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THE INFLUENCE OF CONSUMER
PRICE INFORMATION ON THE STRUCTURE, CONDUCT
AND PERFORMANCE OF FOOD RETAILING

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This article reports the results of research in which the authors had the rare opportunity to manipulate the variable of interest -- market information (retail food prices) -- and to monitor the effects. Contrary to conventional assumptions, it was assumed that consumers have inadequate information with which to rationally choose retail food stores and hence are unable to accurately express their preferences in the market place.¹ The research examined the influence of increased comparative price information (provided by a public agency) on the level of dispersion of retail food prices and the level of consumer satisfaction. Perceived and estimated benefits of the information program were also assessed.

Research Design

A pretest post-test control group research design was employed. Two Canadian metropolitan areas, Ottawa-Hull and Winnipeg, were used as test and control markets respectively. Prices were collected weekly on 65 food products in 26 supermarkets in the test market and in 6 supermarkets in the control market.² There were three phases of the study, all of which were done under the auspices of the Food Price Review Board of Canada.

Phase I was a 17 week pre-information period during which prices in test market stores were collected and summarized but not published. Surveys of consumer satisfaction and shopping behavior in the test and control markets were also conducted.³

Phase II was a 5 week information period during which prices were collected weekly in both the test and control market supermarkets. Comparative price information on one-half of the items and for a weighted market basket was published weekly in the test market through daily newspapers and by direct mail to a sample of consumers. Prices in the control market were collected but not published.

Phase III was a 6 week post information period during which prices in both test and control markets were collected and summarized but not published. Post-test surveys of consumer satisfaction and shopping behavior were conducted in both markets.

Major study hypotheses were:

1. Significantly different prices for a standardized market basket of food products would be charged by competing sellers prior to the dissemination of comparative price information.
2. The public dissemination of comparative price information would reduce the dispersion of prices across stores and lower the average market price level in the test market.
3. The level of consumer satisfaction with food stores and food products would increase significantly in the test market as a result of the comparative price information program.
4. The perceived and estimated value of comparative price information would exceed the cost of providing such information.

The impact of increased price information (Phase II) in the test market was substantial. Average market price dropped 7 percent and then quickly rebound after the cessation of published price comparisons. Consumer satisfaction in the test market was also favorably influenced by

the information program. Consumers indicated a willingness to pay far more for the comparative price information than the costs of the program.

Theoretical Role of Information

Most economic models assume (implicitly or explicitly) that market participants have adequate information for rational decision making. Notwithstanding the work of Stigler (1961), Diamond (1971), Rothschild (1973), Salop (1976) and others, few economists have considered the theoretical consequences of inadequate information and virtually no models have been developed to comprehensively evaluate the consequences of improving market information.

Classical economic theory reveals noticeable imperfections in addressing the disequilibrium problem in imperfectly informed markets. Boulding (1966) asserts:

We can think of the development of imperfect markets as a result of the fact that when commodities become extremely diverse and complicated, when we have to know not only their price but also their quality, arbitrage in effect breaks down, because the cost of acquiring the relevant knowledge is more than the market is willing to support. Hence we get imperfect markets facing both buyers and sellers ... the problem of knowing what are the sales or purchase functions becomes not only acute but almost insoluble, simply because in order to know a function we must have experience with a system beyond its present point. It is this failure to understand the epistemological problem involved which has vitiated much of the otherwise laudable attempt to expand the theory of perfect competition to imperfect markets.

If the problem is a deficiency of information then a consequence can be prices that are higher than competitive norms. If buyers are unable to differentiate between offers in various stores, the market can theoretically support a wide range of prices for a single commodity. The fundamental role of buyers in evaluating and consequently influencing price levels

is significantly impaired. Moreover, economic theory at even the most fundamental levels recognizes that this offers potential advantages to sellers in these circumstances.

In a perfectly competitive world, employers who develop a taste for discrimination will be undersold by less discriminating entrepreneurs .. while perfect competition will not support discrimination, markets with imperfect information will. (Rothchild, 1973).

The likelihood of poorly informed buyers is closely related to the level of buyer search.

Theory of Buyer Search

In one of the early articles on information, Stigler (1961) said:

Prices change with varying frequency in all markets, and unless a market is completely centralized, no one will know all the prices which various sellers (or buyers) quote at any given time. A buyer (or seller) who wishes to ascertain the most favorable price must canvass various sellers (or buyers) - a phenomenon I shall term "search".

Emphasizing the fact that price dispersion is "ubiquitous even for homogeneous goods", Stigler develops the thesis that the degree of price dispersion for homogeneous products depends upon the level of buyer search. Based upon the factors identified by Stigler, the amount of buyer search is hypothesized to be affected by the following:

- Search depends upon the expected savings from search. This in turn depends upon the expected dispersion of prices (potential savings per unit), the quantity of the product to be purchased, and the proportion that expected savings represent of buyer income.
- Search depends upon the expected correlation of prices over time since this affects the potential savings in future time periods from current search.
- Search depends upon the cost and complexity of the search task. If it is assumed that buyers (and sellers) equate the marginal cost of search to the expected marginal benefits, then factors

which increase the cost of beneficial search -- such as large geographic markets or complex purchase environments -- tend to discourage the quantity of search. (In addition, if it is assumed that buyers will purchase only when the level of uncertainty is acceptable, then the cost and difficulty of search is likely to influence the quantity consumed. The cost of search is a cost of purchase.)

Stigler's article focuses primarily on markets with homogeneous products. In such markets, price dispersion represents an undesirable imperfection. In markets with differentiated product-service offers, however, some degree of price dispersion is expected if buyers perceive alternative product-service offers as imperfect substitutes. Thus, the point of concern in differentiated product markets is not whether price dispersion exists, but rather whether the dispersion reflects buyer preferences and seller costs. Buyer search would appear to play an important role in policing the "accuracy" of price dispersion in all product markets.

The retail food store-consumer market is characterized by repetitive transactions, a positive influence on the amount of accumulated search. However, while the total expenditures by consumers for food is very large and the potential savings from selecting a low priced store may also be substantial, consumers may perceive relatively small savings since they are achieved in small increments. Even though the quantity of items purchased per year is very large, a few pennies here and there may not seem as worthwhile as the 30 or 40 dollars that might be saved on a television set by search of the various retailers.

In addition, the cost and complexity of the comparison task is very likely to discourage search. With eight or nine thousand items in a typical supermarket, price comparisons would be difficult even if all other factors

were equal. Given the differences in the quality of products carried and the services offered, search becomes extremely complex. This is further compounded by the frequent price changes which characterize food retailing and probably reduce the correlation of prices at individual stores over time.

The foregoing suggests relatively low levels of search in the retail food market and a high probability of price dispersions across stores which inaccurately reflect differences in consumer preferences and seller costs. The question is, what happens to the market price level and to the dispersion of prices when the level of comparative price information is improved?

Competitive Behavior in Imperfectly Informed Markets

Perfect competition and monopoly represent the two extreme market models in economic theory. To consider information's impact on market conduct in structurally different markets, we first examine two models which approach these theoretical extremes.

Model I. Consider a market that contains a large number of firms selling a homogeneous product to a large number of buyers. If firms have similar cost curves and buyers and sellers have perfect information, prices will converge to a single equilibrium price, P^* , which approximates firm marginal costs.

Now assume the above conditions with one exception, imperfect price information exists among buyers. In this case, a single price will not likely prevail. If it is assumed that P^* is essentially the floor price and that firms are not expected to quote prices below marginal cost, the average price at equilibrium will be above P^* .

Under these imperfect conditions, the dissemination of additional comparative price information is expected to reduce the dispersion of prices between firms and lower the average price level. The more perfect the information, the narrower the price dispersion, and the closer the equilibrium price level will be to P^* . In other words, the accuracy with which the prices reflect both costs and preferences (pricing efficiency), would be expected to improve.

Model 2. Consider a market that has a few firms selling a homogeneous product to many buyers. If firms have similar cost curves and buyers and sellers have perfect price information, prices will converge to a single equilibrium price P^{**} . If seller interdependence is high, theory and empirical evidence suggest that P^{**} would be higher than P^* (assuming all economies of scale are achieved with an atomistic market), but below the monopoly price P^m . (If we assume a collusive oligopoly, the single equilibrium price would be P^m .)

If the buyers in this market have imperfect price information, a single price may not prevail. The equilibrium condition will likely be characterized by a dispersion of prices, the average of which may be higher or lower than P^{**} . Since in this case P^{**} does not equal marginal costs, it does not represent a cost floor.

Under the above conditions, the dissemination of additional comparative price information would be expected to reduce the dispersion in prices but may or may not change the average price level. If prices reflect a normal distribution around P^{**} , the average market price level would not be expected to change with additional information. If improved information made it easier for firms to collude, the average market price

level could be expected to increase toward P^m . Alternatively, however, it is also possible that improved information might reveal that the profit maximizing price P^m was indeed lower than collusive sellers thought it was under imperfect information conditions.

If we assume a firm has power over prices it becomes theoretically impossible to predict if prices will go up or down as a result of additional price information. The probability of a price decline may increase as theoretical constructs approach the perfect market (less probability of collusion) but assumptions about market ignorance, the importance of price to customers, the extent and causes of entry barriers, the public power of moral suasion, the general sensitivity of sellers to a few informed buyers, and changing consumption habits may or may not result in price declines in different homogeneous product markets.

Once we venture out of the world of product homogeneity, the probability of predicting the effect of different levels of information decreases. Inadequate price information would be expected to result in price dispersions which do not accurately reflect differences in costs and preferences, but may have no predictable effect on average price level and may lead to price dispersions that are either too wide or too narrow. Although improved information is likely to improve the accuracy of consumer assessments of enterprise differentiation, we have no way of knowing which firms will benefit and which ones will be penalized. Those that are penalized may not necessarily be the high price firms; the dispersion of prices may in fact widen. Price dispersion and the average market price level may move in similar or in opposite directions in the short run.

The Interrelationships Between Information and Market Structure

The preceding considered the theoretical influence of information in two extreme markets. Without additional assumptions, the rationale developed provides few insights into the effects of varying levels of information in imperfectly competitive markets. We now turn our attention to the relationships between information and the structure of markets in a dynamic setting. Instead of assuming a given market structure, we will explore first the structure changing role of information. Then, drawing on the framework of industrial organization theory, succeeding sections will examine the impact of information on market conduct and performance.

Past empirical results have demonstrated a consistent positive relationship between industry profits (usually a surrogate for allocative efficiency) and the structural dimensions of market concentration, barriers to entry and product differentiation. (Weiss, 1971) Thus, while the level of information possessed by buyers and sellers is rightfully a structural dimension itself, the influence of changing levels of price information on seller concentration, entry barriers and product differentiation is of particular interest.

Most industries include both superior and inferior companies. Inferior firms, for our purposes, will be defined as companies that, relative to their competitors, produce output with low utility per dollar cost. That is, the costs of their products are high relative to the value accorded them by consumers. It seems highly likely that inferior firms survive, in large part, because of buyer ignorance. Increasing the amount of price information would tend to either drive such firms out of business

or force them to improve prices, products, or technology. On balance, the effect likely would be to reduce firm numbers and increase industry concentration.

Increased price information would also tend to broaden the geographic scope of retail markets. Consumers operating with inadequate price information are likely to place relatively more emphasis in choosing a retail store on nonprice factors such as store location, services, and product quality or variety. Improved price information from a credible source would tend to increase the emphasis placed on price by buyers and hence expand the number of sellers which buyers would consider patronizing. This would reduce the opportunities for spatial monopolies and price discrimination. By expanding the size of relevant markets, increased price information would tend to decrease market concentration. This would be a counter force to the decline in firm numbers mentioned above.

Increased price information would be expected to affect the conditions of entry into a market. A credible source of price information should make entry by superior firms easier. The advertising advantages of large established firms would be reduced since the advertising which new entrants would find it necessary to conduct would be less expensive than in the absence of a credible source of price information.

Entry by inferior firms would be more difficult, however, in an environment of adequate price information. Buyers would be able to accurately assess the price differences of such firms, and by our

earlier definition of an inferior firm, would choose to not patronize an inferior new entrant.

Increased price information would also assist potential entrants in evaluating the profit opportunities in a market. This would tend to improve market entry decisions by encouraging entry where monopoly profits are present and discouraging entry where they are not.

Increased price information would also tend to increase the sensitivity of established firms to entry forestalling prices. That is, in those markets where oligopolistic interdependence is so high that tacit collusion and joint profit maximization is likely, a credible source of price information would encourage the established firms to avoid new entrants by pricing at the entry forestalling level. If the latter price level is below the joint profit maximizing price level, price information would serve as a restraint on price levels.

One of the important results of increased information in an under-informed market likely would be a shift in competitive emphasis. If price information is poor and perceived differences between stores is slight, consumers will rely heavily on nonprice factors (store location, cleanliness, product selection, consumer service, etc.) in selecting a store. Increased price information would be expected to reverse this phenomena -- at least until the distribution of prices reach a new equilibrium. Consumers are likely to become more sensitive to price in selecting stores; individual retailers will find the demand curve they face has shifted and become more elastic, encouraging price competition. At least in the short run, prices are expected to decline.

Increased price information would likely influence the structure of markets in several ways. In the short run, market concentration might be changed little since the expanded size of markets would tend to offset the reduction in firm numbers that may occur with the demise of inferior firms. Easier entry as a result of increased public information, would tend to reduce the level of monopoly power in a market and hence the extent to which monopoly prices and profits are likely to exist. Shifts in the demand curves would probably be the most important structural effect of increased price information, particularly in the case where market ignorance was a source of market power.

Effect of Information on Market Conduct

At the present time, information and seller conduct in food retailing-consumer markets appear to be interdependent. Nelson & Preston (1966) found that retail firms made frequent price changes that were not fully explainable by changes in costs or weekly specials. They indicate:

The intensity and diversity in both the number and the magnitude of observed price changes cannot be understood either as response to short-run changes in supplier level costs and retail demand or a "price war" foray. The phenomenon is sufficiently distinct to merit a name -- variable price merchandising. The interpretation which best fits these data is not one of cost or time demand responsiveness, but one of programmed price variation ... This variation differs from simple price cutting because it involved systematic raising as well as lowering of prices... The logic of variable price merchandising only requires that profit derived from the services of the store be greater than it would be otherwise.

A strategy of frequent price changes makes price comparisons across firms more difficult and is likely to discourage consumer search. The level of price information held by consumers is likely to suffer and inaccurate price dispersions would be more probable.

Rothschild (1973) asserts that expected market conduct under oligopolistic conditions of imperfect knowledge will depend on the intentions of the seller; i.e., does he appreciate the relative ignorance in the market and more important does he proceed to exploit it? A strategy of continual price changing may be a profitable offensive strategy. Alternatively, if the seller appreciates the market is complex and relatively uniformed, he may be forced into a defensive guessing game whereby frequent price changes are a necessary hedge against being wrong in the determination of his demand function. Frequent price changes are consistent with either strategy.

Firms which employ price changes in an offensive way to confuse customers would be expected to have higher prices than their competitors. (If they were lower in price, they would want customers to recognize the fact.) If price changes are employed for defensive reasons, however, no logical relationship would be expected between the frequency of price changes and the price level of stores.⁴

Since increased price information would expose firm behavior to greater scrutiny, blatant attempts to confuse customers by manipulating prices up and down would be easier to detect and might therefore be minimized. In addition, with increased public knowledge and surveillance of pricing behavior, retailers might be more hesitant to make price increases that are not justified by cost increases. During an inflationary period, this may slow the speed with which price increases are made.

Effect of Information on Market Performance

In this section, we examine the expected effects of price information on three dimensions of market performance: price efficiency, operational efficiency, and consumer satisfaction.

Pricing Efficiency -- To be efficient in performing the resource allocation task, prices must accurately reflect both producer costs and buyer preferences. In markets with inadequate price information, consumers would be unable to accurately judge the price differences for the product-service offers of different firms, and hence to accurately express their preferences. In such a situation, price dispersions would be expected which inaccurately reflect seller costs and buyer preferences. Increasing the level of price information would be expected to increase pricing efficiency -- at least from the standpoint of the dispersion or distribution of prices across firms.

The effect of increased information on average price levels -- another dimension of pricing efficiency -- is less apparent. Price information would tend to reduce entry barriers and stimulate price competition, at least in the short run. Both of these factors would tend to depress the level of prices. In oligopolistic markets, however, the long run consequences of increased price information are less certain and depend upon the effects of information on operating costs and the effectiveness of competition.

Operational Efficiency -- The National Commission on Food Marketing found that store costs were much more affected by store utilization (measured by sales per square foot of selling area) than by absolute store size. They also found that most retail stores operate considerably short of the point of minimum average costs. These findings suggest an "over stored" condition in food retailing. We hypothesize that this condition persists because of the lack of effective price competition which would drive some stores out of

business and allow the survivors to operate closer to minimum average costs. An increase in price information would be expected to accelerate the demise of inefficient firms that survive largely because of market ignorance. The average costs of the remaining firms would be expected to drop as they operate closer to optimum capacity.

Consumer Satisfaction--The level of consumer satisfaction provides one measure of what Henderson (1975) has called "allocative accuracy". While conceptually similar to pricing efficiency in the sense that it is concerned with the "goodness" with which resources are allocated to produce alternative products, allocative accuracy explicitly recognizes that other mechanisms besides prices are often involved in allocation decisions due to a variety of market failures.

Allocative accuracy refers to the extent to which demand preferences and supply offerings match in terms of the quantity, quality and price of products, and the location and timing of production and marketing. Marion and Handy (1972) have proposed direct measures of consumer satisfaction as indicators of the degree of "match" between actual supply offerings and the preference schedules of consumers.

Increased price information is likely to effect consumer satisfaction both directly and indirectly. The direct effect should include a reduction in the search time of individual consumers and a reduction in the uncertainties surrounding store selection decisions. These changes would be expected to enhance consumer satisfaction.

Since increased price information will allow consumers to more accurately reveal their preferences through their store selection decisions, allocative accuracy would tend to be improved. At least in the long run, this should improve consumer satisfaction. The expected impact of price information on the level of prices is less clear, although earlier discussion lends modest support to a drop in prices even under concentrated

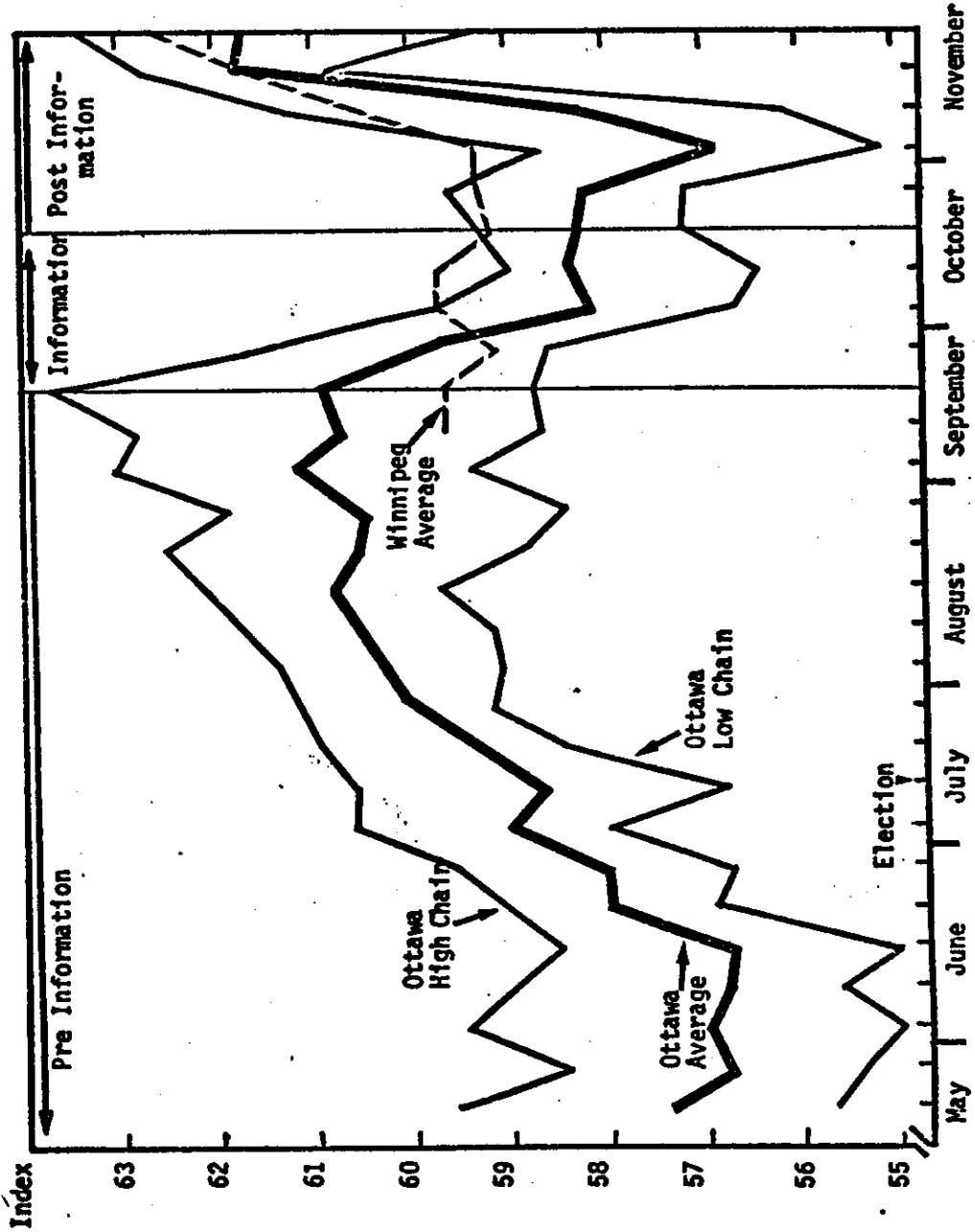
conditions. This would also be expected to increase consumer satisfaction unless preferred services or product quality are sacrificed in the process. Thus, while price information might result in a short term drop in consumer satisfaction, over time, consumer satisfaction would be expected to increase.

Empirical Findings

During the pre-information price monitoring period retail food prices rose steadily and reached a peak immediately prior to the information program, (Figure 1 and Table 1). Statistically significant differences were found between the mean prices of the individual stores and the mean prices of different chains and between the mean prices in submarkets within the metropolitan area of Ottawa-Hull⁵ (Tables 2, 3 and 4).

Subsequent to the publication of comparative price information, average food prices declined 1.5 percent the first week, 3.0 percent the following week, and then remained relatively steady for the next three weeks.⁶ (Figure 1 and Table 1). An additional price decline of 2.5 percent occurred during the week of November 2, bringing the total decline over a six week period to 7.1 percent. The price declines during the first, second and sixth week after the start of the comparative price information program were greater than any price declines that occurred during the pre-information period. Mean prices in the Ottawa-Hull market were significantly lower midway through and immediately following the information program than during the week prior to the information program.⁷ As might be expected, the higher priced stores dropped prices more than the relatively low priced stores. Similarly the higher priced chains reduced their prices more than the lower priced chains (Table 3).

Figure 1
Average Weighted Store Price Index Levels
For Selected Supermarkets
Ottawa-Hull and Winnipeg, 1974.



Source: Food Prices Review Board Survey 1974, Table 5.

Table 1. Average Weekly Store Price Index Levels All Stores Ottawa-Hull and Winnipeg Plus High-Low Extremes for Ottawa-Hull, 1974.

Date	Ottawa-Hull By Firm					Ottawa-Hull By Store		
	Average Price Index	Average Price Index	Low Chain or Group	High Chain or Group	Percent Difference	Low Store	High Store	Percent Difference
	Winn.	Ottawa						
May 19		57.41	55.62	59.60	6.67	53.23	61.46	7.87
May 26		56.81	55.36	58.43	5.25	54.81	59.44	7.78
June 2		56.93	54.98	59.46	7.53	53.61	61.37	12.64
June 7		56.81	55.56	58.98	5.47	54.35	59.57	7.63
June 14		56.75	54.99	58.49	5.98	54.32	59.59	8.84
June 21		57.99	56.91	59.05	3.94	56.36	59.95	6.04
June 28		58.09	56.70	59.60	4.86	55.91	60.13	7.01
July 5		58.99	57.99	60.74	4.52	57.65	62.91	8.36
July 12		58.65	56.73	60.69	6.52	56.49	62.90	10.19
July 19		59.30	58.31	60.94	4.31	57.27	62.22	7.95
July 26		59.94	59.11	61.18	3.38	57.34	62.93	8.88
Aug 2		60.30	59.09	61.34	3.81	58.32	63.19	7.70
Aug 9		60.58	59.18	61.75	4.32	58.76	62.84	5.82
Aug 16		60.80	59.70	62.14	3.92	53.56	62.88	6.87
Aug 23		60.60	58.81	62.58	6.02	58.09	63.71	8.82
Aug 30		60.55	58.41	61.92	5.66	57.98	63.91	9.27
Sept 7		61.15	59.37	63.07	5.86	58.38	65.59	10.99
Sept 14 ^{a/}	59.67	60.74	58.61	62.90	6.96	57.71	66.30	12.95
Sept 21 ^{a/}	59.70	60.89	58.70	63.70	7.84	57.59	67.78	15.03
Sept 28 ^{a/}	59.17	59.96	58.57	61.69	5.05	58.24	63.42	8.16
Oct 5 ^{a/}	59.73	58.12	56.61	59.83	5.38	55.98	60.73	7.82
Oct 12 ^{a/}	59.73	58.37	56.42	59.01	4.38	56.37	59.58	5.38
Oct 19	59.29	58.29	57.18	59.37	3.68	55.60	60.93	8.74
Oct 26	59.31	58.22	57.13	59.66	4.24	55.24	60.33	8.43
Nov 2	59.35	56.85	55.17	58.72	6.04	54.17	59.87	9.52
Nov 9	60.54	58.35	56.19	61.27	8.29	55.07	62.29	11.59
Nov 23	61.78	61.85	60.86	62.79	3.07	59.97	63.77	5.95
Nov 30	62.57	61.77	59.50	63.39	6.36	58.79	63.89	7.98

Source: Food Prices Review Board Survey, 1974

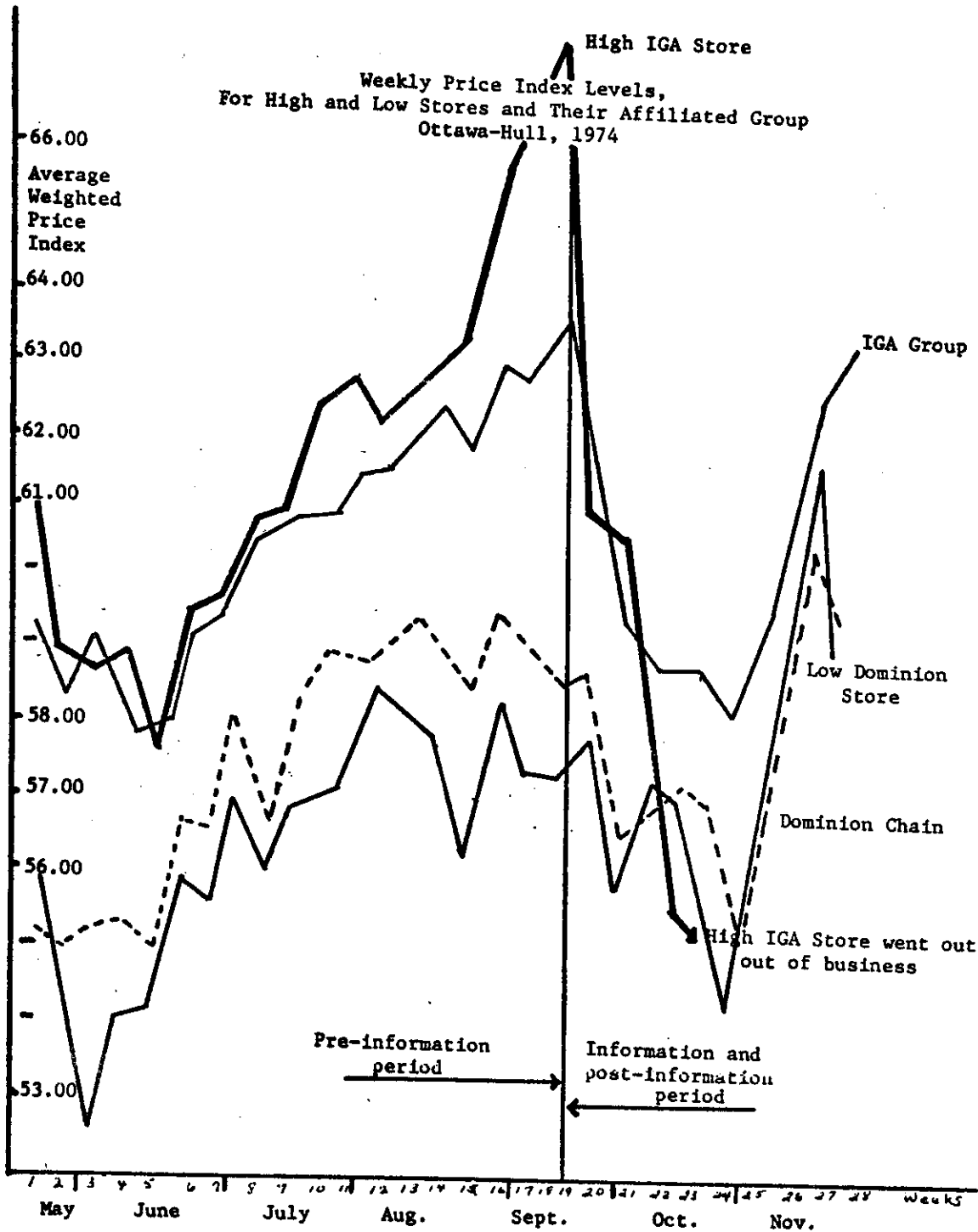
^{a/} Weeks for which Ottawa prices were published during the following week.

The difference in price index levels between high and low priced stores dropped from a maximum of 15 percent during the pre-information period to a low of 5.4 percent subsequent to the publication of information (Table 1). During the same period, the range of prices between high and low priced chains declined from a maximum of 7.8 percent to a low of 3.1 percent (Figure 2). It should be noted, however, that the dispersion of prices in the market reached its high during September 21, the week prior to initial retailer response to published price information. It is more appropriate to compare the average range in prices during the 12 weeks prior to the information program (9.71 percent) to the range in prices during the information program (7.83 percent). The decline in the dispersion of prices was significant at the 90 percent level.⁸

Within two weeks after the termination of the public information program, average retail food prices in the test market began to rise and increased 8.8 percent by the end of the research period.

Although there were statistically significant declines in the overall price level and in the price dispersion among stores, significant differences between the price levels of individual retail outlets remained during the information period (Table 2). The differences in the average prices of individual chains declined but remained statistically significant (Table 3). Dominion stores and IGA maintained their position as the low and high priced chains respectively.

Figure 2



Source: Food Prices Review Board Survey Data, 1974.

TABLE 2
 Analysis of Variance of Food Price
 Index Levels for Individual Stores During Selected Time Periods
 Ottawa-Hull During 1974

Time Period/ Selected Stat.	Mean Price Index	Price Index Range		Percent Difference	F Value
		Low Store	High Store		
a. Pre Election Period May 19 to June 28	57.25	55.01	59.97	8.66	12.42*
b. Post Election Pre Information July 5 to September 21	60.20	57.70	63.55	9.71	12.73*
c. Immediate Infor- mation Period September 28 to October 26	58.59	57.40	61.98	7.83	2.18*
d. Entire Survey Period May 19 ^{a/} to November 9 ^{a/}	58.89	56.70	61.06	7.40	11.18*

* significant at the .99 level of confidence.

a/ Although the Food Price Review Board collected price data during the weeks of November 23 and November 30, it would not release data to the authors on individual stores. For this reason, the significance of price differences during the post information period could not be examined.

Table 3
 Average Food Price Indices for Voluntary or Corporate
 Chains During Pre-Test and Post-Test Periods, Ottawa-Hull, 1974

FIRM	Pre-Information Price Indices (May 19 to Sept. 21)	Information and Post Information Price Indices (Sept. 28 to Nov. 9)	Change in Price Index Absolute Percent
IGA	60.81	59.41	-1.40 -2.30
Dominion	57.64	57.16	-0.48 -0.80
Loblaws	59.70	59.18	-0.52 -0.87
A & P	60.31	58.73	-1.58 -2.61
Steinbergs	59.23	57.67	-0.56 -0.96
A.L. Raymond	59.50	57.82	-1.68 -2.82
Range	3.17	2.25	
F Value, Analysis of Variance	9.51*	3.85*	

Source: Food Prices Review Board Survey, 1974.

*Statistically significant at 99 percent confidence level.

It was expected that the lack of information might be particularly detrimental in low income areas where a lower level of consumer search is less able to police competition. Price data support this expectation. Ottawa South and Gatineau-Hall, the lower income areas, had significantly higher prices during the pre-information period than Ottawa East, a higher income area (Table 4). During the information program, prices in Gatineau-Hull dropped by 4 percent to make it the lowest priced of the four areas. Statistical tests, however, revealed no significant differences in the prices in the four areas during the post-information period.

Average prices in the control market (Winnipeg) were relatively stable during the test market information period (prices declined 0.6 percent compared to 7.0 percent in the test market). During the post-information period, average prices in Winnipeg increased 5.4 percent (compared to 8.8 percent in test market). The cost of the market basket was 2 percent higher in the test market than in the control market at the beginning of the information period. During the final week monitored, prices were 1.3 percent lower in the test market. Thus, although the sharp price increases in the test market during the post-information period offset the price reductions sustained during the information period, prices in the test market relative to prices in the control market were 3.3 percent lower at the end of the study than at the start of the information program. The Canadian Consumer Price Index, developed by Statistics Canada, reflected the price changes that occurred in Ottawa and Winnipeg during this period (Figure 3).

Table 4
 Store Price Levels by Geographic Area During
 Pre-Test and Post-Test Period, Ottawa-Hull, 1974

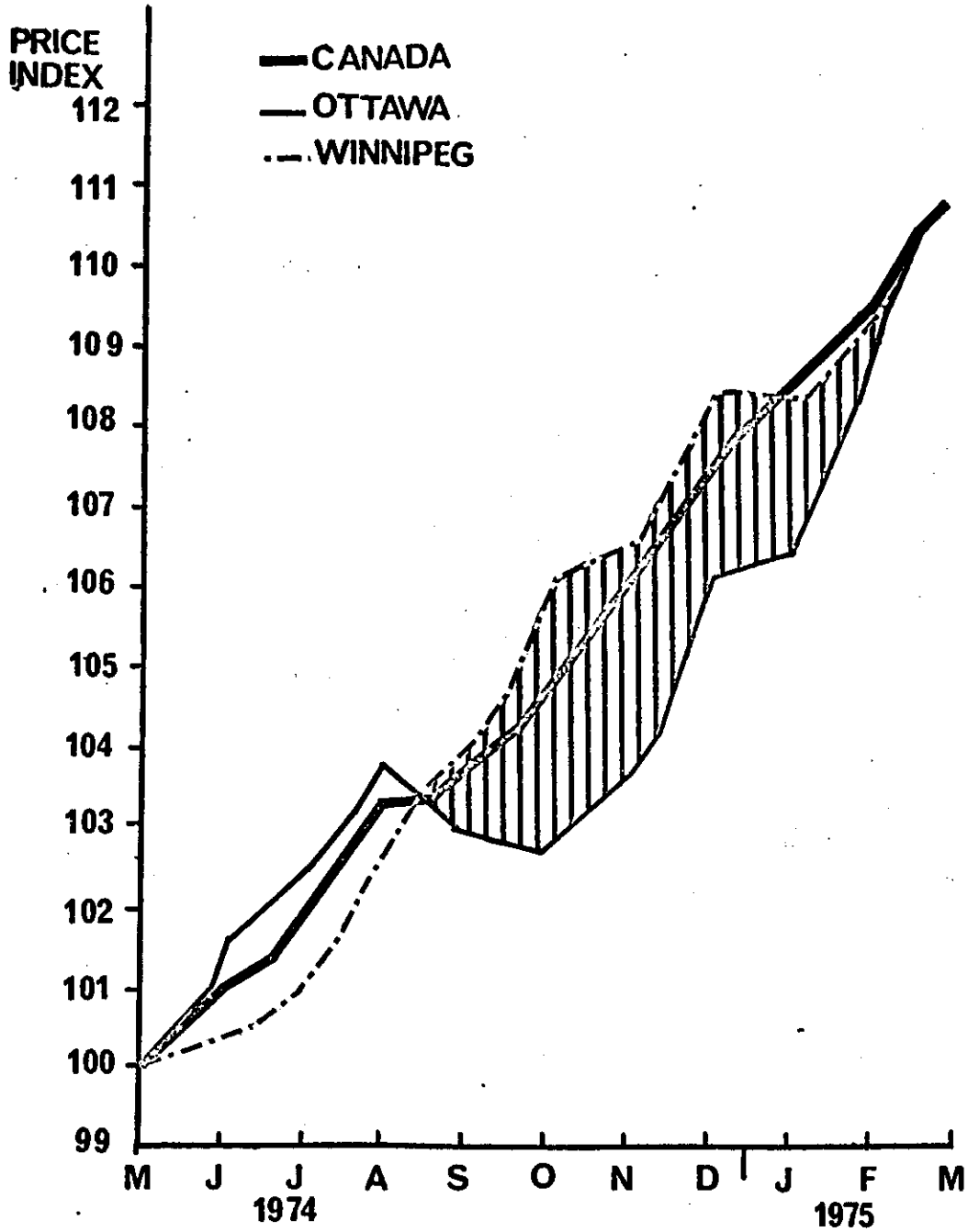
Area	Income Per Family	Pre-Information Average Price Index	Post-Information Average Price Index	Information and Post-Information Average Price Index	Percent Change
Ottawa West	\$12,890	60.08	58.07	58.07	-3.34
Ottawa South	10,540	60.60	59.27	59.27	-2.19
Ottawa East	12,561	59.29**	58.27	58.27	-1.95
Gatineau-Hull	9,508	60.32	57.93	57.93	-3.96

**Significantly different at the 95 percent confidence level.

Source: Food Prices Review Board Survey Data, 1974.

Figure 3

Consumer Price Index for Food Consumed at Home
 May 1974 to May 1975 (May 1974 = 100)



Note: Observations are made once a month during first two weeks of each month.

Source: Statistics Canada.

On average, stores changed prices each week on 43 percent of the items price checked. The frequency of price changes was surprisingly similar for different chains, ranging from 40.6 percent for Dominion to 46.5 for Loblaws. Higher priced firms tended to change prices slightly more often than lower priced firms. This may have been largely in response to the price comparison program, as higher priced stores and firms dropped their prices to become "competitive".^{9/}

Only half of the items included in the market basket were identified in the weekly publishing of comparative prices (Exhibit 2). Since the identity of the remaining items in the market basket were never revealed, it was expected that price adjustments by retailers would be made on a broad range of products.

Changes in the price index for published items was compared with changes in the price index of non-identified items. The price index for published items declined 5.8 percent during the information period compared to 7.8 percent for the unidentified items. The price index for the published items then increased by 9.8 percent by the end of the study compared to a 5.6 percent increase for unidentified items. Statistical tests (t test) revealed no significant differences in the price changes made in the two groups of items.

Results of Consumer Satisfaction Surveys

Table 5 summarizes the pre-test and post-test surveys of consumer satisfaction in the test and control markets. Possible scores range from 1.00 if all consumers surveyed indicated they were "always satisfied" to 5.00 if all consumers said they were "never satisfied". Since higher scores indicated higher levels of dissatisfaction, we refer to the scores as "Mean Dissatisfaction Scores".

An examination of the first column of scores in Table 5 indicates that Ottawa consumers were generally quite satisfied with both food products and food stores during the pre-test period. With respect to information provided by food stores, consumers were moderately satisfied with the information in stores about prices (MDS of 2.77) and the reliability and truthfulness of advertisements sponsored by stores (MDS of 2.81). They were least satisfied with information about the freshness of perishable food products (MDS of 3.26), with manufacturer advertising (MDS of 3.27), and nutritional labelling (MDS of 3.32).

Although consumers were, on average, "almost always satisfied" with their ability to choose between stores (MDS of 2.08), they were less satisfied with the information available for making store comparisons (MDS of 2.91). When asked, "How often could you use additional information to help you compare products and choose between stores?", 21 percent said always, 32 percent almost always and 36 percent said sometimes. Only 10 percent indicated they rarely or never needed additional information. Young and better educated consumers were significantly less satisfied with the information available for making store comparisons.

The hypothesis that the percentage increase in levels of consumer satisfaction in the test market would be significantly greater than the percentage increase in the level of consumer satisfaction in the control market was tested using the Student's *t* statistic. The specific test involved 16 variables concerning food stores and their characteristics (1, 5, and 9-22 in Table 5). The change in attitude among Ottawa-Hull respondents concerning store characteristics was significantly different than the changes in attitude among Winnipeg consumers. Whereas Winnipeg

TABLE 5

Levels of Consumer Satisfaction During Pre-Test and Post-Test.
Ottawa-Hull and Winnipeg, 1974.

	Ottawa Hull Pre- Test	Ottawa Hull Post- Test	Winnipeg Pre- Test	Winnipeg Post- Test	Change in Ottawa Relative to Change in Winnipeg (Percent)
1. Food Products in General	2.42	2.36	2.18	2.26	6.14
2. Ingredient Labelling	2.50	NA	2.46	NA	
3. Manufacturers' Advertising	3.27	NA	3.11	NA	
4. Nutritional Labelling	3.32	NA	3.10	NA	
5. Food Stores in General	2.52	2.49	2.23	2.24	1.64
6. Instore Price Information	2.77	NA	2.23	NA	
7. Store Advertisements	2.81	NA	2.52	NA	
8. Information About Freshness	3.26	NA	2.71	NA	
9. Food Store Prices	3.47	3.40	3.28	3.36	4.46
10. Store Services	2.52	2.50	2.13	2.25	6.42
11. Clerk Friendliness	2.29	2.20	1.93	1.96	5.48
12. Store Cleanliness	2.23	2.21	1.89	1.96	4.60
13. Selection of Foods	2.23	2.37	1.91	2.13	6.51
14. Speed of Check Out	3.16	3.12	2.45	2.60	7.40
15. Store Layout	2.20	2.21	1.91	1.99	3.74
16. Parking Space	1.85	1.75	1.72	1.70	4.24
17. Prices on Weekly Specials	2.76	2.66	2.47	2.67	11.72
18. Availability of Advertised Items	2.54	2.50	2.14	2.27	8.22
19. Accuracy of Check Out Clerks	1.97	1.98	1.89	1.88	-1.00
20. Clarity of Price Markings	2.85	2.86	2.33	2.55	8.90
21. Your Ability to Choose Between Stores	2.08	2.13	1.82	1.97	5.84
22. Information Available for Comparing Stores	2.91	2.82	2.54	2.78	12.53
Average (Var. 1,5,9-22) --	2.50	2.47	2.18	2.29	6.18

respondents generally became more dissatisfied between the pre-test and post-test, Ottawa-Hull respondents either increased in satisfaction or their dissatisfaction increased less than their Winnipeg counterparts.

The last column in Table 5 indicates that for 15 of the 16 characteristics, Ottawa consumers increased their satisfaction relative to Winnipeg consumers from pre-test to post-test. The relative increases in satisfaction were greatest for the "information available for comparing stores" and for "prices on weekly specials". This was expected. The relative increase in Ottawa consumers' satisfaction with their "ability to choose between stores" was less than expected.

The comparative price information program appears to have generally enhanced consumer satisfaction with food stores and their characteristics, even when the characteristics were unrelated to price information. (It is doubtful, for example, that the comparative price information program had any effect on store layout or parking space, yet Ottawa consumers indicated a relative increase in satisfaction with these factors over the study period.) This so-called "halo effect" has been found in other attitudinal studies and complicates the interpretation of results.

Consumers in both the test and control markets were asked in the post-test mail survey if they had recently changed stores. Approximately 43 percent of the Ottawa-Hull respondents indicated they had temporarily or permanently changed stores compared to 18 percent of the Winnipeg respondents.

Consumer patronage in the Ottawa-Hull market shifted to retail stores with lower price index levels--suggesting that pre-information differences in prices did not accurately reflect consumer valuation of the differences in product-service offerings. This led to an increase in the share of market held by the top four corporate

chains from 74 to 81 percent.¹⁰ By comparison, the major store types in Winnipeg maintained relatively constant market shares.

Perceived Value of Information Program

Consumers in the test market were asked to indicate the maximum value they would be willing to pay to receive the comparative price information on a weekly basis. Figure 4 presents the cumulative frequency of consumers willing to purchase weekly price information publications at various prices. The mean value was 34.14 cents per week. There was no significant difference in the willingness to pay by the one-half of the sample who received the price comparison information by direct mail (as well as through newspapers), and the half who received the information through newspapers only.

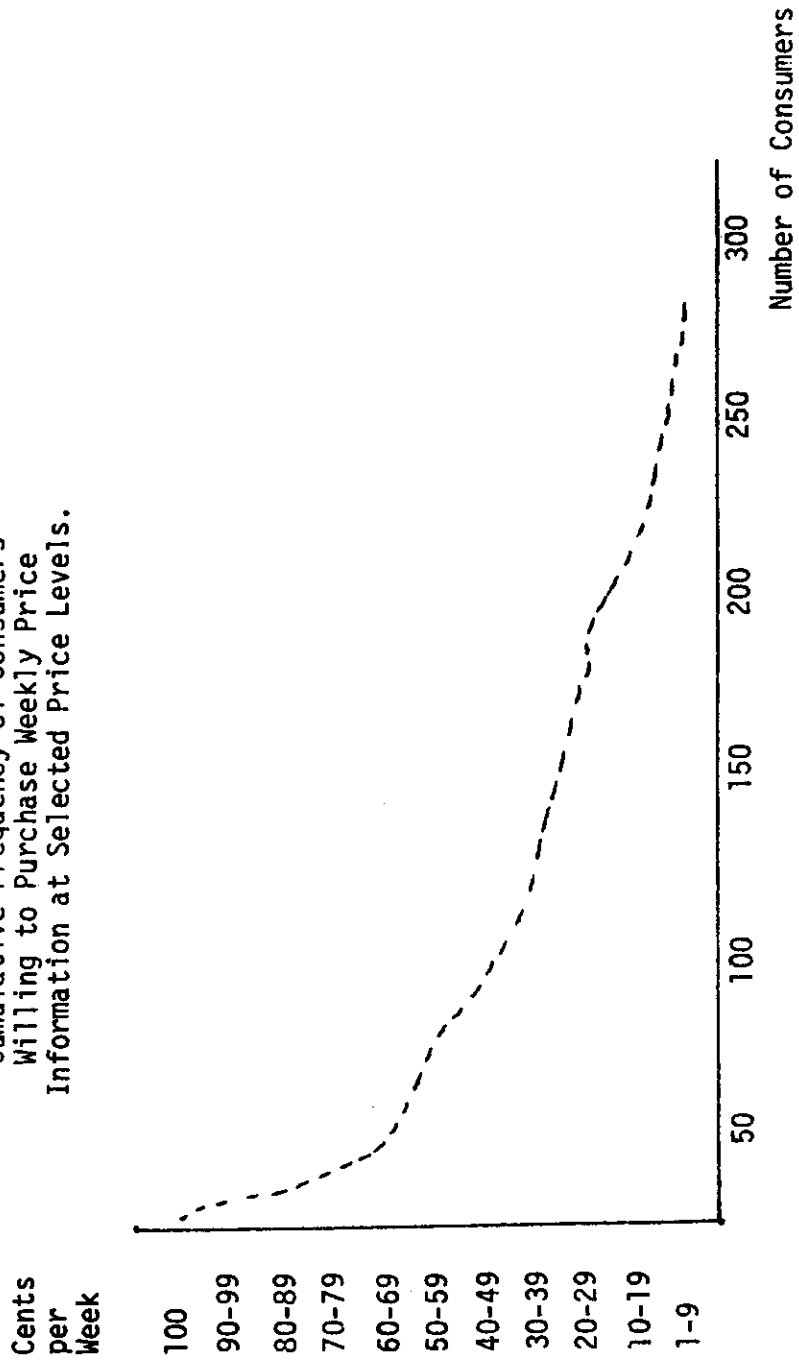
Consumers in the test market were asked several specific questions about the experimental information program. When asked if the information program saved them time, 87 percent of the respondents replied "yes" or "sometimes". Similarly, 94 percent of the respondents indicated that the information program made them more aware of price differences between stores and between products. When asked to describe what they thought of the information program, the majority of consumers indicated that the program either (1) made them more aware, (2) reduced price levels, (3) increased competition, or (4) some combination thereof.

Measures of Consumer Benefit

The information on food price comparisons provided by the study was a short term "public good". Its value was not determined by the traditional market forces of supply and demand. Consequently, consumers' perceived value of the information served as a proxy in the absence of a market estimate.

Figure 4

Cumulative Frequency of Consumers
Willing to Purchase Weekly Price
Information at Selected Price Levels.



Consumers indicated they would, on average, be willing to pay 34.14 cents per week or \$1.36 per month for the price comparison information. With 118,000 families in the Ottawa-Hull market, the potential support for such a program would be about \$174,541 a month and \$2,094,500 annually. Although we expect these to be inflated estimates due to response bias, they provide a "ball park" estimate of the perceived value of the information program. The cost of the program, including consumer questionnaires, was approximately \$3,500 per month.

The benefits of the comparative price program can also be estimated by computing the change in consumer surplus. With total monthly expenditures on food in the test market of \$17,700,000, and assuming an aggregate demand elasticity of -0.2, a 5 percent drop in prices would result in an estimated gain in consumer surplus of \$892,525.00 and a loss to retailers of \$883,691.00. The resulting net benefit to society is \$8,834.00 per month, assuming no changes in firm costs. If the price decline was associated at least in part with cost reductions, the net benefit to society would be correspondingly larger. It is of interest to note that if a permanent drop in price of one percent is assumed, the estimated gain in consumer surplus is \$178,505 per month. This compares to \$174,541 per month that consumers indicate they would be willing to pay for price comparison information.

Economic Implications

The results of this study indicate that the performance of markets can be significantly affected by the distribution of accurate and credible market information. Statistical analyses confirmed the major study hypotheses:

1. Significantly different prices for a standardized market basket of food products would be charged by competing sellers prior to the dissemination of comparative price information.
2. The public dissemination of comparative price information would reduce the dispersion of prices between stores and lower the average price level in the market.
3. Consumers in the test market who received information on comparative price offerings would reflect a significant increase in the level of satisfaction with market performance compared to consumers in the control.
4. The perceived and estimated value of comparative price information would exceed the cost of providing such information.

Although the short period during which information was published precludes an assessment of the long run results of such a program, in the short run, both pricing efficiency and consumer satisfaction were enhanced. In highly concentrated markets, the long run consequences of a price information program might not be as laudable. The program might be used as an instrument for price collusion. If prices were monitored simultaneously in several markets, some of which were effectively competitive, collusive behavior might be detectable, however. The longer run effects of both continuous and intermittent information programs are currently being examined by the authors. (Devine, 1977).

Market information is itself a dimension of market structure; however, it also influences other market structure dimensions. Estimated four firm concentration in the test market increased from 74 to 81 percent between the pretest and post-test surveys. Since lower priced chains increased their market shares at the expense of higher priced firms, this shift appears to have resulted from the information program. Although the information program was also expected to reduce entry barriers, no measure of this structural dimension was attempted. In the long run, the structural change potential of market information may be more important than the immediate changes in market conduct and performance.

Consumers in the market derived benefit from the public dissemination of information whether they used the information or not. The fact that they could have used the information was enough of an impetus to generate a general price decline from which all consumers benefited. Additional benefits were realized by consumers who used the information to select lower priced stores. Forty-three percent of the test market respondents indicated that they changed stores as a result of the information program. This suggests that a significant portion of consumers captured both the primary and secondary benefits of the additional information.

The results of this research indicate that public dissemination or retail price information deserves serious consideration. In addition to the effects indicated above, additional factors to be considered include:

1. Comparative price information is essentially a public good.
2. An inherent free rider problem is likely to prevent the private development of comparative price information on a sufficient scale to policy markets. Consumers quickly recognize that as long as "other" consumers search, the fruits of search activity can be enjoyed without the labor.
3. Markets cannot be responsive to consumer preferences without some minimum level of consumer knowledge. Although the minimum is as yet undefined, existing levels of information in many consumer markets are thought to be inadequate. The response of consumers and retailers to increased information in this study indicates that pretest information levels were not sufficient to provide a stable informed equilibrium.
4. Markets for consumer goods are becoming increasingly complex, making the search and evaluation process more difficult.

5. Market price information is widely accepted in many commodity markets (both spot and futures), the stock exchanges, money markets, etc. In some of these, public agencies are responsible for gathering and reporting information; in others, private agencies do the job. Newspapers report much of this information free because of reader interest.

Consumers obviously choose their food stores based upon price and nonprice factors. Price comparison programs generally ignore differences in non-price factors and leave it to consumers to evaluate such factors as store location, customer services, meat and produce quality and store environment. Because non-price factors are difficult to measure and are valued differently by different consumers, programs to provide comparative information on non-price factors would appear to hold less potential for social benefits than a price comparison program.

Some may argue that developing price information programs is public invasion of business establishments. However, we contend that public comparison of privately publicized prices is a legitimate function of the public sector. Although privately produced, prices are publicly displayed on counters, shelves, and in media advertisements every day of the week. Retail prices are therefore neither confidential nor private information. Only if price information is adequate and is shared among participants can we expect markets to perform efficiently.

Exhibit 1

An Example of the Press Release on Store Price Comparisons
Ottawa-Hull, September, 1974

The following is a comparison of weighted price levels between retail food stores in the Ottawa-Hull area during the week ending September 14, 1974. A three-week history of positions is also included.

		Weighted Price Index Sep. 14	Rank Sep. 14	Rank Sep. 7	Rank Aug. 31	Rank Aug. 24
<u>Ottawa West</u>						
Steinbergs	2148 Carling	58.35	1	3	5	7
Dominion	Carling & Kirkwood	59.06	2	5	3	2
Steinbergs	1611 Merivale Rd.	59.09	3	6	4	8
Dominion	1653 Merivale Rd.	59.20	4	4	1	5
Steinbergs	100 Bayshore	59.28	5	1	6	4
Dominion	1224 Welington	59.40	6	2	2	1
I.G.A.	Richmond & Carleton	61.37	7	9	9	10
Loblaws	Carlingwood Mall	62.07	8	8	7	3
Loblaws	1980 Baseline Rd.	63.08	9	7	8	9
A & P	1855 Carling Ave.	64.05	10	10	10	6
<u>Ottawa South</u>						
Dominion	1582 Bank	58.89	1	1	1	1
Loblaws	1681 Alta Vista	61.37	2	4	4	2
I.G.A.	Bank & Walkley Rd.	61.90	3	2	5	3
A & P	1525 Bank St. So.	62.69	4	3	3	5
Independent	Bank & Somerset	63.23	5	5	2	4
<u>Ottawa East</u>						
Steinbergs	St. Laurent Blvd/Mtl.	56.25	1	2	2	3
Steinbergs	1944 St. Laurent Blvd.	58.83	2	1	3	4
Dominion	St. Laurent Shop Ctr.	59.54	3	4	1	1
Loblaws	St. Laurent Blvd/Mtd.	60.88	4	3	5	2
I.G.A.	Beachwood Ave.	62.13	5	5	4	5
<u>Gatineau-Hull</u>						
Dominion	St. Joseph Blvd.Hull	57.71	1	1	1	1
Steinbergs	St. Joseph Blvd.Hull	59.84	2	2	2	1
A.L.Raymond	210 Champlain Hull	61.76	3	4	4	3
A.L.Raymond	Maloney Blvd.Gatineau	62.05	4	3	3	2
I.G.A.	Maloney Blvd.Gatineau	62.49	5	5	5	5
I.G.A.	Tache Blvd.Hull	66.30	6	6	6	6

Source: Food Price Review Board Survey, 1974.

Exhibit 2

An Example of the Press Release on Product Price Comparisons
Ottawa-Hull, September, 1974

The following sample of some of the items being examined provides a comparison between retail chains and groups of stores in the Ottawa-Hull area during the week ending September 14. The chain or group of stores with the lowest average price index per item is listed number one, the next lowest is listed number two, etc.

	POSITION DURING WEEK ENDING SEP.14					
	A&P	DOM	IGA	LOB	RAY	STB
Round steak, boneless 1 lb.	6	1	5	4	3	2
Prime Rib Roast (Standing), 1 lb.	5	4	3	1	2	6
Ground Beef or Hamburger, 1 lb.	5	1	4	2	3	2
Beef Liver, 1 lb.	3	1	2	2	4	2
Pork Sausage, fresh, 1 lb.	5	3	1	6	4	2
Bacon, private label, 1 lb.	3	2	3	5	4	1
Bologna, Maple Leaf or T.P.L.*, 1 lb.	2	2	4	3	3	1
Weiners, 1 lb. Maple Leaf or T.P.L.	2	3	4	5	6	1
Chicken (2-4 lb.) Whole Grade A	3	2	5	4	1	4
Turkey (8-16 lb.) Grade A	2	3	3	1	4	2
Eggs, Grade A medium	5	1	6	2	4	3
Butter, T.P.L.	1	5	3	3	4	2
Milk Cheddar Cheeze - Private Label	1	3	5	3	2	4
Milk, Homogenized 25, (2 qts.)	4	3	2	4	1	3
Margarine, 3 lbs. Blue Bonnett or T.P.L.	5	2	1	6	3	4
Ice Cream $\frac{1}{2}$ gal. Borden (Vanilla) or T.P.L.	2	1	6	5	4	3
Tomato Juice, 48 oz. Heinz, or T.P.L.	4	2	2	3	1	2
Potatoes, fresh, 10 lbs. Canada No.1	3	4	3	6	5	1
Tomatoes, fresh 4 tom. Canada No.1	2	2	1	2	2	2
Tea, 60 bag pkg., T.P.L.	2	4	6	3	5	1
Coffee, 1 lb. Nabob or T.P.L.	2	4	5	3	1	4
Instant Chocolate 2 lb. Nestle's Quick	2	1	2	1	2	1
Peanut Butter 2 lb. jar Kraft or T.P.L.	3	2	2	2	2	1
Corn Oil 32 oz. Mazola or T.P.L.	4	1	4	2	2	3
Sugar 10 lb. T.P.L.	6	2	5	4	3	1
Catchup 15 oz. Heinz or T.P.L.	2	1	1	2	2	1
Flour 10 lb. Robin Hood	1	1	4	2	3	2
Corn Flakes 12 oz. Kellogg's	2	2	4	1	5	2
Skim Milk Power 3 lbs. Carnation	1	1	2	3	2	2
Pork & Beans 14 oz. Libbys or T.P.L.	2	1	3	3	2	1
Tomatoes, canned 19 oz. Aylmer or T.P.L.	2	2	1	3	3	2
Vegetable Soup 10 oz. Campbells or	2	1	3	1	2	2

* T.P.L. means Top Price Line

Source: Food Price Review Board Survey, 1974.

FOOTNOTES

¹ Implicit in the posited role of consumers as directors of resource allocation are assumptions that consumer preferences are largely not manipulated, that a sufficient number of alternative goods are available so that consumers are able to maximize satisfaction and reveal their true preferences, that prices are known, and that consumers have sufficient information and ability to accurately evaluate alternative products and sellers.

The implications of these assumptions being right or wrong are particularly great. If consumer demand is subject to any manipulation, as Professor Galbraith contends, then a "market economy" may be a charade for a seller administered economy. If the information available to consumers is inadequate for rational evaluation of alternative goods and alternative sellers, the probabilities are high for "wrong" decisions (i.e., decisions that lead to non-optimal levels of consumer satisfaction and transmit incorrect preference signals).

² The 65 food items were selected to adequately represent the major food categories of meat, fresh fruits and vegetables, dairy products, canned fruits and vegetables, major beverages, and cooking materials.

A weighted price index was employed in the study to take into consideration the different expenditures an average Canadian family would make on individual food items. (The specific data were obtained from the Statistics Canada publication Average Family Food Expenditures, Catalogue No. 62-531, 1969). For example, if an average family spends 75 cents per week on hamburger and the price of hamburger is 89 cents per pound, the weighted index is $.89 \times .75$ or $.6675$. Similarly, if the average family spends 26 cents per week on oranges and a dozen oranges is priced at 99 cents the weighted index is $.26 \times .99$ or 0.2574 . However, the index is not invariant with respect to units. Items were priced in equivalent units to the extent possible.

³ To improve the response rate normally associated with a mail questionnaire and to simultaneously avoid the cost of personal delivery and pick-up, a pre-mailing telephone survey was employed to identify consumers willing to participate in the study. A telephone directory was obtained for each of the two cities including a telephone map indicating the specific areas associated with each telephone exchange (3 digit prefix). Corresponding population densities were calculated for each of the telephone areas and a sample of consumers were drawn accordingly. Population densities were obtained from census tract data from Statistics Canada (8).

Questionnaires were sent to the 1,800 Ottawa consumers beginning the latter part of June. After a follow-up letter in mid-July, the final response rate was higher than 60 percent; 1,137 questionnaires had been completed and returned. Questionnaires were sent to 1,500 Winnipeg consumers in mid-July; 743 were returned by the first week in August. Both cities received the post test examination in November, 1974 with 1,137 questionnaires sent to Ottawa consumers and 753 to Winnipeg consumers. The response was 507 and 363 respectively.

- 4 Nelson (1966) found a negative relationship between the frequency of price changes and store price levels. Devine and Hawkins (1972), however, discovered a positive relationship between in-store price variation (a measure of both frequency and magnitude of price changes) and store price level.
- 5 Differences in the mean prices of individual stores during different time periods were tested using one way analysis of variance. One way analysis of variance was also used to test for significance of difference in the mean prices in the four submarkets in Ottawa-Hull.
- 6 Prices were collected on Thursday, Friday or Saturday and published in daily newspapers the following Thursday. Thus, on Thursday, Sept. 19, the first price comparisons were published and were for the week ending Sept. 14. Since retailers could not adjust their prices until the week after publication, retailer response to the comparison of prices in effect during the week of Sept. 14 was not evident until the week ending Sept. 28.
- 7 The differences in mean prices during the different weeks were tested using a one tail t test. Prices during Sept. 21 were compared to prices during October 5 and Nov. 2. The t values for the comparisons of mean differences were 5.41 and 7.20 respectively. With 25 degrees of freedom, both of these t values are significantly at the 99 percent confidence level.
- 8 The dispersion of prices across stores during the period July 5 to Sept. 21 was compared to the dispersion during Sept. 28 to Oct. 26 using a F test of the difference in normalized variances (standardized mean squares).
- 9 An experimental measure of in-store price variance was used with mixed results. The measure was developed by using the following formula:

$$\text{Var} (P_{ij}) = \sum_f a_f (P_{ijf} - \bar{P}_{ij})^2$$

where: $\text{Var} (P_{ij})$ = a measure of the dispersion of prices in store i for week j

P_{ijf} = price of item f in store i during week j

\bar{P}_{ij} = weighted average of price in store i during week j

f = items

i = stores

j = weeks

a_f = expenditure weight for item f, where the $\sum a_f = 1$

The measure was applied to individual stores for individual weeks, and was found to be positively and significantly related to price levels. That is, higher priced stores tended to have a greater dispersion of prices than lower priced stores. In-store price variance was also positively related to average price levels over time suggesting that firms increased the prices of the more expensive items (above the mean price for the items checked) faster than the prices for the less expensive items.

10. When asked, "At what store do you buy most of your food?", test market consumers responded as follows during the pretest and post-test periods:

	<u>Pretest</u>	<u>Post-test</u>
A & P	1	1
Dominion	20	25
I.G.A.	17	15
Loblaws	25	23
Steinbergs	27	32
A.L. Raymond	8	3.5
Others	2	0.5

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