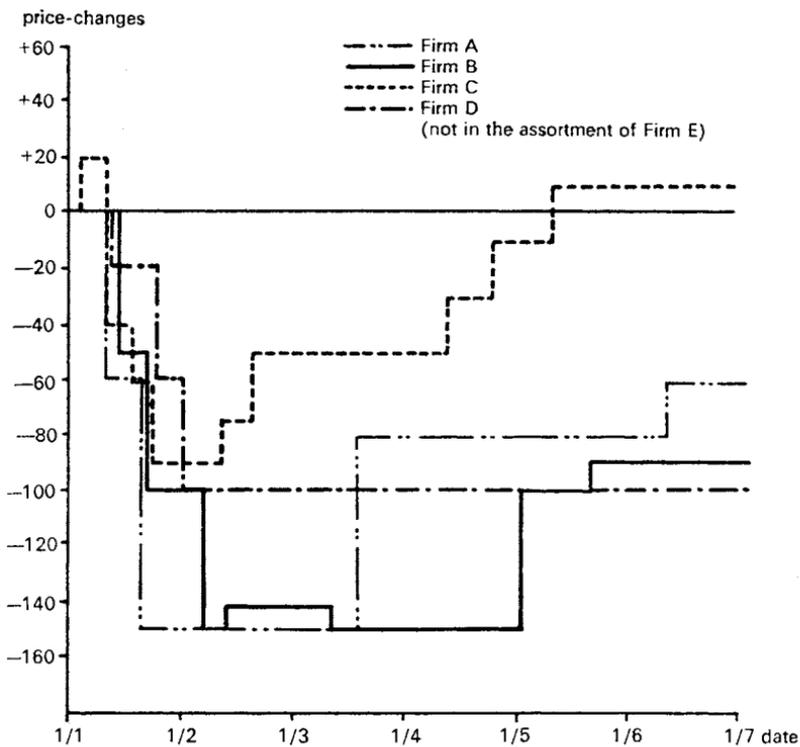


Diagram 5. Ham.

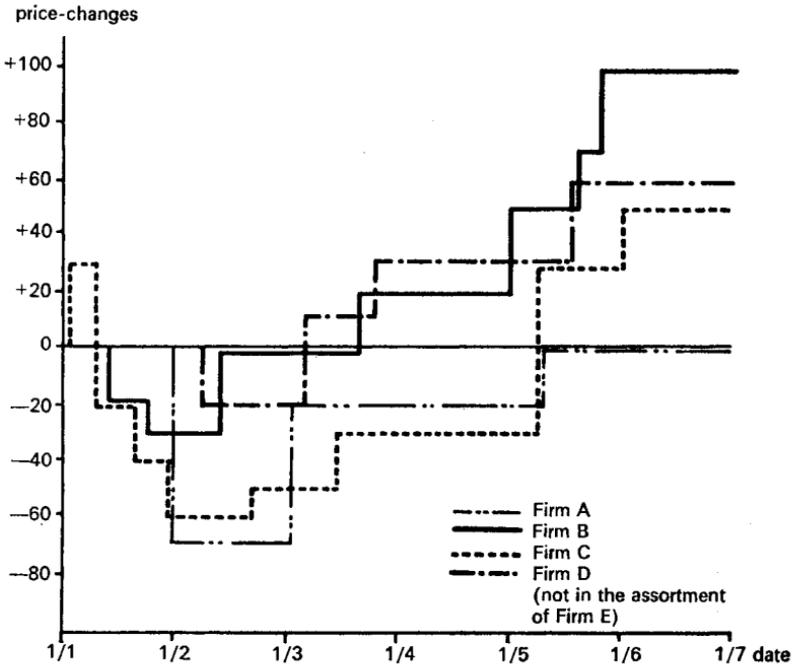


Diagram 6. Pork chops.

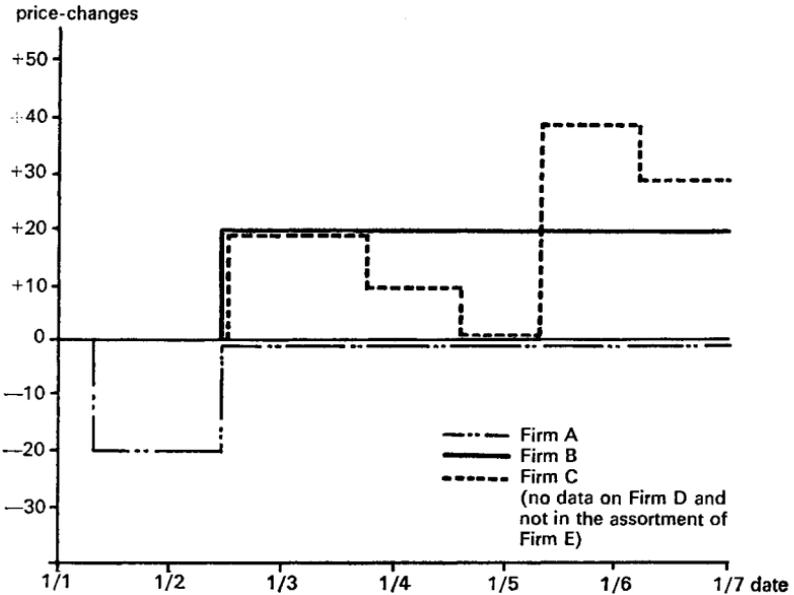


Diagram 7. Liverwurst.

Supplement to Chapter 3

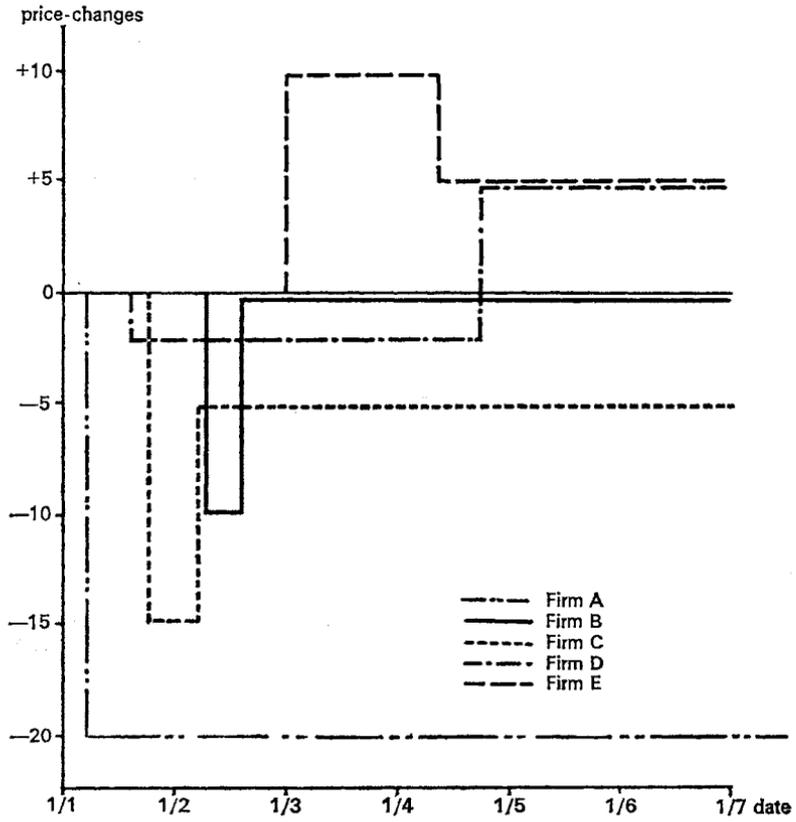


Diagram 8. Spinach, frozen.

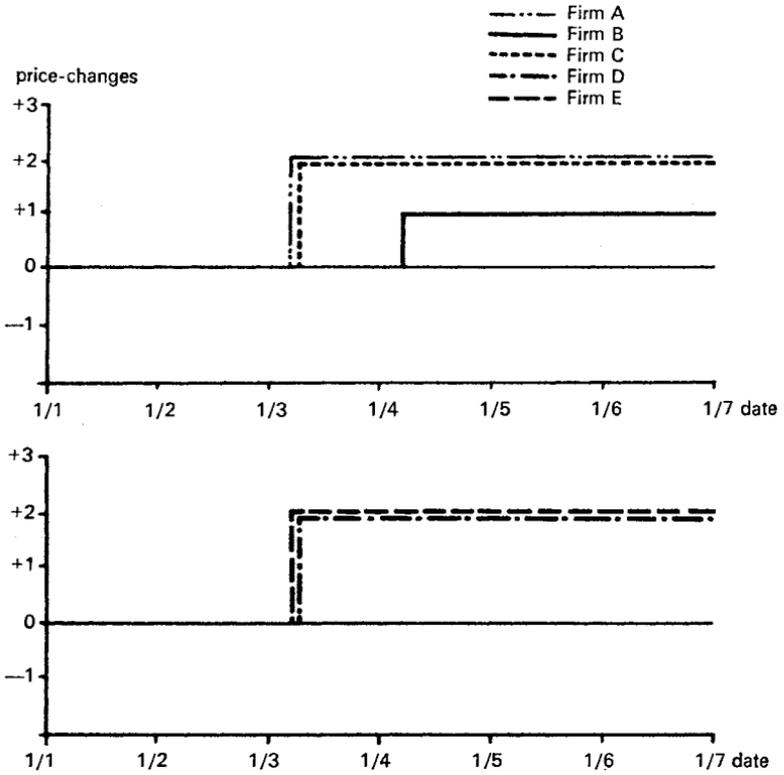


Diagram 9. Hard bread.

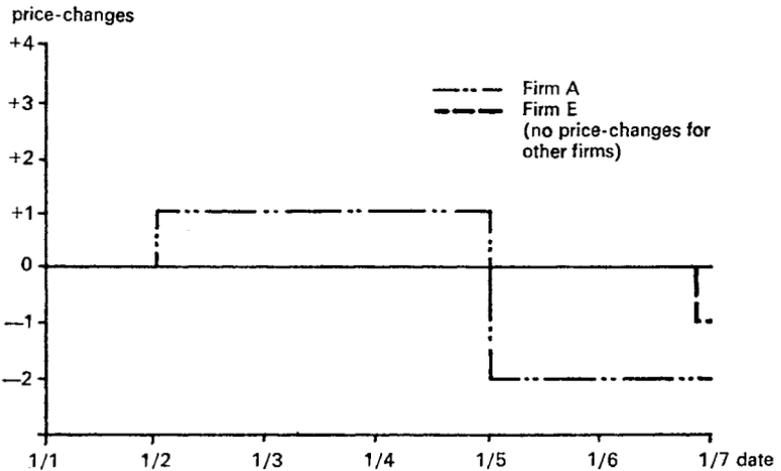


Diagram 10. Corn flakes.

Supplement to Chapter 3

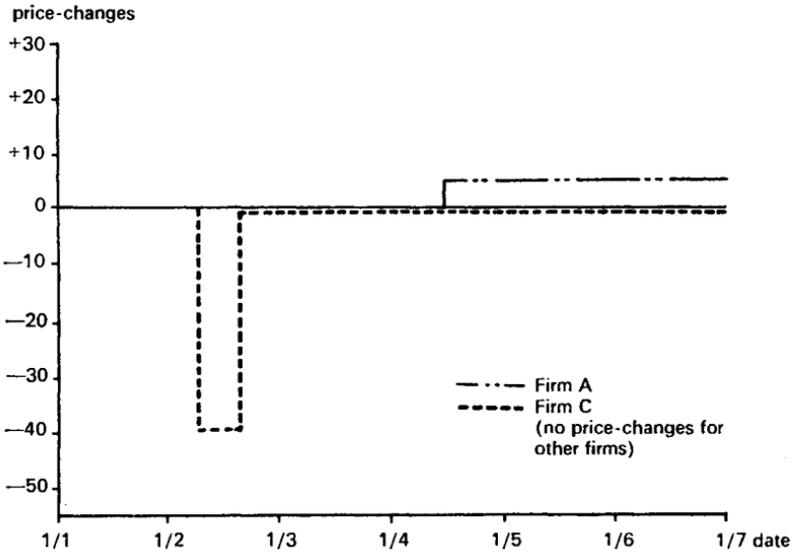


Diagram 11. Pineapple, canned.

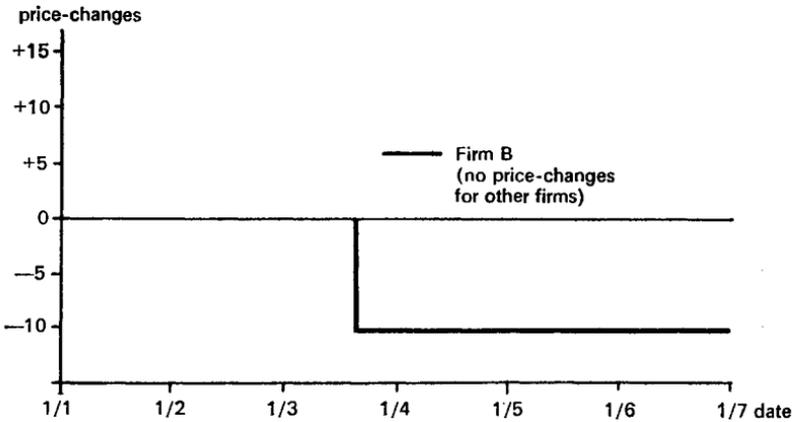


Diagram 12. Mayonnaise.

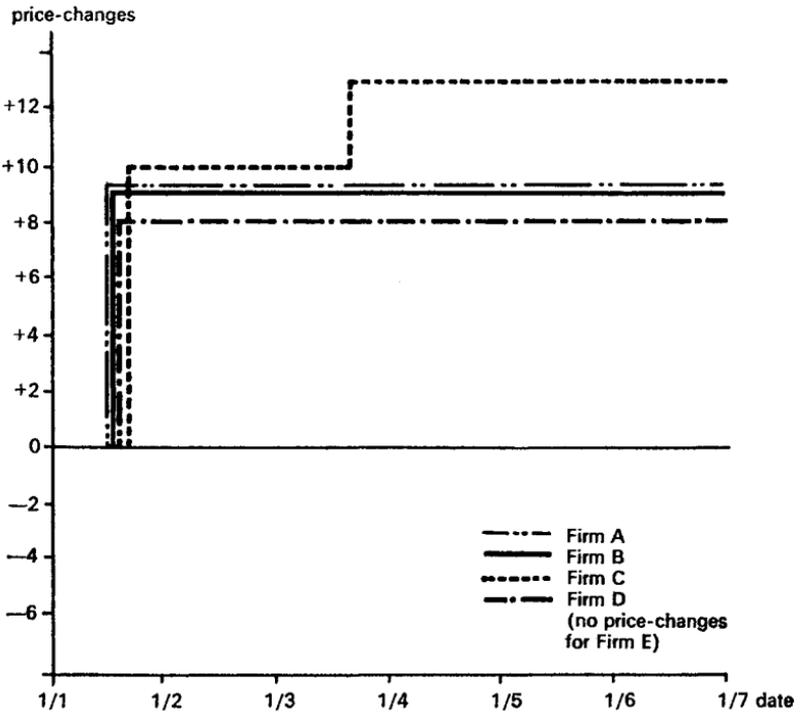


Diagram 13. Wheat flour.

Supplement to Chapter 3

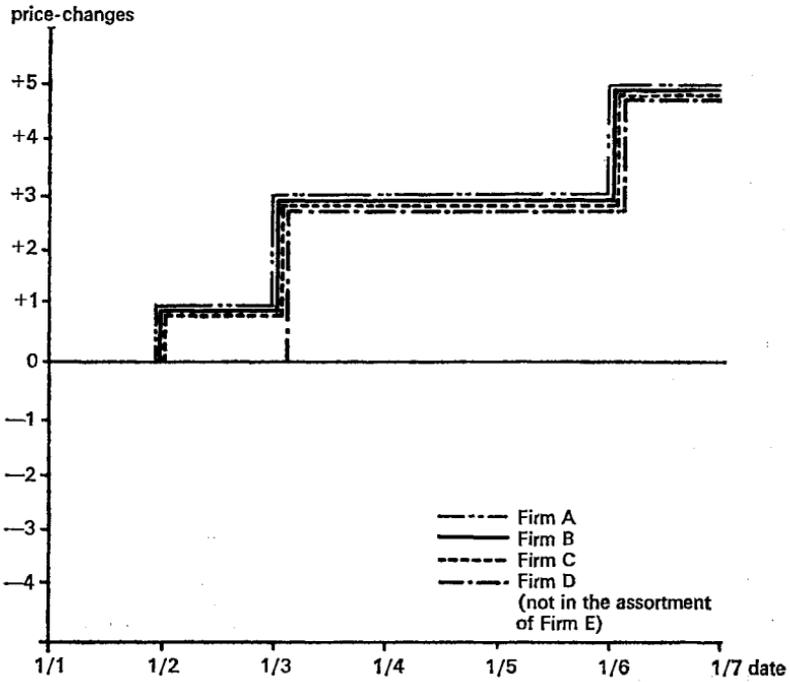


Diagram 14. Milk.

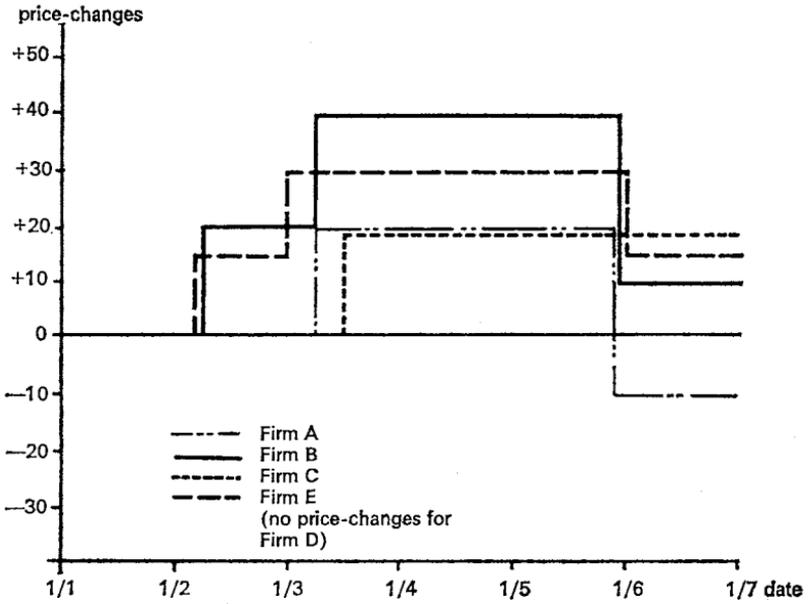


Diagram 15. Cheese.

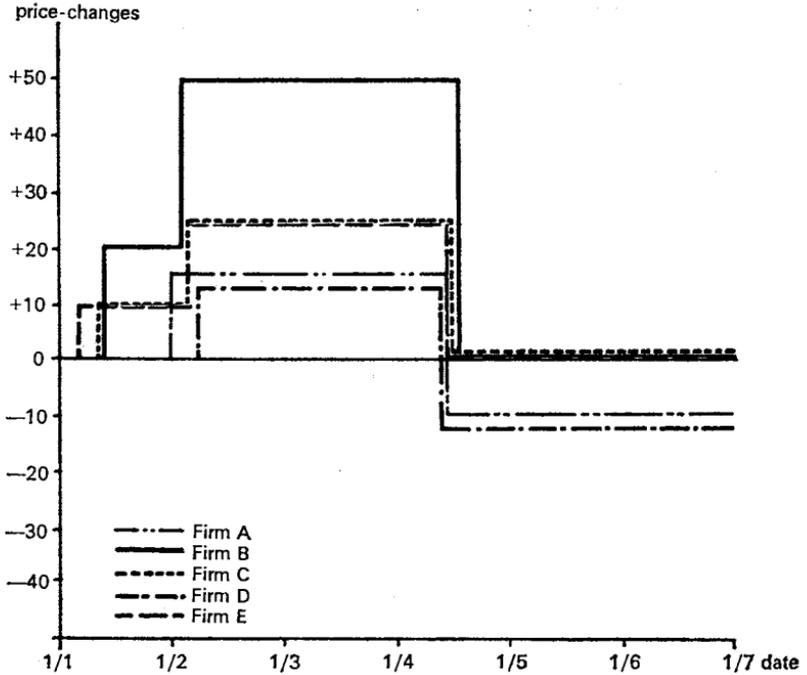


Diagram 16. Butter.

Supplement to Chapter 3

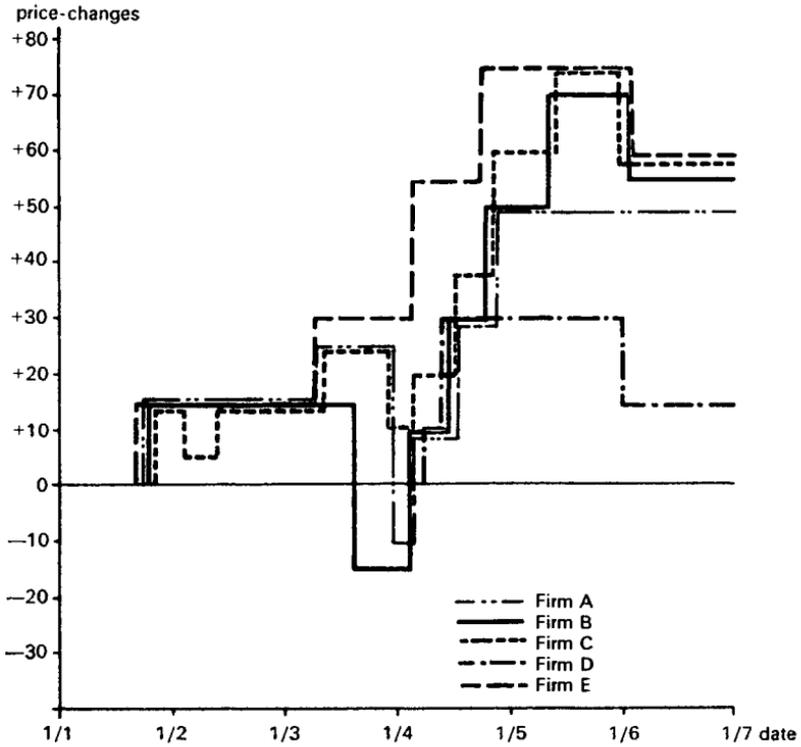


Diagram 17. Eggs.

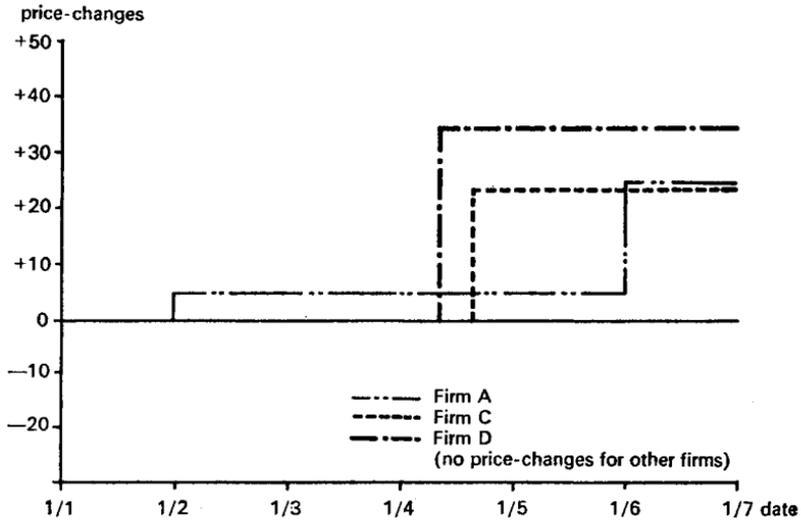
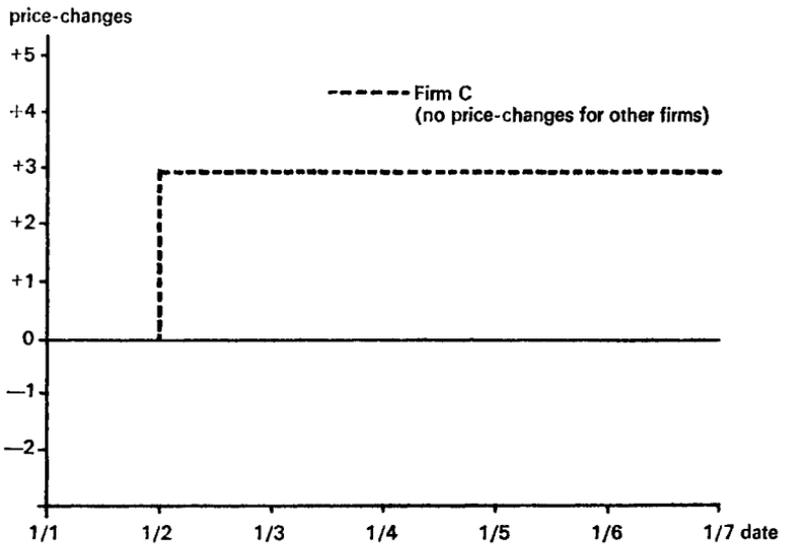


Diagram 18. Collops, canned.

**Diagram 19. Cocoa.**

Supplement to Chapter 3

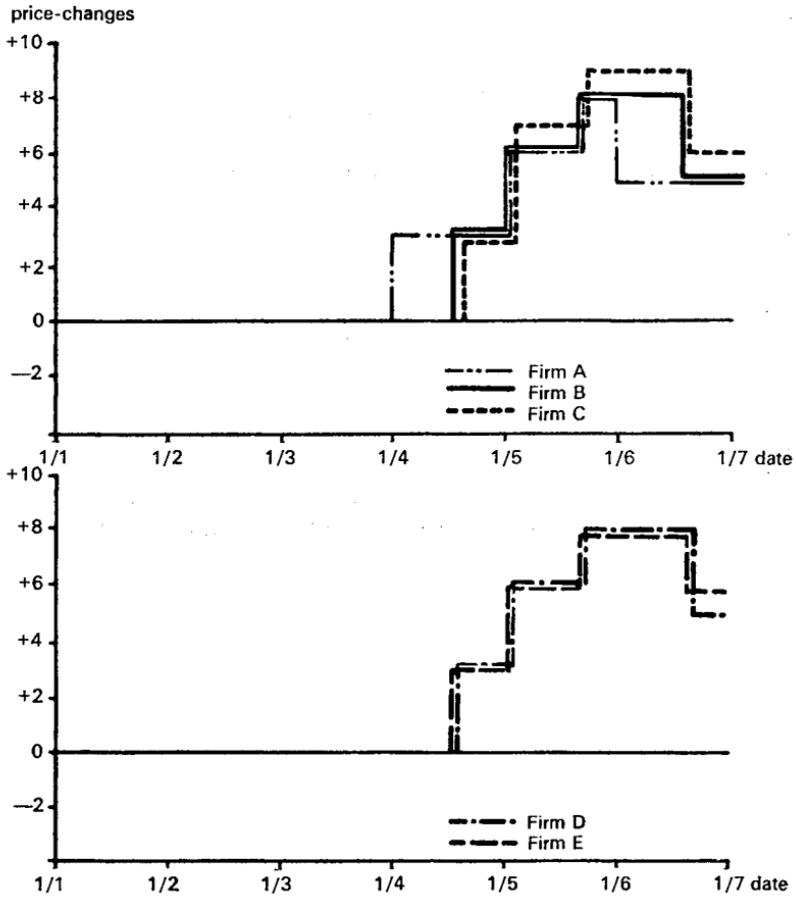


Diagram 20. Sugar.

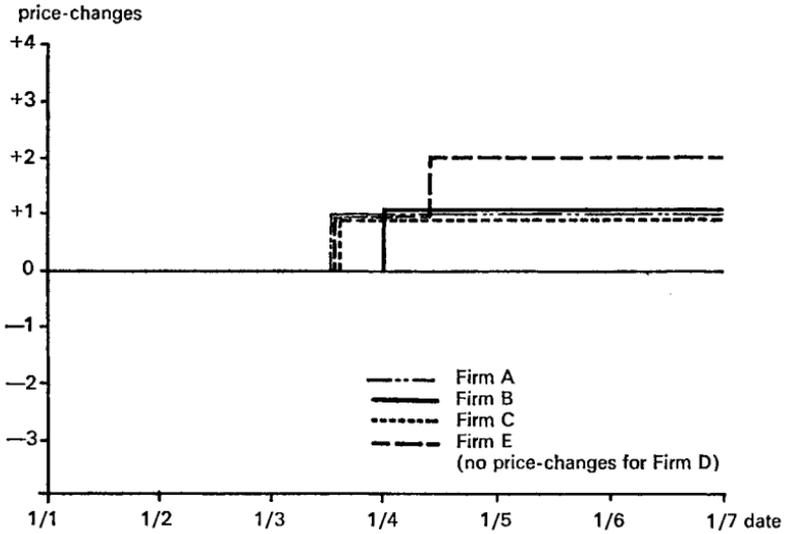


Diagram 21. Beer.

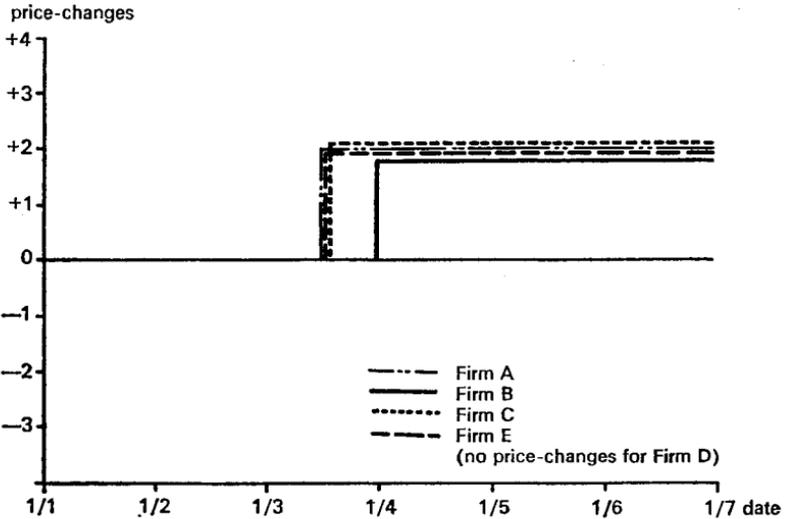


Diagram 22. Soft drink.

S.8 Supplement to Chapter 8

S.8.1 Translation of questions and main results of the interview study

Question 1 *Age*

Question 2 *Occupation*

Question 3 *Size of household*

Results Questions 1—3:

Occupation	Size of household	Age					Total
		21—30	31—40	41—50	51—60	61—	
<i>Female</i>							
Employed	1	4	1	1	—	—	6
"	2	1	—	1	1	—	3
"	3—5	1	2	4	—	—	7
Housewife	1	—	—	—	—	1	1
"	2	—	—	2	2	1	5
"	3—5	5	5	9	2	—	21
<i>Male</i>							
Employed	1	2	1	1	1	1	6
	Total	13	9	18	6	3	49

Question 4 Do you make your purchases more often in a certain store than in other stores

Results:

Yes	No	Total
38	11	49
78 %	22 %	100 %

Question 5 If yes, what store?

Results:

B	C	D	F	G	Total
9	13	2	12	2	38
24 %	34 %	5 %	32 %	5 %	100 %

By crosstabulation with Question 8:

- 2 who most often purchased in Firm B considered Firm B cheapest
- 2 who most often purchased in Firm C considered Firm C cheapest
- 2 who most often purchased in Firm D considered Firm D cheapest

Question 6 How many purchase trips out of 10 do you make there? (if yes, question 4)

Results: (see also Table 9, p. 148)

0—5	6—8	9—10	Total
3	24	11	38
8 %	63 %	29 %	100 %

Question 7 Apart from service, assortment and quality do you think you will get more for your money if you make your purchases regularly in a certain store? (Filter question.)

Results:

Yes	No	Total
49	—	49
100 %	—	100 %

Question 8 (If yes Question 7) Rank the 5 stores in Solna Center beginning with the most expensive one.

Results: See Table 7, p. 145.

Supplement to Chapter 8

Question 9 (If yes Question 7) If you make purchase for 100 Crs. in the cheapest store, what will the corresponding purchases cost you in the other four?

Results: See Table 8, p. 146.

Question 10 What do you think an expert would say?

Results:

Same opinion	Different opinion	No opinion	Total
24	10	15	49
49 %	20 %	31 %	100 %

(3 believed an expert would consider the differences to be smaller)

Question 11 Have you read or heard about any impartial investigations or consumer studies on food prices?

Results:

Yes	No	Total
24	25	49
49 %	51 %	100 %

Specific information	Vague memory	Total
19	5	24
79 %	21 %	100 %

Question 12 Indicate in the spaces provided, for these sixteen articles, how you consider prices to be in the five stores in Solna Center. Set a minus for those that are low, plus for those that are high and a zero for those in between. If you do not believe that there are any differences, set zeros for all. Also indicate the differ-

ences in öre (1/100 Cr.) between the cheapest and most expensive one.

Results: See Table 10, p. 151, Table 11, p. 152 and Table 12, p. 153.

Question 13 Do you believe it is worthwhile to visit several stores on one purchase trip because of price differences?

Results:

Yes	No	Total
41	8	49
84 %	16 %	100 %

Question 14 (If yes) Do you do so?

Results:

Yes	No	Total
20	21	41
49 %	51 %	100 %

Question 15 Have you heard the opinion of any friend or other consumer about food prices?

Results:

Yes	No	Total
40	9	49
82 %	18 %	100 %

Question 16 To what extent do you read food store advertisements in the newspapers or otherwise?

Supplement to Chapter 8

Results: (see also Table 13, p. 160 and Table 14, p. 161)

1. Not at all	8	16 %
2. Somewhat (5 also compare advertisements)	20	41 %
3. Reads thoroughly (17 also compare advertisements)	21	43 %
Total	49	100 %

Question 17 Do you buy more often in other stores than your usual one(s) when special prices are advertised?

Results:

Yes	No	No opinion	Total
9	23	17	49
18 %	47 %	35 %	100 %

Question 18 Note for each of these pairs of advertisements which one gives the most priceworthy impression.

Results: Table 15, p. 163.

Question 19 What food advertisements do you read?

Question 20 Are there any other food advertisements?

Results, Questions 19—20:

Aware of advertising of Firm:

	B	C	D	F	G
No. of persons	38	48	15	43	—
Percent	78 %	98 %	31 %	88 %	—

Reads the advertising of Firm:

	B	C	D	F	G	none	uncertain
No. of persons	24	35	4	24	—	9	3
Percent	49 %	71 %	8 %	49 %	—	18 %	6 %

Question 21 Do you find the advertising of any store particularly price attractive?

Results:

Yes	No	Total
25	24	49
51 %	49 %	100 %

Question 22 If yes, what store?

Results:

B	C	D	F	G	Unspec- ified	Total
—	22	—	2	—	1	25
—	88 %	—	8 %	—	4 %	100 %

Question 23 Do you think it is more expensive or cheaper to shop in stores that often change their prices?

Results:

Cheaper	More expensive	No difference	Total
27	2	20	49
55 %	4 %	41 %	100 %

Question 24 Do you believe certain stores change prices more often than other stores?

Results:

Yes	No	Total
40	9	49
82 %	18 %	100 %

Supplement to Chapter 8

Question 25 If yes, what stores.

Results:

B	C	D	F	G
1	39	—	—	1

(1 person answered both C and B)

Question 26 If the five stores had identical prices, how would you rank them with the best one first?

Results: Table 16, p. 167.

**S.8.2 Examples of advertisements representing Firms B, C and F in the pairwise comparisons in Table 10.
(English translations in parentheses.)**

Lambringa fryst (breast of lamb, frozen)	7: 90	Endivesallad hg (lettuce)	0: 49
Lammkotlett fryst (lamb chops, frozen)	7: 90	Morötter kg (carrots)	0: 95
Fläskfilé fryst (fillet of pork, frozen)	13: 90	Kum 33 cl retur (beer)	0: 45
Fläskkorv kg (pork sausage)	8: 30	Fraspannkaka mix (pancake mix)	1: 65
Frukostkorv kg (breakfast sausage)	10: 20	Wienersockerkaka mix (cake mix)	1: 70
Delikatesspastej 130 g (liver wurst)	1: 80	Wienerpepparkaka mix (cake mix)	1: 70
Böckling ca 500 g förp. kg (smoked herring)	5: 50	Nyfiskade räkor 1/2 kg (fresh shrimp)	8: 50
Grevéost 45+ (cheese)	9: 90	Rödspättafilé kg (fillet of plaice)	6: 50
Apelsiner kg 1: 30 5 kilo påse kg (oranges)	1: 20		

**S.8.2.1. Advertisement B. 3 (Represents Firm B)
(advertisement pairs no. 3, Table 10)**

Supplement to Chapter 8

Holländskt smör 1/2 kg (butter)	3: 75
Fläskkarré fryst (ribs of pork, frozen)	9: 50
Köttfärs (ground meat)	12: 90
Oxsvans (ox tail)	4: 30
Svintunga rimmad (pig tongue)	11: 60
Hot dogs 10 st (hot dogs)	3: 95
Isterband (pork sausage)	7: 90

Hallonbåtar 190 g (gum drops)	1: 25	Lakritsbåtar 190 g (liquorice)	1: 25
Bilå engångsassiätt 25 st (paper plates)	2: 15	Enson engångsbestick 25 st (plastic utensils)	1: 95
Bilå alldrycksbägare 25 st (paper mugs)	1: 48	Cobbelrör 100 st (drinking straws)	0: 90
Kumminstocklimpa 330 g (bread loaf)	1: 10	Kaffelängd 200 g (coffee bread)	1: 16
Apelsiner (oranges)	1: 25	Äpplen (apples)	2: 25
Endivesallad 1 kg (lettuce)	5: 50	Kronärtskockor styck (artichoke)	1: 95
3 st tulpaner (tulips)	2: 90	Krokus 3 lökar i kruka (crocus)	1: 95
Engelsk ölsejdel 57 cl (beer tankard)	1: 20	Classic kaffe 1/2 kg burk (coffee)	4: 90
Kaffefilter Nr 102 11 st (coffee filters)	1: 95	Fluff-blöja kort 30 st (diapers)	3: 20

(cont.)

(cont.)

Prissänkningar (Price-decreases)

Potatismos Blå Band (mashed potatoes)	(2: 05)	1: 95	Libby's Tomatketchup (tomato ketchup)	(1: 35)	1: 10
Slottssenap tub (mustard)	(1: 55)	1: 38	Taffel-Chips (potato chips)	(3: 00)	2: 50
Kalles kaviar (caviar)	(2: 40)	2: 15	Wasa husmans stor (hard bread)	(1: 74)	1: 48
Druvsaft 1,9 dl tetra (grape juice)	(0: 75)	0: 65	Apelsinjuice 1,9 dl tetra (orange juice)	(0: 75)	0: 65
Nyponsoppa Blå Band 15 port. (fruit soup)	(3 :95)	3: 45	Blåbärssoppa Blå Band (fruit soup)	(2: 10)	1: 85
Ärtor frysta (peas, frozen)	(1: 35)	1: 18	Broccoli frusen (broccoli, frozen)	(2: 25)	1: 90
Brytbönor frysta (beans, frozen)	(2: 50)	2: 10	Majsblandning fryst (corn frozen)	(2: 45)	2: 10
Tingsryds fatöl 45 cl (beer)	(1: 50)	1: 35	Vov hundmat (dog food)	(1: 85)	1: 60
Klara jätteflaska (detergent)	(3: 50)	2: 75	Via jättepaket (detergent)	(3: 75)	2: 75
Rustibuss blöja 30 st (diapers)	(4: 25)	3: 80	Leni Dublett 8-pack (toilet paper)	(4: 40)	3: 95
Cloetta Roulette (chocolate)	(0: 95)	0: 75			

S. 8.2.2.. Advertisement C. 3 Represents Firm C
(advertisement pairs no. 3, Table 10)

Supplement to Chapter 8

Hälleflundra (halibut)		13: 50
Stor rödspätta (plaice)		4: 80
Lake flådd (burbot)		6: 50
Gös (pike-perch)		4: 90
Varmrökt lax (smoked salmon)		21: —
Bogblad (shoulder-bone)	8: 90	
Oxfransyska stjärnkött (rump steak)	24: —	
Fläskfilé m. svampsås o. pot. (fillet of pork dinner)	4: 80	
Kalkon m. sallader, smör o. bröd (turkey dinner)	8: 75	
Chalet smältost 30 g (soft cheese)	(0: 80) 0: 65	
Henninger beer 33 cl (beer)	(1: 40) 1: 27	
Bakad leverpastej 130 g st (liver wurst)		1: 85
Entrecote stjärnkött (entrecote)		24: 20
Oxstek m. ärter, gräddsås o. pot. (steak dinner)		5: 25
Apelsiner ca 4 kg (oranges)		4: 60
Köttsoppa Findus 1/2-burk (meat soup)	(2: 10)	1: 85

S.8.2.3.. Advertisement F. 3 (Represents Firm F)
(advertisement pairs no. 3, Table 10)

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List of Figures and Tables

List of Figures

Figure	Page	
1	66	Extent to which firms claimed to consider each other's price-changes
2a–2c	99	Successive transformation from a traditional micro-economic framework to a psychologically extended framework (The prices and price images of competing firms are assumed not to change)
3	120	Generalization between different adjacent levels of analysis
4a–4b	123	Two extreme cases of generalization and discrimination in the price evaluation of an item
5	124	Possible influences of pricing on price evaluations
6a–6b	126	The hypothetical relative importances of different pricing influences, as functions of product differentiation in a psychological sense
7a–7c	131	Cognitive equilibrium and disequilibrium
7d–7f	132	Cognitive equilibrium and quasi-equilibrium
7g	133	Price image viewed as a complex function of past price evaluations
8	179	Varying the relative flexibility of pricing of a firm (expectation parameter)
9	181	Illustration of a simple strategy of increasing the flexibility of pricing
10	205	Continuous process of individual learning, due to discrimination on the item level of pricing
11	206	An integrated economic and psychological view of pricing
12	221–222	A game or decision theoretical illustration

List of Tables

Table	Page	
1	53	Number of price-changes
2	54–55	Relative flexibility of pricing for firms based on ranking by number of price-changes
3	56–57	Average absolute price-changes and ranking of firms
4	59	Accumulated price-changes for each product and firm
5	60	Degree of pricing independence
6A–6C	62	Degree of pricing initiative (within parenthesis the number of times a firm has had the pricing initiative)
7	145	Price image ranking of stores by interview persons from 1 (most expensive) to 5 (cheapest)

List of Figures and Tables

Table	Page	
8	146	Estimates by interview persons of how much a 100 Crs. purchase in the cheapest store would cost in the other stores
9	148	Price images of loyal buyers
10	151	Intraindividual variation in price evaluation rankings for different products
11	152	Correlation for each individual between price image ranking and "average" price evaluation ranking
12	153	Interindividual variation in price evaluation rankings for each product, and average correlation for all individuals, between price evaluation ranking and price image ranking for each product and individual
13	160	Comparisons between frequently and infrequently advertised items with regard to differences in buyer estimates of percentage differences in price between competing items (for different levels of advertising readership)
14	161	Price image differences for different levels of advertising readership
15	163	Pair-wise comparisons between the advertisements representing firms B, C and F
16	167	Non-price image ranking of stores by interview persons from 1 (most favorable) to 5 (least favorable)

Name index

- Abbott, L. 19, 21
Abelson, R. P. 116, 128
Ackoff, R. L. 28
Adam, D. 47, 136
Adelman, M. A. 14, 91, 92
Alderson, W. 13, 45, 73, 83, 190, 213
Allen, R. G. D. 212
Andrews, P. S. W. 42, 43, 106, 113
Aubert-Krier, J. 13, 14, 22, 40, 72
- Baily, M. J. 37
Balderson, F. E. 25
Baumol, W. J. 38, 214, 216
Bayton, J. A. 117
Behrend, H. 47, 184
Bertrand, J. 34, 212
Blackwell, R. D. 12, 26
Boring, R. A. 48
Boulding, K. E. 114, 115
Bowley, A. L. 212
Brems, H. 19, 22, 37–39, 88
Brown, F. E. 48, 168–170
Brown, R. 128
Bruner, J. S. 135
Burns, A. R. 36, 73, 74
Bush, R. R. 129
- Cassady, Jr., R. 40, 44, 45, 72, 103, 142
Chamberlin, E. H. 13, 23, 34, 107
Clark, J. M. 21
Clarkson, G. P. E. 28
Clemens, E. W. 37, 38
Coase, R. H. 25, 37, 38, 40, 100
Cohen, A. R. 189
Collins, B. E. 118, 127, 128, 135, 136
Cooper, P. 47
Cournot, A. 34, 44, 212, 213
Cox, R. 13
Crutchfield, R. S. 135
Cyert, R. M. 43, 44, 81, 176, 213, 228
- Dalrymple, D. 81
Danielsson, A. 28
Danielsson, S. 45, 52
Dean, J. 48
DeGroot, M. H. 213
Dirlam, J. B. 76
DLF 52, 110, 193
Dollard, J. 116
Doob, L. W. 135, 136
Due, J. F. 37
- Edgeworth, F. Y. 34, 36, 212
Edwards, W. 111
Emery, F. E. 47
Engel, J. F. 12, 26
Enis, B. M. 115
- Fellner, W. 35, 212
Ferguson, C. E. 44, 213
Festinger, L. 119, 128
Fishbein, M. 118
Fouilhé, P. 47, 136
Frenckner, P. 105
Frisch, R. 22, 212
- Gabor, A. 47, 168, 169
Gonsior, M. H. 48
Granger, C. W. J. 47, 168, 169
Grether, E. T. 13
- Hall, M. 40
Hall, R. L. 35
Heflebower, R. B. 76
Heider, F. 128
Hempel, C. G. 28
Henderson, J. M. 25, 33
Henle, M. 116
Hicks, J. R. 98, 104, 112
Hilgard, E. R. 129
Hitch, C. J. 35
Holdren, B. R. 37, 38, 41, 42, 71, 92, 101, 107, 109, 195, 198, 199
Holton, R. H. 22, 37, 38, 40, 41, 72, 100, 107
Hotelling, H. 36
Howard, J. A. 119

Name index

- Kaplan, A. D. H. 76
Katona, G. 28, 38, 118
Katz, D. 135
Kelley, J. L. 85
Kiesler, C. A. 118, 127, 128, 135, 136
Kihlstedt, C. 22
Kollat, D. T. 12, 26
Krech, D. 135
Kristensson, F. 214
- Langholm, O. 88, 91, 228
Lanzillotti, R. F. 76
Lazarsfeld, P. E. 118
Learned, E. P. 40
Leavitt, H. J. 48
Lewis, W. A. 40
Lindh, L. G. 40
Livs 93
Luce, R. D. 216
- Machlup, F. 21, 77
Madsen, K. B. 28
March, J. G. 43, 44, 81, 118, 176, 214, 228
Markham, J. W. 36, 74, 217
Mattsson, L. G. 80
McClelland, W. G. 46, 109
Mickwitz, G. 13, 19, 21, 39, 40, 102
Miller, D. W. 116, 215, 216
Miller, N. 118, 127, 128, 135, 136
Mindak, W. A. 115
Morgenstern, O. 35, 215
- Nagel, E. 28
Nelson, P. E. 45, 46, 92, 142
Neumann, J. von 35, 215
Nicosia, F. M. 119
Nowak, K. 120
Nyström, H. 45, 52
- Odhnoff, J. 214
Osgood, C. E. 115, 128, 130
Oxenfeldt, A. R. 11, 48
Ozga, S. A. 136
- Papandreou, A. G. 28
Persson, L. 18
Pfouts, R. W. 44, 213
Pigou, A. C. 112
P & K 78, 93, 146, 231, 232
- Praag, B. M. S. van 112, 113
Preston, L. E. 37, 38, 45, 46, 76, 80, 92, 100, 142
- Quandt, R. E. 25, 33
- Raiffa, H. 216
Ramström, D. 24, 114
Rasmussen, A. 19, 21, 23, 26
Robinson, J. 37, 71, 88
Rosenberg, M. J. 116, 128
- Samuelson, P. A. 38
Schelling, T. C. 215
Schlackman, W. 138
Schneider, E. 22
Scitovsky, T. 13, 76
Sessions, R. E. 83
Shapiro, S. J. 45
Shawver, D. L. 11, 71
Sheth, J. N. 117
Shubik, M. 35, 38
Siegel, S. 154
Simon, H. A. 28, 118, 176, 214
Smith, H. 40, 71
Smith, M. B. 135
Solomons, D. 105
SOU 12, 52
Spector, A. J. 115
SPK 47, 146, 147, 168–171
Stackelberg, H. von 34
Stendenbach, F. J. 129
Stigler, G. J. 35, 36, 74, 75, 91
Stoetzel, J. 47, 136
Suci, G. J. 115
Sweezy, P. M. 35
Sylos-Labini, P. 76
- Tannenbaum, P. H. 115, 128, 130
Thompson, D. 81
Tull, D. S. 48
- Vaile, R. S. 13
Walker, E. L. 119
White, R. W. 135
Wickström, B. 111
Wiechel, C. 144
Wikström, S. 47, 168, 169
Wärneryd, K. E. 72, 128
- Ölander, F. 48

Subject index

- action parameter 22, 209–211, 226
- advertising
 - general 38, 41, 107
 - item specific price (see also price advertising) 186
 - price image (see also price advertising) 186, 187
- analytical simplification 28, 29
- area of freedom, in pricing 80
- associative relationship 129
- assortment
 - dimension 15, 16
 - assumptions with regard to 21–24, 31, 32
 - combined 23, 31, 32
 - price level (see price level)
- attitude theory 117, 118, 134–136

- balance model 128
- Bayesian analysis 213
- behavior
 - definition of 117
 - optimizing 214
 - satisfying 214
- budget effect 198, 199
- buyer
 - definition of 12, 15
 - psychological dimension 15–17
 - welfare 87, 90, 96, 146, 192, 195, 202–204
 - loyalty 147, 148

- capacity to respond, of firms 109
- centralized/decentralized decision making 64–69, 82
- chain stores 12, 52, 190
- cognitive
 - equilibrium 116–118, 128–134, 193
 - structure 129
 - elements 129
 - limitations 117, 118, 176

- combined
 - customers 21
 - assortment (see assortment)
- communication effects, psychological 189
- communication of price decisions 64, 67–69, 81, 82
- competing items (see item(s))
- competition
 - active 13, 21, 72, 73, 192, 195, 211–225
 - passive 21, 72
 - perfect 21, 24, 34
 - imperfect (quasi-monopolistic) 34, 71, 72
 - monopolistic 13, 14, 24, 34, 71–73
 - viewed as depending on interaction between the item and assortment levels of pricing 13, 14, 42, 103, 226
 - between firms, rather than within assortments 25–28, 103, 169, 226
 - basic economic models of 34–36
 - fair/unfair 96, 194
- competitive legislation 12, 83, 84
- complementarity effects
 - traditional economic 25–28, 100
 - retail 13, 14, 25–28, 72, 100, 192
- congruity model 128, 130
- consistency theory 128, 135
- convenience goods
 - definition of 22
 - buyer price sensitivity for 13
 - main emphasis of the study to 20
 - applicability of standard economic models to 12–14, 25–28, 72, 98, 102–104
- conjectural variation 212
- co-operative firms 186, 188
- cost
 - functions 106–109
 - relationships, vertical 79, 80

Subject index

- cost-changes
 - in relation to price-changes 76–78
 - estimates by firms of proportion price-changes attributable to 79
- cost-plus prancing 35, 67, 76–80, 82
- cost push-through hypothesis 79
- cost(s)
 - average 76
 - common 77–79
 - discretionary fixed 107–109
 - fixed 76, 109
 - handling 27, 106
 - incremental 77, 105–109, 186, 219, 225
 - interrelated (joint) 38
 - inventory 27, 109
 - invoice (purchase) 77–80, 106–109, 201
 - marginal 37, 76
 - promotional 107–109
 - relative 80, 186
 - variable 76, 105–109, 194, 196, 201
- criteria
 - buyers' 22, 23
 - sellers' 22, 23, 41
- current goods 13, 22
- decentralized decision making (see centralized/decentralized decision making)
- deductive analysis 116
- demand
 - curves 35, 48, 98–103
 - kinked curve 35, 74, 75
 - elasticities 37, 76, 102, 112
 - oriented pricing 67, 77–80
 - interdependencies (see inter-related demand)
- descriptive analysis 30, 46, 80, 116, 207, 218
- decision theory (see game theory)
- discretionary fixed costs (see costs)
- discrimination
 - psychological 17, 119, 122–127, 138, 171, 172, 174, 191, 203, 204, 223, 227
 - price (see price discrimination)
- dissociative relationship 129
- dissonance model 119, 128, 133
- dominant firm 217
- dynamic analysis
 - definition of 15
 - general economic 38
- economic
 - effects (see instantaneous economic effects of pricing)
 - rationality (see rationality)
- empirical validity 28–30
- enterprise differentiation 13
- ex ante analysis 90
- expectation
 - elasticity 104
 - parameter 22, 209–211
- expectations
 - price 17, 135
 - in economic theory 135, 136
- experimental analysis 29, 48, 49, 228
- explorative analysis 33, 140
- ex post analysis 90
- firm
 - single-store definition of 12, 13
 - multi-store implications of 12, 51, 190, 201, 202
 - dominant (see dominant firm)
- food retailing
 - specific applicability of the analysis to 20
 - empirical data on 26, 41, 42, 44–46, 52–69, 78, 144–172
- formal logic (see logical reasoning)
- full cost pricing (see cost-plus pricing)
- game theory 35, 215–225
- gasoline retailing 40, 74
- generalization 17, 119–127, 138, 171, 172, 191, 202–204, 223, 227
- gross margin 106
- image
 - general 113–116
 - buyer price 17, 18, 92, 96, 103–105, 121, 145–157, 202–204

- buyer non-price 95, 137, 138, 165–168
 - of competing firms 217
- impulse buying (see unplanned buying)
- income effect 98, 112
- indifference curves 112
- inferior goods 98
- information
 - item specific price 17, 24
 - perfect 24
 - degree of price 25
 - buyer knowledge of cost 78
 - item specific quality 137
- instantaneous economic effects of pricing (see also interrelated demand) 25–28, 37, 188–191, 196, 197–201, 207, 219, 223, 226
- integration in distribution systems 80
- interrelated demand
 - in an economic framework 25–28, 37, 38, 40, 49, 100, 103, 104, 197, 198, 226
 - in a psychologically extended framework 37, 100, 104, 226
- investment theory 38, 91, 210
- isoprofit curve 181
- item(s)
 - definition of 22, 23
 - competing (cf. product) 23, 24, 32
 - identical 23, 24
 - selection of (in price study) 52, 230, 231
 - price level (see price level)
- kinked demand curve (see demand)
- learning
 - by buyers 17, 39, 47, 127–136, 138, 166, 174–183, 191, 192, 202–204
 - by firms (organizational) 44
 - theory 129, 136
- location aspects 18, 21, 83, 171
- logical reasoning 116
- long-run
 - psychological effects 18, 26, 92, 144, 171, 188–191, 196, 197, 199–201, 207, 210, 219, 223, 226
 - analysis 91, 92, 184, 203, 207
- loss leaders 192, 194, 195
- marginal analysis 76, 100
- marketing literature 33, 44–46, 113, 114
- mathematical programming 183
- maximum price 47, 136
- microeconomic theory, traditional
 - 11–16, 20, 33–43, 70–76, 85, 98–103, 107, 111, 112, 118, 125, 138, 140, 157, 170, 171, 226, 227
- minimum price 47, 136
- model, definition of 28
- monopoly 13, 21, 24, 34, 72, 73
- multi-period analysis 38, 39, 88, 90–92, 210
- multi-product analysis 11, 25, 36–38, 40–42, 45, 101, 195
- multi-store analysis (see firm, multi-store implications)
- normative analysis 98, 116, 173, 207
- observation set
 - of the individual buyer 15, 77, 113, 176
 - extended 177
- occasional goods 13, 100
- oligopoly 13, 14, 24, 34, 35, 44, 50, 72–74, 89, 187, 211–216
- operational analysis
 - need for 39, 41–43, 46, 73, 83, 106, 107, 208, 214, 218, 227
 - of price-change strategies 17, 50–63
 - of psychological variables 145–171
- operationality, degree of 28, 29
- optimizing behavior (see behavior)
- organizational aspects of pricing 67–69, 75, 80–83, 89, 109, 186–190, 210
- organizational learning (see learning)
- organization theory 43, 44, 118, 176
- parameter theory 19

Subject index

- price advertising (see also price promotion) 45, 125, 133, 155–165, 170, 186–190, 195, 201–203, 230, 231, 239–241
- price agreement, degree of 87, 89, 97
- price-changes
average 58, 67, 183, 213, 225
accumulated 58–60, 72, 96
group 60–63
isolated 60–63
- price-change strategy
absolute 50
relative 50
realized 50, 81, 105, 173
intended 50, 81, 173
expected 50, 105, 178
active 108, 109, 185, 186, 191
passive 106, 108, 185, 186, 191
- price consciousness of buyers 19, 47, 83, 116, 142, 143, 145–150, 168, 169, 175, 203
- price discrimination
definition of 17
model 37, 88
- price evaluation 17, 18, 121–134, 143–172, 193
- price evaluation sensitivity 143, 149, 158, 171, 172, 192, 198–200
- price follow up by firms 67–69, 75, 82
- price image (see image)
- price image learning (see learning by buyers)
- price image sensitivity 18, 77, 104, 105, 170, 180, 194, 199, 200, 219
- price interviews
with firms 63–69
with buyers 144–172, 236–242
- price leadership 35, 36, 68, 73–76, 217
- price level, assortment
absolute 89, 186
relative 86–97, 185, 187, 194, 202–204
point 86, 87, 90, 94, 96
period 86–90, 94–97, 185, 192, 203
measurement of 16, 17, 92–96, 146, 147, 169, 170
informational content of 25
- price level, item 125, 184
- price level equilibrium, degree of 87–90, 97, 185, 187, 203
- price policy 51, 69, 81–83
- price promotion (see also price advertising) 17, 18, 51, 106–109, 198, 211, 212
- price sensitivity of buyers 13, 17, 19, 69, 72, 83, 103, 116, 143, 145–150
- price wars 78
- pricing
extended view of 18–20, 226
strategy, definition of 21, 22
dependence/independence 60, 61, 67, 68, 72, 82, 89, 187
flexibility of 45, 54–58, 67, 82, 88, 89, 104, 108, 109, 149, 178–187, 192, 199, 203, 213, 218–225, 241
initiative 45, 61–63, 68, 75, 82, 89, 108, 178, 184, 213, 225
response 63, 68, 69, 82, 108, 187
uniformity 58, 68, 82
organization (see organizational aspects of pricing)
- product
definition of (= set of competing items) 23, 24, 32
viewed as generalized service capacity 14
as basic assortment unit 19
homogeneity of 24, 25, 75, 95, 193
- product differentiation 13, 16, 18, 23, 27, 102, 125, 155, 185, 193–195, 199, 203
- profit function 106
- psycho-logic 116
- psychological
dimension 15–17
consistency 15, 114, 117, 135
equilibrium 114, 128–134
interaction between the item and assortment levels of pricing (see also long run psychological effects) 14, 37, 104, 143, 150–158
threshold 184
increasing returns to scale 202
theory 29, 116

- quality
 - competition 19, 20, 41, 228
 - interaction with price 48, 136–138
 - evaluation 137, 165, 166
 - image (see image, non-price)
- quantity discounts 27, 109
- quasi-equilibrium 133

- rationality
 - economic 15, 102, 111, 112–114, 117, 138
 - psychological 114
 - bounded 118
- realism of basic assumptions 28–30
- reaction functions 44, 211–215
- recommended prices 52, 232
- retail complementarity (see complementarity effects)
- rules of thumb in pricing 82

- satisfying behavior (see behavior)
- self-service retailing 12, 20, 77, 108, 109
- service 18
- shopping goods 13, 22, 72, 100
- short-run analysis 91, 92, 104
- short term price reductions (see special prices)

- simulation 228
- single-period analysis 38
- single-product analysis 11, 36, 39, 40, 45, 72, 81, 100, 138, 195
- single-store analysis (see firm)
- special prices 52, 67, 94, 108, 110, 158, 169, 187, 190–197, 199
- structural changes (in the distribution system) 11, 12
- stimulus-response model 129, 174
- strategy
 - definition of 21
 - explicit 191
 - implicit 191
 - price-change (see price-change strategy)
 - pricing (see pricing strategy)
- substitution effects
 - in economic models 25–28, 98, 100, 104, 112
 - brand substitution 26

- theoretical controllability 28–30
- time dimension 15–17
- traffic effects 190–197
- transfer effects 42, 198

- unplanned buying 12, 13, 26, 27, 37, 43, 192, 198

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