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# Customer Responses to Retail Meat Prices and Ads

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## PREFACE

This research was conducted under Missouri Agricultural Experiment Station Research Project No. 25, Analysis of Strategy and Structure Within the Livestock-Meat System. This study of customer behavior at the meat counter has the objective of increasing the understanding of all elements of the industry from producer to consumer.

Supermarkets manipulate several variables over time and particularly ads and item prices as parts of a merchandising strategy. The major part of this case study is concerned with customer response to weekly variations in ads and prices for various meat items. The general magnitude of sales response of specific items to ads without price changes and to price changes with and without ads is shown. Those responses are shown to differ between two supermarkets with different types of advertising-pricing patterns. A final part of the study examines customer response to price as an indication of quality in ground beef.

## INTRODUCTION

In the multi-product retail food store, weekly featuring of selected items, by ads or price cuts or the two combined, may have as its goal an increased volume of sales of those items. Another possible short-term goal is to increase storewide sales. The premise is that customers who are induced to shop for the featured items will do other buying as well. But merchandising strategy has longer term objectives, too. One, prosaic but important, may be to call attention repeatedly to the store's presence in the market. A fourth possible purpose may be to build a certain image of the store as to price competitiveness, quality and depth of its product line, convenience, friendliness of its personnel, etc. [1, pp. 89-95]. All these purposes are part of an overall objective of promoting maximum total sales and profits.

Selective reduction of prices may be the familiar price "special"—a term used to describe prices reduced briefly (a week or a weekend) and then restored to their regular level. Nelson and Preston developed a broader concept of variable-price merchandising. They described it as "the simultaneous and sequential manipulation of selected prices upward and downward in order to draw attention to the market offerings of the firm and to differentiate them from those of its competitors" [7, p. 4]. The concept goes beyond the concept of the special by including both raising and lowering of price, by questioning the idea of a "regular" price, and by including price changes of varying

length. While one might presume that price reductions may better "draw attention" if advertised, Nelson and Preston focused on price changes while observing that there were some unadvertised price changes and some ads with unchanging prices [7, p. 5].

This paper is based upon detailed data collected on prices and weekly movement for most meat items in two medium-size supermarkets for 7 weeks in one and 8 weeks in the other. The two markets—one a unit of a large local chain and the other an affiliate of a wholesale group—were about 2 miles apart in the same general type of residential area in the suburbs of a large Midwestern metropolitan area.<sup>1</sup> The two supermarkets employed differing strategies of pricing and of advertising. This paper focuses upon customer response to these differing strategies insofar as it could be measured by the short-term data available. Such responses should be of interest to those interested in consumer behavior or in retail merchandising strategies. While perhaps of some interest to the general economist, these customer responses in a store are considerably removed from the normal measures of demand elasticity.

Store I developed an everyday reasonable-price image by advertising repeatedly numerous meat items at quite competitive prices. Few of the meat items in its ads exhibited price changes and not many of the price changes were advertised, although a few were weekly specials (Table 1).

TABLE 1 -- AVERAGE WEEKLY NUMBER OF ADS AND PRICE CHANGES<sup>a/</sup>  
BY STORE

	Store I	Store II
Price Up: Total Items	7	14
Away from Modal Price	1	4
Toward Modal Price	6	10
Price Down: Total Items	8	11
Away from Modal Price	7	9
Toward Modal Price	1	2
Ads-Mentions with Price Cut	3	4
Ads-Mentions with Price Unchanged	19	2
Ads-Mentions with Price Raised	1	0.3

<sup>a/</sup> Price in Week t compared to price in Week t-1.

Store II relied much more upon weekly specials. Items did not appear repeatedly in the ads. A majority of the ad items were price reductions—usually for that week only. The general level of all meat prices was about 7 percent higher in Store II than in Store I, but the advertised price reductions averaged considerably larger in Store II. Store II, during the study period, made more price changes than Store I, and conformed a bit more closely to the VPM model. Thus, Store II did move prices of an average of four items per

week above their regular level at the same time it reduced prices of nine items below their regular prices. The price-changing pattern of Store I was more nearly a matter of temporary price reductions (Table 1).

### ITEM SALES RESPONSE

To what extent was a sales change associated with a price change? To what extent was inclusion of the item<sup>2</sup> in the weekly ad, with or without a price reduction, associated with a sales increase?

#### Price Changes, With and Without Ads

Uhl's results with studies of consumer perception of food price changes suggest that responsiveness is likely to be greater to advertised price changes than to those not advertised. His results also suggest a greater sensitivity to price increases than to price decreases [12].

In both supermarkets, price changes were made ordinarily on Wednesday to coincide with Wednesday ads. Most prices were restored after a one-week change.<sup>3</sup> Most price changes were reductions initially, so most price increases were the aftermath of a one-week reduction (Table 1).

Table 2 provides examples of the kind of item response data available in this study. Such data are of interest to store management as they plan their

TABLE 2 -- SALES RESPONSES TO PRICE CHANGES, WITH AND WITHOUT ADS, SELECTED ITEMS

	Prices*			Ad in week t	Pounds Sold		Elasticity
	Week t-1	Week t	Modal		Week t-1	Week t	
<u>Store I</u>							
Chicken Legs	75	59	75	yes	67	113	-2.1
Split Broilers	47	38	47	yes	53	433	-7.4
Spare Ribs	89	79	89	no	192	134	+3.0
Delmonico Steaks	209	199	209	no	54	76	-6.9
Center Chuck Roast	68	74	68	yes	104	86	-2.2
Ham Butt	39	49	49	yes	175	265	+1.8
Top Round Rst. B. O.	129	149	129	no	47	30	-3.1
<u>Store II</u>							
¼ Pork Loin	89	69	89	yes	223	560	-3.4
Ham Slice B. O.	119	99	119	yes	116	472	-6.6
Polish Sausage	95	69	95	yes	67	120	-1.8
Fam Pak Ground Beef	65	59	65	no	658	818	-2.2
Arm Roast	109	99	109	no	74	49	+4.2
Cut-up Fryer	29	39	53	no	377	421	+0.4
Blade Chuck Steak	59	82	85	no	104	64	-1.5
Cut-up Fryer	39	53	53	no	421	266	-1.5
Pot Roast B. O.	129	149	129	no	49	35	-2.3

\*Prices are cents per pound.

advertising and pricing patterns. Item sales responses are not the whole story, of course. Special prices and ads are part of an overall promotion of the whole market basket, and item responses, alone, are not a full measure of store sales response to promotion.

The customer responses to about three out of every four advertised price cuts were elastic<sup>4</sup> (Table 3). A majority of these elastic responses fell in the range of -2.0 to -7.0. The maximum elasticity was -10.9. When price cuts went unadvertised, only one-half elicited an elastic response and a surprising 38 percent had reductions in quantities sold. Responses to price increases without ads tended to be greater (a higher proportion of elastic responses and fewer positive responses) than responses to price decreases without ads (Table 3). Thus the greater responsiveness to advertised price changes and to (unadvertised) price increases as compared to decreases are both consistent with Uhl's findings [12].

TABLE 3 -- IMMEDIATE SALES RESPONSES TO PRICE CHANGES AND ADS

Store	Price-Ad Stimulus	Total Observation	Percentage of Quantity Responses		
			Opposite to Price Change		Same as Price Change
			More than Proportionate	Less than Proportionate	
I	Cut-Ads	20	55.0%	25.0%	20.0%
II	Cut-Ads	22	95.5	0.0	4.5
Total		42	76.2	11.9	11.9
I	Cut-No Ads	35	45.7	11.4	42.9
II	Cut-No Ads	44	54.5	11.4	34.1
Total		79	50.6	11.4	38.0
I	Raise-No Ads	44	65.9	9.1	25.0
II	Raise-No Ads	85	63.5	13.0	23.5
Total		129	64.3	11.7	24.0

Notes: Data summarize responses in quantity in terms of changes from preceding week to current week on an individual-item basis, as associated with the specific direction of price change on each item, and according to whether or not it was advertised. Observations were excluded when sales were zero in either week since this usually reflected a decision not to stock the item, rather than consumer response. Items were generally excluded unless the total range in weekly sales was at least 25 pounds.

It is clear that the advertising of price cuts tended to increase customer response. One of the most dramatic illustrations of response to ads was a two-consecutive-week price reduction of whole broilers in Store II. In week 2, price was cut from 39 to 29 cents a pound. In week 3, the 29 cents was maintained but was advertised for the first time. Weekly sales for weeks 1 to 3 were 219, 174, and 2,376 pounds, respectively.<sup>5</sup> In view of this kind of dramatic response, why did some ads—a minority—bring little response? One can hypothesize explanations such as more attractive ads in competing stores, or consumer failure to perceive that the ad represented a price cut.

These measurements of customer response should be interpreted in terms of the narrow situation described. Each one refers to a change between two consecutive weeks for a single item. However, there were five items for which a single price change was made near the middle of the period of observation and continued thereafter, so that average sales for 4 weeks before the price change could be compared with average sales for four weeks after. The elasticities computed for this longer period had considerably less dispersion than those from the immediate responses (Table 4). The two positive elasticities of the week to week measurements did not carry over the eight-week period measurement; elasticities for the latter measurement were less in the other three cases.<sup>6</sup>

TABLE 4 -- SHORTER AND LONGER PERIOD SALES RESPONSES

Item	Price Change	Weeks Advertised	Immediate Elasticity	Whole Period Elasticity
(1) Center Chuck Roast	68¢ to 74¢	1, 2, 3, 4, 5	-2.2	-0.8
(2) Arm Roast	88¢ to 94¢	1, 2, 3, 4, 5	+3.7	-2.6
(3) 7-Bone Roast	78¢ to 84¢	none	-1.3	0.0
(4) Sirloin Steak	137¢ to 134¢	2, 4, 5, 7, 8	+2.8	-1.2
(5) Whole Broilers	43¢ to 39¢	none	-6.0	-3.2

Note: Price change was made between weeks 4 and 5, except for item (5) which was between weeks 5 and 6.

### Advertising Without Price Change

Store II occasionally, and Store I more frequently, advertised items for a single week without a price change. Of 23 observations, 13 had an increase in sales and 10 a decrease, comparing the week of the ad with a previous week of no ad. Ads without price cuts did not appear to have been a dependable short-term stimulant to the sales of the items listed, although they may have contributed to other goals.

### AGGREGATE SALES RESPONSE

Since it has been demonstrated that ads and price changes influenced sales of individual items in a majority of instances (Table 3), were the weekly variations in total sales of *species* of meat associated with variations in the total number of items which had price changes and/or appeared in the ads? To a considerable extent, yes. Most of the see-saw variations in the pork and beef sales totals of weeks 3 to 7 in Store II (Figure 1) were the kinds expected to be associated with the changes in ads and prices. For example, in week 4, the number of pork ads increased, there were more pork price decreases than increases, and pork sales were up. Comparison of stores I and II also supports the thesis. Store I generally had fewer and smaller weekly fluctuations in its

beef and pork sales totals. It had much greater stability in its total number of ads for pork and beef, and it made fewer price changes.

Total meat department weekly sales were affected noticeably by "specials" on one occasion in each store (Figure 1). Note that the week to week variations in total *dollar* sales in each store were typically less than 5 percent. It seems likely that larger fluctuations in the number of ads and in prices would have produced larger variations in weekly total meat sales than recorded here. The advantages of such fluctuations to a meat department are not obvious while the accompanying managerial problems of inventory control and labor scheduling are apparent. Thus, it is quite likely that both stores generally restricted their actions so as not to generate sharp fluctuations in weekly sales. Store I's repetitive ads and relatively few specials were consistent with stability of total sales. Store II had greater instability because of its greater dependence upon specials; its coefficient of variation of total weekly tonnage was nearly twice that of Store I.

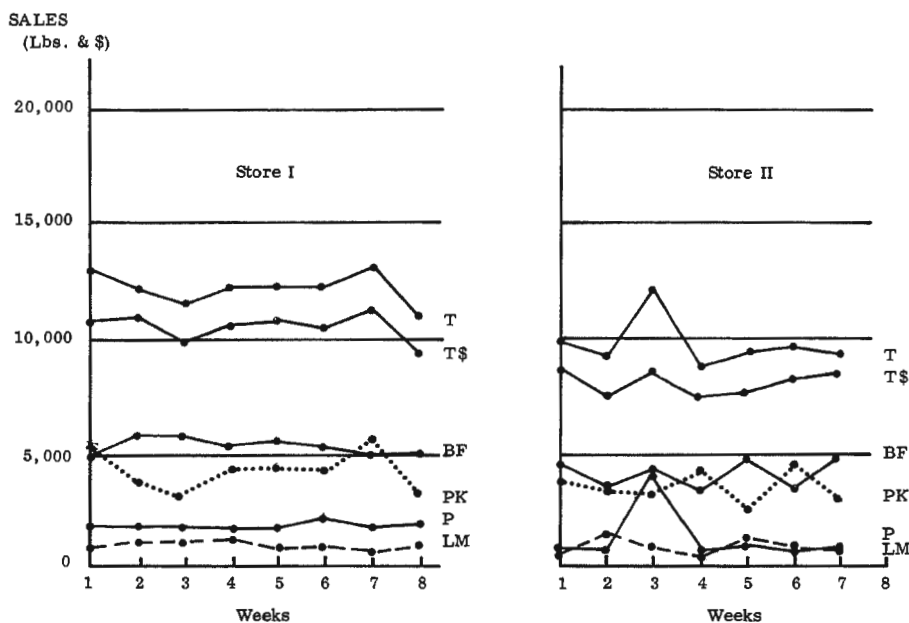


Figure 1. . . Weekly Sales by Category

### Response to Store Strategy

There is evidence suggesting that customers in each supermarket understood the general nature of these prevailing advertising-pricing patterns. The response in the two stores to *advertised* price cuts was quite different. In Store II, where 58 percent of the advertised items had price cuts, 95.5 percent of



the sales responses to such specials were elastic. In contrast, in Store I, where only 13 percent of the ad items were price cuts, only 55.0 percent of the responses to the specials were elastic (Table 3). There was no difference in the two stores as to response to price *increases* and little difference in their response to unadvertised price-cuts. Thus, the customers seemed to differ not in their response to price changes, but in their awareness of them. Store II customers had found that they could rely more on the ads to shop for "bargains."

### PRICE AS AN INDEX OF QUALITY

The study produced incidental observations on the topical issue of whether customers who find it difficult to judge quality of a product accurately may tend to rely upon price and other guides furnished by merchandisers [5, 8, 11]. Ground beef appears to be an excellent example of such behavior. Store I had four categories of ground beef listed in ascending order of price as ground beef, ground chuck, ground round and ground sirloin. Store II lacked ground sirloin. These categories, as they are commonly used across the country, are generally understood by meat merchandisers to refer to leanness rather than muscle origin. These particular muscle origins are meaningless as indications of eating quality of a ground product, and it is common knowledge that meat departments have generally not felt bound by these designations in running their grinders [2,6]. Thus the cost of the ground beef is virtually a linear function of its percentage of leanness. Likewise, the intrinsic quality of ground beef is a direct function of its percentage of lean meat. Therefore, these customers paid far more for meat in the leaner categories than was justified by their content (Table 5). While sales of the lowest priced ground beef were larger, large quantities of ground chuck and ground round, and even 87 pounds per week of chopped sirloin were sold. Store I did so much more successful a merchandising job than Store II with these higher priced cuts that it realized 5 cents (6.8%) a pound more on total ground beef sales. This was done even though it priced each item at or below the price charged by Store II. It's always possible to argue that consumers received more psychic satisfaction from eating ground round than the cheaper ground beef. If not, then purchasers of expensive ground beef paid considerable for their lack of product knowledge.

TABLE 5 -- INDEX VALUES OF QUALITY AND PRICE DIFFERENCES

Item	Leanness Value	Store Prices	
		I	II
Ground Beef	100	100	100
Ground chuck	105	122	122
Ground round	110	137	136
Chopped sirloin	115	150	NA

Note: The value differences correspond to average differences in leanness claimed by the stores. Published reports indicate that such differences are typically less [2.6].

The empirical example above has a textbook parallel. Scitovsky argues that sellers in an uninformed market will frequently find it profitable to engage in just such price discrimination, where "differences in prices are out of proportion to differences in quality" [10, p. 477]. He argues further that such situations may lead to a leveling effect on consumers' welfare if—to return to our example—higher income consumers buy mainly the higher priced ground beef and lower income consumers buy mainly the cheaper [10, Ch. 25]. The relative incomes of the buyers were not available in this study to verify that assumption. However, it is plausible that this pricing practice in ground beef encouraged the supermarkets to price their cheapest ground beef lower than they would have if they had not price discriminated so successfully with ground chuck, ground round, etc.

### SUMMARY AND CONCLUSIONS

About 62 percent of the sales responses to an unadvertised price cut for a week on a meat item were elastic in an eight-week study in two supermarkets. The percentages of elastic response were higher when the price cuts were advertised. The responsiveness to advertised price cuts was much higher in Store II than Store I. Store II with a generally higher level of meat prices, consistently had sizeable price cuts in a majority of its ads. On the other hand, Store I advertised relatively few price cuts in its ads. The total evidence suggests that customers generally responded in the expected direction to price changes of which they were aware, and that awareness of price cuts was much higher with the advertising-pricing pattern of Store II.

Week to week variations in total dollar sales of meat were typically less than 5 percent in each store. Store I's advertising-pricing pattern was accompanied by rather stable weekly sales of beef, pork, and poultry. Store II had larger fluctuations of beef, pork, and poultry sales but generally balanced a pork sale with higher beef prices, and vice versa, resulting in mostly offsetting sales fluctuations. Store II's version of variable price merchandising with its greater relative fluctuations in the sales of most items and of most aggregates resulted in more inventory and labor management problems than Store I's version of variable price merchandising.

As a side result, ground beef was found to be a good example of the situation in which uninformed consumers rely upon name and pricing guides furnished by merchandisers. Both stores were quite successful—and store I especially so—in selling the leaner types of ground beef (ground chuck, round, sirloin) at prices considerably out of proportion to their relative leanness.

These results have the limitations of all case studies. They are not generalizable to a statistical population. On the other hand, the results are based on empirical data that has seldom been available to public researchers. The inferences are generally consistent with findings of related research. Moreover, in the multi-variate world of U. S. food retailing, the limitations listed above apply in much the same degree to all existing studies. Thus, these results are submitted, not as definitive answers, but as a few more pieces of evidence.

## Footnotes

<sup>1</sup>Details of research procedure are available from the senior author.

<sup>2</sup>"Item" refers to the most specific unit identifiable—e.g., ground round in 1 pound packages; "category" refers to common groupings such as ground beef or pork loins; "species" refers to beef, pork and poultry.

<sup>3</sup>Wholesale meat prices were quite stable during the study period (summer 1971).

<sup>4</sup>"Elasticity" as used in this paper refers to the simple ratio of percentage change in quantity over percentage change in price from one period to the next. The measures computed should not be interpreted as demand elasticities in the usual sense; there were no adjustments for variation in other factors in order to estimate specific demand functions. This paper deliberately refers to customer response or sales response rather than to demand elasticities. Direct comparisons are obviously not applicable with published elasticities for beef, pork, or poultry based on long term national aggregates, nor even with the retail elasticities of Dooley or Holdren [3,4]. Holdren's analysis for example, involved observations of price differences in an index of 46 grocery items in one store versus its numerous competitors. While these results are somewhat comparable to Purcell and Raunika's [9] pork and beef elasticities of demand computed from weekly panel data, there are important differences in models and their results apply to a given set of consumers while the weekly sets of customers in a store vary in an unknown manner.

<sup>5</sup>From the stores' point of view, consumer response was so large in week 3 as to cut severely into the meat department gross margin for that week and into the gross margin on broilers for the whole period.

<sup>6</sup>These results appear consistent with Purcell and Raunika's findings that price elasticities over longer periods were generally lower than those for week to week changes [9]. Week to week responses are probably greater because the price changes are expected by many customers to be temporary.

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