A Review of the Experimental Effects of Increased Price Information on the Performance of Canadian Retail Food Stores in the 1970's

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Characteristics of Food Retailing

The focus of competition in retail food markets is generally within a metropolitan area. Although the firms involved often operate in several areas, and hence may be considered regional or national chains, consumers rarely travel to another metropolitan center to purchase groceries.

Local concentration in Canadian retail food markets is high. In Western Canada, the four largest firms account for over 90 percent of all grocery store sales and have, for example, 98.8 percent of the market share in the city of Saskatoon, (Mallen, 1974.)

Entry barriers would be considered moderate to high in most metropolitan markets for multi-unit organizations. The scarcity of good store sites, economies of scale, and the enterprise differentiation of established retail firms are the major deterrents to new multi-firm entry.

Compounding product line complexity is the frequent changing of prices by retail firms. Many of these price changes are associated with weekend "specials". Such price changes may be made to reflect changes in wholesale costs, to offset the price reductions on "specials", or to confuse consumers. Regardless of the reasons for frequent price changes, the effect is to make store comparisons more difficult.

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For the most part, consumers must rely on their personal experiences and observations from shopping at alternative stores in making their store selection decisions. Commercial or government reports which provide store comparison information are generally not available.

Although the total consumer expenditure in food stores is relatively large, the money spent on any one particular item is relatively small. Thus, the potential benefit derived from store to store comparisons of inexpensive items is marginal. On the other hand, to derive more substantial savings by comparing several hundred inexpensive items in several stores requires considerable time and expense. On an individual basis, it is questionable whether the benefits of extensive search in retail food markets would outweigh the costs incurred in collecting the information.

Experimental Objectives

The objective of several Canadian research experiments was to determine the impact of additional comparative price information on buyers and sellers in an urban retail food market. Market performance was considered a dependent variable and was measured from two vantage points: (1) price efficiency, and (2) perceived consumer satisfaction. The key independent variable was market information, specifically the level of comparative price information over time.

The proposed relationship between price information and price levels stems from Stigler's (1961) thesis that price dispersion, a frequency distribution of quoted prices, is a measure of market ignorance. Prices are considered to be efficient if they accurately reflect both costs and preferences. Consequently, both the level and the distribution of prices were monitored as price information was improved.

In its relation to consumer preferences, price efficiency is concerned with the balance or mix of products. If buyers and sellers are perfectly informed, entry is free, resources are mobile, and an adequate selection of products are available from which buyers can choose, then the balance of products produced is assumed to be optimal when the price of each product equals it's average cost.

Similarly, the optimal despersion of prices at equilibrium is assumed to occur when prices accurately reflect consumer preferences with appropriate allowances for transportation, processing, and storage costs. Deviating dispersions represent either conditions of monopoly profits or inaccurate reflection of preferences or both.

A Review of the Research Settings

I. The Edmonton Experience

Retail price monitoring and experimental publishing had its Canadian origin in Edmonton in March of 1970 (Devine, 1972). Earlier research (Devine and Hawkins, 1970) had revealed several interesting conduct characteristics associated with the Edmonton market. The city was characterized by a wide range of prices among geographical regions, socio-economic regions, firms, stores, products, and overtime. In particular, stores in the same chain showed statistically significant price differences both in level and in volatility depending on conditions associated with market segregation. Empiricial observations indicated that the necessary conditions for strategic price discrimination did exist and may have been exploited. One particular firm was a dominant price leader setting the competitive price for all regions of the city.

As a result of the 1970 findings, the research staff recommended that

all stores within one firm should sell indentical products at one price in a metropolitan market, subject to reasonable cost differences. It was hypothesized that the above stipulation would cause price redutctions, generated in selected areas, to become city-wide and not limited to segregated neighborhoods.

On January 10, 1970, Firm A, the dominant firm in the market, announced a major policy change, namely, that it would charge identical prices for homogeneous products in all stores throughout the city. Competitors reacted quickly to the new information announcing the development of new "discount" pricing strategies.

The market changed quickly and substantially. The predictions made in the previous research were largely validated. Various competitors were now able to under-price Firm A. The range of price level differences between stores, within Firm A, declined as did the average price level for the firm. Instead of most other major competitors ranging above the Firm A level, many were now more competitve, resulting in a general decline in prices for the entire metropolitan area. In short, both sellers and consumers had increased information; if you monitored prices in only one Firm A store, you knew the price levels in all the firm's stores regardless of the neighborhood.

The University began publishing comparative weighted price level indices each week. There was a positive response from both sellers and buyers to the increased information. Consumers used the price indices to select stores (many changing to the new lower priced competitors and sellers used the indices as a benchmark for performance eveluation.

II. The Ottawa-Hull Experiment

The second major experiment involving the publication of comparative retail food price indices was initiated by the Food Prices Review Board in

Ottawa-Hull in April, 1974, (Devine, 1976). To more accurately measure the impact of a market stimulus, like increased price information, a comprehensive pretest, post test, control group design was developed. Ottawa-Hull was selected as the test market and Winnipeg, Manitoba, as the control market. Pretest price monitoring and consumer questionnaires were undertaken in both markets during Stage I of the experiment.

During Stage II of the project, comparative retail price indices were published on a weekly basis for five consecutive weeks in the test market, Ottawa-Hull. Prices continued to be monitored but not published in the control market.

In Stage III of the experiment, a post test questionnaire was distributed to both test and control markets while prices were being monitored in the two metropolitan areas.

The results of the experiment supported all pre project hypotheses:

(1) Individual retail food outlets did reflect significant price differences in weighted price levels prior to the dissemination of comparative price information.

(2) The public dissemination of market information on comparative price offerings: (a) reduced the dispersion of prices across stores, (b) decreased the price variation within stores, and (c) lowered the average price level in the market.

(3) Higher priced stores had more volatile prices as measured by an index of in-store price variation, the higher the variation the higher the price level both across stores and over time.

(4) The 'underpriviledged' areas of the market tended to be characterized by higher priced stores than the more 'affluent' areas, and

(5) Consumers that received additional information on comparative price offerings did reflect significantly higher levels of satisfaction (see index development by Marion & Handy, 1973) with food products, food stores, and food prices, than consumers who did not receive the information.

The comparative price movements in the test and control markets during the three stages of the experiment are depicted in Figures 1 and 2. In total, the retail price index declined approximately 7.0 percent in the text market

during and immediately after the information program. The initial difference in price index levels between high and low priced stores dropped from a maximum of 15 percent on September 21 to 5.4 percent on October 12. Stores with the highest price indexed generally dropped prices to meet the lower priced competitors. Alternatively, food prices in the control market (and in the rest of Canada) continued to increase notwithstanding periodic minor price reductions, see figure 2.

An examination of benefits and costs associated with a 5 percent decline in retail food prices revealed a gain in consumer surplus of $892,525, a loss to retailers of $883,691, and a resulting net benefit to society of $8,834 per month. The cost of monitoring and publishing retail prices was approximately $2,500 per month in the test market. It is interesting to note that the net gain to society approaches the full $892,525 per month if the price decline was associated with a corresponding decline in retail costs due to either fewer price changes or less advertising.

Forty-three percent of the consumers sampled in the test market indicated they had changed stores as a direct result of the comparative price program. Alternatively 18 percent of the sampled consumers indicated they had changed stores during the same period. Consumers in the test market indicated they would, on average, be willing to pay 34 cents per week to receive the information (and still remain on the same indifference curve, see Brown, 1971) or the 118,000 families in the test markets would conceivably pay $174,541 per month (notwithstanding a potential non response bias in the sample).

III. The Saskatchewan Project

The latest experiment in comparative price publication was undertaken in the province of Saskatchewan in October 1975. The research design was further modified:

(1) Prices were monitored in six Saskatchewan cities and in Calgary and Winnipeg located in neighboring provinces.

(2) Prices were published in test markets in Saskatchewan, namely, Regina and Saskatoon, and

(3) Prices were published weekly for six consecutive months, to determine the longer run effects of the stimulus. Two major differences in the experiment were evident during the experiment, (a) prices and costs were generally declining during the experiment rather than increasing as in the 1974 study, and (b) the Canadian Anti-Inflation Board applied wage and price guidelines (controls) soon after the beginning of the publication program.

The results of the project generally supported earlier hypotheses:

(1) Individual retail food outlets did reflect significant price differences in Regina, but not in Saskatoon prior to publication. (Note the top four firms account for 98.8 percent of the market share in Saskatoon).

(2) The public dissemination of test market information on comparative price offerings, (a) reduced the dispersion of prices across stores in both test markets, (b) lowered the average price level in both the test markets, (c) lowered the average price level in other Saskatchewan cities where prices were only monitored. (These monitored cities received the test market comparisons in the newspaper but were not informed if or when publication would begin in their respective centers), (d) lowered the price differences between cities within the province, the highest priced cities declined to meet the price levels in the lower priced centers, and (e) lowered the price index levels in the test markets to a larger degree than the price declines recorded in the control cities of Winnipeg and Calgary outside the province. Regina, for example, led the National decline in the Statistics Canada Consumer Price Index for Food Consumed at Home during the latter part of the publication period.

(3) Consumers that received additional information on comparative price offerings did reflect significantly higher levels of satisfaction with food stores and prices than consumers in other Saskatchewan cities.

The comparative price movements in the test and control markets is given in Figure 3. Comparative analysis, while not conclusive, indicates that the food price monitoring and publishing program was correlated with a reduction in food prices above that generally experienced in the control centers, (in Regina between 1.6 to 2.1 percent and in Saskatoon between 0.5 and 0.7 percent). Note the publication period narrowing of the difference in the Calgary-Regina price spread and the widening of the Saskatoon-Winnipeg spread, see Figure 3. Also, of interest is the relatively rapid increase, (3.5 percent in one week) in the Regina food price index immediately following the termination of the publishing

program. This post publication price move was the single most significant reaction of the entire program.

Conclusions and Future Considerations

Market performance in highly integrated retail industries is difficult to appraise because of the rapid growth in (1) product lines, (2) differentiation, (3) the frequency of price changes, and (4) the concentration of managerial control. Buyers (and sellers) are forced to pay increasingly higher costs to acquire the necessary information to make rational market decisions. For consumers, making accurate store comparisons in consideration of literally thousands of products and as many weekly price changes, is theoretically and for many empirical purposes, most impractical. The consequences of this relative growth in market ignorance is the increasing probability of pricing inefficiency and resource misallocation.

In appreciation of the problem complexity, the theoretical and the empirical consequences of improving pricing information under various structural configurations is largely unknown. Pioneering work by Stigler (1961), and Nelson (1966) and more contemporary research by Diamond (1961), Rothschild (1973), and Salop (1975) support the propositions that (1) ignorance is a source of inordinate price variation and inefficiency, (2) variable price merchandising is a profitable retail strategy in relatively complex misinformed environments, and (3) the theoretical ramifications of improving information, the benefits and costs, under conditions of monopolistic competition and differentiated oligopoly reveal a wide range of possibilities associated with various interdependency assumptions. If we assume that a defined minumum level of market information is necessary for 'workable' competition under most contemporary market structures and that the minimum is not supplied because of the lack of market incentive, the characterisitics of the product would suggest that retail price infromation may be a public good.

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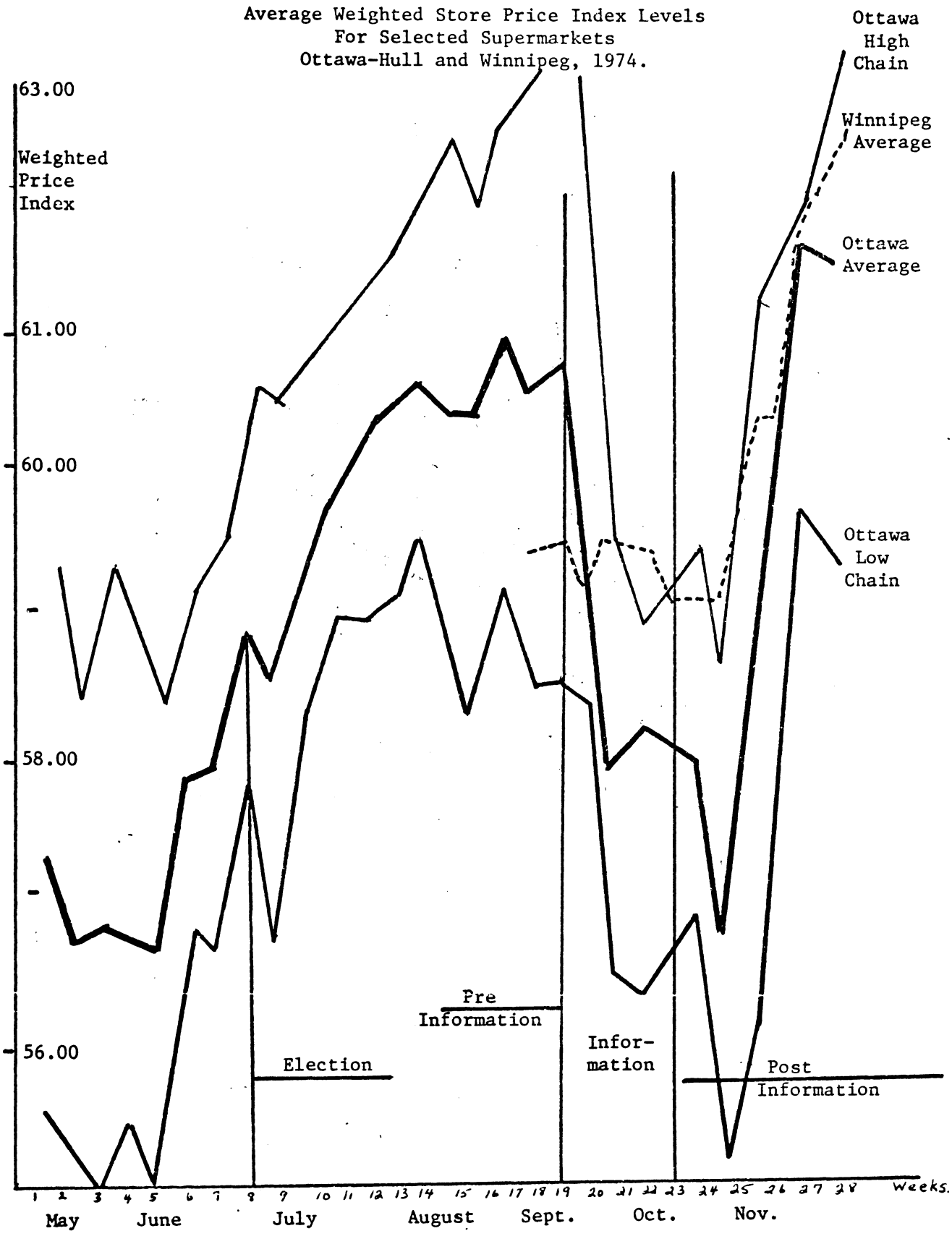
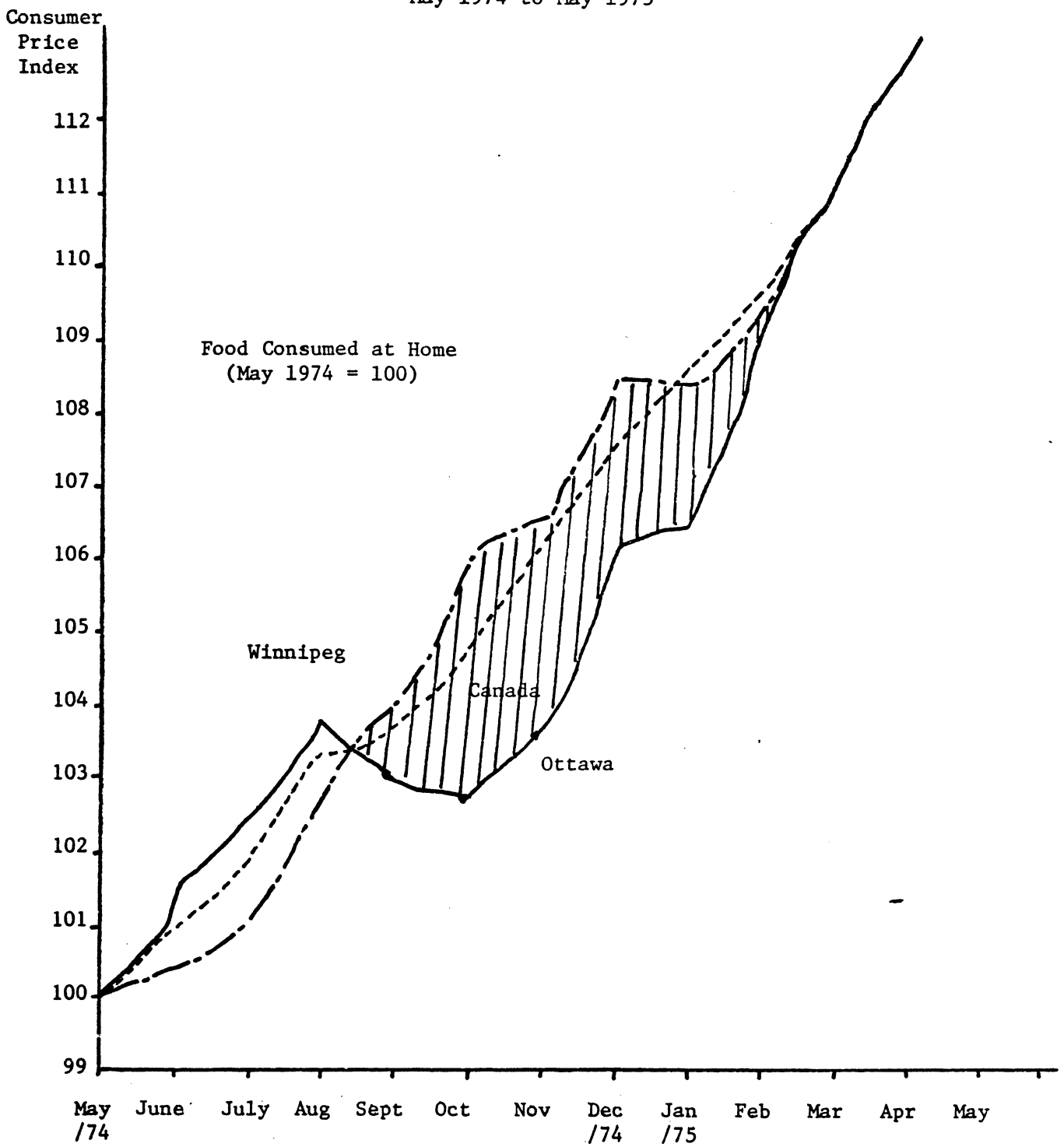
Figure 1



Source: Food Prices Review Board Survey 1974

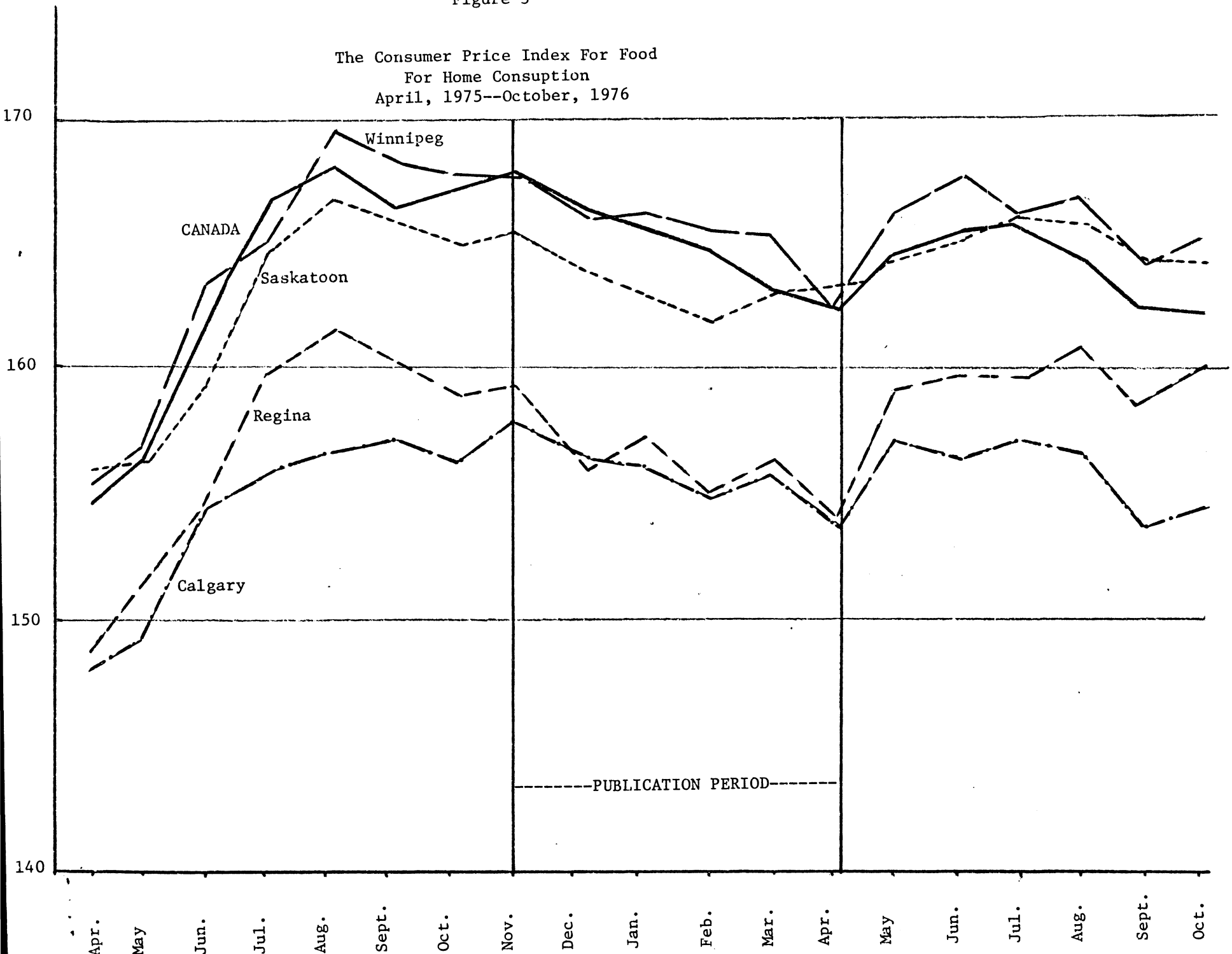
Figure 2

Consumer Price Index for Food Consumed at Home
May 1974 to May 1975



Source: Statistics Canada.

Figure 3


The Consumer Price Index For Food
For Home Consuption
April, 1975--October, 1976
170
160
150
140
Winnipeg
CANADA
Saskatoon
Regina
Calgary
--------PUBLICATION PERIOD-------
Apr.
May
Jun.
Jul.
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb.
Mar.
Apr.
May
Jun.
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