# An Economic Analysis of Sales Flyer Advertising Frequency by Competing Grocery Manufacturers and Supermarkets 

## By

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#### Abstract

The advertising strategies of retailers competing for processed food and beverage product markets are studied by constructing a theoretical model and then testing the model's predictions using statistical analysis of primary data. The advertising decisions are jointly determined by the food manufacturers and food retailers. Categorical data consisting of yes-no advertising decisions for 22 processed food products was collected from the sales flyers of four major supermarket chains and was recorded in 2 X 2 contingency tables. The chi-square test for a $2 \times 2$ contingency table was then used to test the hypotheses concerning yes-no advertising decisions for a particular product in three pairs of competing supermarkets, and for different brands of a common product by two competing manufacturers within a particular supermarket. In the second category four scenarios were considered: (1) a chosen brand versus the private label, (2) a chosen brand versus any national brand other than the chosen brand, (3) any national brand versus the private label, and (4) the private label of one supermarket versus the private label of another supermarket. The results show overwhelming support for the hypothesis that food manufacturers and retailers are randomly choosing which products to promote and when to promote them. For the within-store analyses, the advertising strategies for national brands and private label products are independent in most cases. Results show that there is a negative correlation for those few cases that are statistically dependent, apparently that the food companies are choosing to advertise different brands in a given period to avoid intensive competition. However, in the supermarket selling a large volume of products with private labels, there is a positive correlation for those cases that are dependent. The retailer is evidently advertising both the national brand and the private label to promote the private label products as substitutes for the national brand products.


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## Chapter 1

## Introduction

### 1.1 Background

An advertising sales flyer is a unique form of print advertisement that is widely used by retail grocery stores. The sales flyer is a simple and informative way to identify the prices corresponding to a wide array of grocery products. This thesis examines sales flyer advertising frequencies for national brands and private label food products. Flyers are prepared and printed by retailers; however, there is a vertical interaction between the food manufacturers and grocery retailer in making the advertising decision. The thesis, which is written from an industrial organization perspective, attempts to capture the horizontal competition of supermarkets selling a common product (e.g. Kraft peanut butter), the horizontal competition of food manufacturers selling similar products (e.g. store-brand versus Kraft peanut butter) and to a certain extend the vertical interaction between food manufacturers and grocery retailers.

The printed advertisement is a powerful tool for communicating price information to consumers of retail supermarket products because of the efficiency of this form of advertisement - relatively low in cost and easy accessibility to massive number of potential consumer. Flyers are typically delivered weekly to household doorsteps as an insert to free community newspaper. Burton et al. (1999) have indicated that there is a strong positive correlation between advertisement coverage in the sales flyer and the sales volume of the advertised products. Indeed, the sales flyer allows the consumer to get the price information contained in the sales flyer without incurring search costs. Advertising is an important component of a store's marketing program because it influences the purchasing behavior of consumers regarding store choice and brand choice, which in turn has a significant impact on the store's performance, especially in the short run (Nijis et al., 2001, and Tellis and Zufryden, 1995). While the major flow of research examines the impact of advertisement and price promotion on the store's performance in terms of sales, store traffic, and profits, this thesis views maximizing the store's performance as the primary objective of supermarket managers and maximizing individual product performance as the primary objective of food manufacturers. This thesis is examining the joint advertising strategy of manufacturers and retailers from an industrial organization perspective.

There is a close vertical relationship and many potential interactions between manufacturers and supermarket chains in the processed food industry because there is almost no intermediaries in North America compared to the Asian market. Retail price is theoretically determined by manufacturers and retailers together, as it is the sum of the manufacturer's wholesale price and the retailers' markup margin. Thus, there is a certain interaction between the manufacturer and the retailer when they are making decisions concerning price promotion and advertisement in the sales flyer. The price promotion and advertising decision is a critical interaction because the agreement is based on the individual firm's objective, market position, and target segment; furthermore the result has a direct impact on the firm's performance, competitiveness, and market share. McGee (1988) states that previous empirical studies demonstrate a positive relationship between industry profits and advertising intensity. The profit rate of industries that have a higher advertising expenditure is greater than those industries which advertise less. Thus, price communication plays an important role in attracting consumers, specifically the informed and rational consumers who search for the lowest price among the retailers. McGee (1988) also indicates that in general "advertising lowers the cost of bringing valuable information to buyers, eases the entry of new products and new firms, increases competition, and lowers price" (p.372). This is supported by substantial empirical evidence.

Manufacturers and retailers have to agree on certain conditions in order to come to an agreement in a joint advertising strategy. For example, manufacturers may need to subsidize the retailer's advertising cost, make payments, or provide the retailers with a special delivery schedule. On the other hand, retailers may need to defer the advertisement of other brands and feature a manufacturer's name brand exclusively within the sales flyer. Kim and Staelin (1999) point out that "retailers seem to be extracting numerous concessions from manufacturers, such as slotting allowances, local advertising support, deep discounts for promotional activities, and special delivery schedules, but retailers cannot transfer these concessions into accounting profit" (p.60). Lal and Messinger (1996) suggest that retailers have a lower profit margin on advertised products than on unadvertised products, which implies that price promotions are not really beneficial to the retailers. Kim and Staelin (1999) suggest that frequent price promotion increases consumers' price sensitivity across stores. Consumers pay attention to advertising and compare price when searching for the lowest price available, thus increasing the level of store switching. As a result, competition between retailers becomes more intense and retailers earn lower profits. In this case, manufacturers must give larger payments to
retailers for merchandising activities. However, retailers will not pocket all the payment because "merchandizing activity affects the degree of cross-store shopping which drives them to always pass on a portion of the side payment to the consumer" (p.72). However, manufacturers' profits decrease as consumers' store choice becomes more sensitive to the cross-store price difference in aggregate promotional activity. "Since the promotional activities also affect brand shares within a store, each manufacturer feels compelled to 'enter into a promotional war' and give the retailers larger allowances" (p.73), implying that profits will decrease for both food retailers and manufacturers. Kim and Staelin (1999) suggest that manufacturers should "assist retailers in building store loyalty in ways other than promotional activity" (p.73).

Although Manufacturers and Retailers have to work together in setting the joint advertising strategy, the two players do have different incentives and expectations from the advertisement. Each player wants to increase its sales volume, market share and profits in the respective industry. Manufacturers want to increase sales volume and market share of the products under their name brands; while retailers expect more from price advertising, higher customer traffic, and increase overall sales volume of products carried in individual store, regardless of brands and product categories.

This thesis will investigate the advertising patterns of products from both national brands and private labels. These advertising patterns will affect sales of a product across two competing stores as well as the sales of competing brands within a particular store. We will first examine yes-no advertising decisions for a common product sold by competing supermarkets and find out if the joint promotional activities by manufacturers and retailers are independent across stores. Independent activities do not encourage cross-store shopping. Then we will shift the analysis to across-brand advertising patterns within a supermarket, to determine the extent that yes-no advertising decisions are independent over time. The results will reveal the extent that joint advertising strategies are independent across individual supermarkets and if there is dependence, the extent that firms are either purposely avoiding or purposely engaging in price competition at the retail level. The analysis will also show how the individual retailer chooses how to simultaneously advertise its private label products at the same time as it enters into a joint advertising strategy with food manufacturers.

### 1.2 Research Question

This thesis seeks to answer the following question: Are competing supermarkets likely to promote a particular product (e.g., Kraft peanut butter) at the same time or at different times? Moreover, are competing name brands of the same generic product (e.g., Kraft versus Skippy peanut butter) likely to be promoted at the same time or at different times? A simple spatial theoretical model, which eliminates much of the complexity of the real-world interaction, is constructed and used to generate specific hypotheses concerning the above questions. The hypotheses are then tested using weekly sales flyer price promotion data.

The theoretical model predicts that competing firms will choose to promote their products on a random basis. This outcome implies that the price promotion data should show statistical independence, both across retailers and across brands. A static model is employed to test the probability of two products being advertised together in a given week. In the across-store section, we test the probability of the same product being advertised in a pair of competing supermarket in the same week; the null hypothesis is that the advertising behavior among the pair of retailers tested is independent. In the across-brand section, we test the probability of two brands in the same category being advertised on the flyer of each supermarket in the same week. It is hypothesized that the advertising strategies of two competing brands within a product category in a supermarket, are independent. Three combinations of two competing name brands are tested: (1) the chosen brand versus the private label at each supermarket, (2) the chosen brand versus other national brands, and (3) any national brand versus the private label at each supermarket.

In reality, advertising decisions by food manufacturers and retailers are made jointly, but the research in this thesis does not explicitly address this joint interaction. Both manufacturers and retailers use advertisement in providing information to consumers in terms of existence of sellers and price information for their products. According to Lach (2002), retailers practice random pricing strategy so that consumers cannot learn which stores have consistently low prices. Likewise, random advertising strategy would create an imperfection information environment for the consumers. This research attempts to observe the advertising behavior in the oligopoly environment between the major supermarket chains in the Metropolitan of Vancouver. If there is a strong evidence that the joint advertisement between the manufacturers and the four retail supermarkets in this analysis have independent advertising strategies on a particular food product. Food retailers are apparently randomizing their strategies to prevent intense competition, which would
decrease their overall profit.

### 1.3 Research Procedures

A simplified version of the spatial model developed by Rao and Syam (2001) is presented in Chapter Three. It demonstrates that $i$ retailers will collectively earn higher profits if they choose to advertise different-goods rather than advertising the same good. However, there is a strong incentive for a retailer to deviate and chose a same-goods strategy if its competitor is choosing a different goods strategy. This outcome implies that there is no pure strategy equilibrium, which necessarily implies that we are left with a mixed advertising strategy equilibrium. Specifically, retail supermarkets will randomly choose what products they are going to advertise and when, in any given week. The story is similar for food manufacturers.

The categorical data used to test the theoretical hypothesis was obtained from a collection of sales flyers from four major supermarket chains with store locations in the Vancouver metropolitan area during a 52 week period (May 6, 2001 to May 5, 2002). The observations were put into $2 \times 2$ contingency tables. A chi-square test was employed to test the hypotheses concerning the statistical independence of the yes-no advertising status of a chosen product at two competing supermarkets, for both chosen brands and private label, and different brands of a common product of competing manufacturers within a particular supermarket.

However, there are some limitations to the static model employed in this thesis, because the model does not encounter the dynamic aspects of the advertising environment. There is no consideration of the dynamic aspect over time. Although the model assumes a Bertrand competition between the food retailers, and each week is a new game for advertising decision, yet it is unlikely to be the case in reality. Stigler (1961), and Hayes and Morris (1991) suggest that the sellers would repeat product advertisement overtime to remind the forgetful consumers the existence of advertised items and the location of sellers. An industry contact explains that some advertising decisions between manufacturers and retailers are made up to three months prior to the effective date of the sales flyer, but there are some last minute amendments and corrections before the printing of the flyer. Little is known about the time lag between when the decision is made and when the flyer is distributed.

Therefore, the same chi-square testing procedure with contingency tables is constructed to find out if there is a lag relationship between pairs competing supermarkets with different brand combinations in the 52 weeks sample period. The yes-no advertising status of a brand in Store $A$ in week $t$ is compared with the yes-no advertising status of the same brand in Store B in week t -k where $\mathrm{k}=\{1,2,3,4\}$ for both the chosen national brands and the private labels. For example, the advertising status of Kraft peanut butter in Safeway in week 1 is compared with the advertising status of Kraft peanut butter in Market Place IGA in week 2. Lag relationship, between a pair of competing supermarkets with similar market position and target segment, does emerge, implying that there is a possible leader-follower relationship among the retailers, but the results show no particular pattern of lag relationship across-stores and across-brands. The general result of this time-lag analysis will be discussed in Chapter 7. Because manufacturers place advertisements alternately at different supermarkets so that the product is exposed to consumers continuously over time on different supermarkets' flyers, the product get exposed to consumers in different population segments. Given that the manufacturers wish to place a certain number of advertisements within a 52 weeks period, both the manufacturers and retailers would like to alternate the advertising status between the competing supermarkets in order to reduce competition at the retail level, and according to our spatial model, retailers would advertise opposite-goods in order to obtain a higher profit.

### 1.4 Outline of the study

The second chapter provides a review of the economic and marketing literature on price advertising from academic perspective, and general price advertising practice in the food retail industry. A brief overview of the Canadian food retail market structure and the marketing environment is presented in Chapter Three. The market position of each of the four retail supermarkets studied in this thesis is also discussed in this chapter. The theoretical model, a simplified version of the model by Rao and Syam (2001), for this study is constructed in Chapter Four. The data and statistical methodology are described in Chapter Five. Chapter Six contains the empirical results and the discussion. A summary and conclusion are presented in Chapter Seven.

## Chapter 2

## Literature Review

### 2.1 Academic Research

Retail supermarkets often use sales flyer to advertise their weekly price information and special discounts on selected products from their merchandise. Supermarket managers select different items in various product categories for advertisement in the sales flyer to improve the performance of their organizations. Sales flyer is a powerful marketing tool because consumers often make their decisions about which store to visit and which product to buy, based on the information in the flyer. Many researchers have investigated food retailers' price promotions from the perspective of consumer behavior and of industrial Organization. Previous research, such as Lal and Matutes (1994), Gupta (1988), Bell at al (1999), Nijis, Dekimpe, Steenkamp and Hanssens (2001), and Konishi and Sandfort (2002), have concentrated on the following three effects of price promotion on store performance:

1. Sales effect - Does price promotion for selected items increase the overall sales volume of the food retailer?
2. Profit effect - Does the price reduction or loss leader pricing has a negative effect on the store's profit?
3. Traffic effect - Does price promotion for selected items influence the flow of consumer shopping in the store?

Empirical research by Walters and MacKenzie (1988) tests the direct and indirect effects of price promotion with loss leading pricing on grocery sales, store traffic and profit, advertised and unadvertised in-store specials, and double coupons promotions. They conclude that these price promotions can have a significant impact on the store's performance in the short run, but the effect of loss leader pricing is essentially zero in the long run. Moreover, the price promotion does not have a direct impact on sales and profit; the reason that the supermarket has a prompt increase in sales and profit in the promotion period is a result of an increase in store traffic with a store switching effect. The price promotion at retail supermarket attracts consumers from competing stores while retaining its patrons. Because there is a transportation cost incurred by consumers for each shopping trip, consumers rarely purchase only the promoted products when they make a shopping
trip to the grocery store. Promotion, therefore, stimulates the sale of overall merchandise. The corresponding increase in store traffic leads to an indirect effect of higher sales and profit performance.

Nijs, Dekimpe, Steenkamp and Hanssens (2001) yields a similar conclusion from the perspective of demand effects: price promotion results in category demand that is relatively stable in the long run. Although the long-term impact is essentially zero, the net short-term effect of price promotion on product demand is substantial. However, the demand effect is only related to price advertisement, showing that the consumers are very price sensitive. Non-price advertisement (i.e. image building, quality signal) reduces the impact of price promotion on product demand. As the competition in the product category increases, the short-run price promotion effect decreases. Lastly, Nijs et al. conclude that rivals generally do not react to the product advertisement and price promotion. In other words, the advertising strategies between competing firms are independent.

The research of Walters and MacKenzie (1988) also finds that unadvertised in-store specials appear to have no effect on store profit, sales, or traffic. Most consumers do not have the price knowledge for each supermarket, and large search costs prevent consumers from shopping around competing supermarkets to locate the lowest price. Therefore, consumers are likely to make their store choice base on their overall reservation price. Supermarkets with unadvertised in-store specials do not generally earn higher profits, because there is incomplete information in the market. Unless the consumer routinely patronizes a particular supermarket, then he or she may have perfect price knowledge for that supermarket only and still be uncertain about prices in other retail supermarkets. A price promotion is more effective when the temporary discount is advertised. This allows the reduced price information to reach large numbers of consumers, so that the food retailer can achieve the goal of gaining store traffic by stealing consumers from its rivals.

Burton, Lichtenstein, and Netemeyer (1999) studied the association between consumers' exposure to sale flyers and the sales volume in retail supermarkets. Their results indicate that there is a significant relationship between the purchasing behavior of an individual consumer who is exposed to the advertisement, the number of advertised products purchased, and the amount spent on these products. The results also indicate that there is a positive correlation between the advertisement, the price sensitivity, and the age of a consumer. Compared to unadvertised products, the sales volume doubles when
products are advertised. This implies that a supermarket manager can influence the consumers' product choice and purchasing behavior in order to achieve their goal of profit maximizing.

According to the study by Urbany, Dickson, and Sawyer (2000), "supermarket managers often misjudge consumers' price search behavior and believe that consumers are very price sensitive with a high willingness-to-pay for price information in the market". However, their findings suggest that consumers generally devote a higher effort to within-store price search than across-stores price search, implying that the increased sales volume in the short-run is a result of loyal customers who wait and stock up when a price promotion is advertised rather than new customers who visit the store when they are exposed to the advertisement. Because there is a transportation cost incurred on each shopping trip, consumers look more carefully for in-store specials once they already shopping at a store, instead of reading through the flyers from individual retail supermarkets and searching for the lowest prices prior to their shopping trip. In another words, an increase in store traffic is more likely to be a result of customer retention rather than customer acquisition from competing supermarkets.

It is impossible for retail supermarkets to advertise all the products with price promotion on the sales flyer; consumers only know about the advertised prices, so there is still imperfect information in the market. The analysis of Rajiv, Dutta and Dhar (2002) examines how the advertisements of price promotion for stores in different market positions compete for store traffic with the application of a game theory. They conclude that "promotional advertising is motivated by both traffic building and customer retention considerations; and the relative importance of these considerations is related to the store's service positioning"(p93). Assuming that the supermarkets have similar cost structure, the high-service stores would have a higher margin; therefore, they can afford to advertise at a higher frequency than those low-service stores with a lower margin. The analysis indicates that high-service stores advertise a shallow discount at a higher frequency and play a more prominent role in offensive advertising, while the low-service stores offer deeper cuts at a lower frequency for customer retention purposes.

In addition to examining the advertising strategies of competing supermarkets, researchers have also studied the advertising strategies of individual supermarkets. Food manufacturers pay retailers for promotional or merchandizing activities, including
advertisement in sales flyers, in-store promotion, and even the display position of the products, implying that the manufacturers influence the selection of the brands on the sales flyer. A localized study of Reed and Robbins (1981) compares the information of advertised specials to the manufacturers' advertising allowances and the buy-in price of the products from the corresponding manufacturers for retail chains. They find that "advertising allowance by manufacturers plays an important role in indicating what products should be advertised"(p19). However, each retailer has their own degree of influence through their spatial, product, and service differentiations. This develops a specific market position or so-called "firm image" in terms of storewide merchandising activities and pricing strategy in both regular and temporary price promotion.

Tellis and Zufryden (1995) indicate that there are two significant characteristics of retailers' promotions. First, unlike manufacturers, retail supermarkets are not interested in the effect of price promotion on individual product performance; they are more concerned with how marketing and product mix affect overall store performance in category sales and profits. Sometimes the margin of a promoted product is higher than the margin of an unadvertised product; otherwise, advertisement that leads to brand switching by itself is not profitable. Secondly, manufacturers affect retailers' margins that fluctuate over a planning cycle based on deals; thus, the length of price reduction and the advertising frequency is directly related to the manufacturer's deal. Gupta (1988) examines the effect of price promotion by focusing on the increase in sales volume during the promotion period; the study indicates that brand switching causes the sales volume to rise during the price promotion. Both Gupta (1988) and Tellis and Zufryden (1995) conclude that the discounts have only a short-run sales effect; the accelerated purchase appears at the time of the discount period, but when prices return to their regular level, sales subsequently decline due to the stockpiling effect.

Although national brand manufacturers exert vertical influence on the supermarket manager's decision regarding the selection of product advertisement, manufacturers still face horizontal competition from private labels. Messinger and Narasimhan (1995), Rostoks (2002), and Ward et al. (2002) discuss the rapid invasion of private labels into food industries. They show that the market share of private labels is expanding significantly relative to the growth of national brands. The evidence compiled by Ward et al. suggests that an increase in the share of private-label goods is correlated with a rise in the price of name-brand goods. Their conclusion is consistent with the findings of Jafri et al. (1993). A
private label is usually subcontracted to a manufacturer by the supermarkets and thus the cost is relatively low compared with the costs of most national brands. Therefore, the price of a private label product is at a consistently low price regardless of its share in the market. Because a national brand devotes more resources to research and development for product improvement, and makes a greater effort in product marketing, the national-brand manufacturers offer fewer discounts and non-price promotions. The national brand also achieves a high level of product differentiation as a reaction to the invasion of private labels into the market.

Sexton and Lavoie (2001) noted that, unlike most Asian countries, the vertical relationship between food manufacturers and retailers is very close, with few interventions by intermediaries. Food manufacturers trade directly with supermarket chains; the manufacturers and the retailers are the main parties who jointly decide the retail price. Retail price varies within a large range depending on the profit margin of the retailers, and there is a temporal price dispersion with price varying over time such as the weekly price promotion offered by different supermarket chains. The theoretical model of Varian (1980) indicates that the retail market is characterized by a larger degree of price dispersion and the price dispersion can persist in markets where at least some consumers behave in a rational manner. The empirical study by Lach (2002) indicates "price dispersion across stores is prevalent and differs across products in reasonable ways"(pl). Both Varian and Lach's findings support our result of independent advertising decisions on the part of two competing retailers who randomize prices in an attempt to reduce the difference in shopping decisions between informed and uninformed consumers.

Lastly, Rao and Syam (2001), a study that is closely related to my research, constructed a model within which competing firms chose to advertise one of two goods in each period. It is more profitable for competing firms to have pure opposite goods advertising strategies than pure same goods advertising strategies. However, there is a strong incentive for a firm to deviate from the pure equilibrium for opposite goods advertising and offer same goods advertising, which yields a higher profit, while its competitor is offering oppose-good advertising. In Chapter three, we will discuss Rao and Syam's study in more detail and will develop a simplified version of their model to show that competing firms choose to randomize their advertising strategies, advertising the same product some of the time and different goods at the other times.

### 2.2 Textbook Perspective

The Structure-Conduct-Performance (SCP) paradigm is an essential study in most Industrial Organization textbooks, and it provides a framework for investigating market behavior. The structure of an industry determines the conduct of firms, and the behavior of firms determines how well the industry performs. The relationships of Advertising with Market Concentration, Prices and Profits are discussed from an Industrial Organization perspective in assessing the behavior of firms in different market environments. There are two categories of advertising: pure informative and persuasive. The informative advertising provides consumer with information such as existence and location of sellers and products, and prices; while persuasive advertising attempts to increase consumer's preference for the firms' product. McGee (1998) and Hayes and Morris (1991) explain that information is important to the functioning of the market, but persuasive advertising is indeed less desirable in welfare terms.

Informative advertisement serves to identify the existence of sellers and the brand names that they carry in their merchandise. Supermarket managers choose the sales flyer as their marketing communication of choice because it is efficient in delivering price information to large numbers of consumers at a relatively low cost comparing with television and radio commercials. The flyer is then combined with other aspects of marketing programs, such as product, pricing, and distribution strategies from the marketing mix of the firm.

The profit margin of individual products is differs across the overall merchandise for sale in retail supermarkets. The profit margin on national brand items is less than the private label products because manufacturers of national brand products spend enormous resources on research and development to continuously improve the quality of products, service information, and promotional activities such as recipes and contests. Also non-price advertisement sends signals of high quality to consumers. On the other hand, all private labels are subcontracted by the manufacturer and produce copies of national name brand products at a much lower cost, seeking to gain a market share in the product category by targeting price sensitive consumers. Because the cost of private label products is low, they usually sell at a consistently low price and if there is a price promotion on private labels, the discount would not be as deep as for the national brands.

Although private label and national brands compete for market share within the supermarket, and according to Gupta's findings (1998) brand switching has a significant effect on profit as a result of price promotion, brand switching does not influence the store performance in general. If both national and private labels are advertised in the same week, the advertisement would become inefficient for the national brand manufacturers because this would reduce the effect of price promotion on individual product performance. Hence, supermarket managers avoid advertising the national and private label together in the same week and allow the consumer to focus on the discounted national brand in the sales flyer.

In the across-brand advertisement analysis for competing national brands, the association of advertising frequency is expected to be high in most product categories. This situation is different from the competition between national brands and private brands as the national brands in the same product category compete intensively for market share. There are exceptions, however, when there is a name brand domination in the product category; in this case the association of advertising frequency is expected to be low.

### 2.3 Industry Perspective

According to an industry insider, Debby McKinnon (personal communication, November 29,2002 ), a retail supermarket has a very large number of items that are promoted each week in various product categories; there are usually over 7,000 items in the grocery section of the supermarket on sale on average each week. Approximately 1,000 items (including different flavours and sizes) are advertised in the flyer weekly, but not all products advertised are on promotion -- some of the products are advertised at regular prices. The selection of advertised products in the flyer is typically planned three months in advance, especially for products with seasonality; for instance, ice-cream and barbeque sauce in the summer, and turkey and flour near Christmas time. Generally, there are 10 to 15 loss leader items every week, and it is possible to have 3 to 4 of the loss leader products advertised in the flyer. There is some last minute adjustment for price changes and corrections prior to the printing of the advertisement; however, the time lag between the adjustment and the printing is unknown.

McKinnon indicates that it is usually the manufacturers who initiate the temporary price promotion and who pay retailers to advertise their products in the supermarket's weekly sales flyer. It is common for manufacturers to exercise bargaining power and negotiate the terms of the promotion, such as which product is to be advertised and
discounted, the level of discount, and the length of promotion. Manufacturers also have to pay for merchandising activities, such as advertisement in the sales flyer and shelving position in the store. Consumers choose at which store to shop and which brand to buy according to their personal preferences and the price information. Roughly $7-12 \%$ of customers only shop for the promotional products. Various supermarket card programs also offer special discounts to customers; they do not only build store loyalty, but also obtain valuable customer information for marketing purposes.

## Chapter 3

## Market Environment of the Food Retail Industry

This chapter provides some background information on the market environment and the market structure of the Canadian food retail industry. Section 4.1 describes the Canadian food retail market; section 4.1 .1 provides an overall view of the Canadian food retail market environment based on information from a report by Drake (2001); and section 4.1.2 discusses the food retail market environment of the Vancouver metropolitan area studied in this research in terms of market concentration, social demography, and recent trends in the food retail industry. Section 4.2 describes the background and the market positions of the four supermarkets under study in this thesis.

### 3.1 Food Retail Market Structure

### 3.1.1 Overview of Canadian Food Retail Industry

According to the Canadian grocery sales report by Drake (2001), the Canadian grocery business has been growing steadily across the country. Grocery sales in Canada increased $3.9 \%$ in 2000 and reached a total of $\$ 56.63$ billion. The food retail sector is a competitive industry involving domestic food distributors and retail chains as well as American ones. Domestic food distributors and food retail chains are expanding in various regions in order to gain a greater market share in the industry, and the report by Woodcock (1999) indicates that U.S. based companies are also seeking opportunities to enter the growing market in Canada. However, the market structure varies across provinces because the grocery business is a localized industry; most promotional activities occur only at the selling point. This is obvious from the perspective of consumers; they are not willing to travel a long distance to purchase groceries unless they live in remote areas. Life styles and food trends may also vary across regions due to demographic and geographic differences.

Drake (2001) also indicates that in the year 2,000, the food retail industry had a market concentration in a range of 61.7-67.1\% in the Atlantic provinces, Ontario, and the Prairies; Alberta had the highest market concentration at 73.2\%; and Quebec had the lowest market concentration at $32.9 \%$. The market concentration is $65.5 \%$ in British Columbia. Although large corporations are continuously expanding across Canada, the trend is to move towards
smaller community grocery retail stores, which sell fresh food items as well as delicacies, to appeal to the improving life style of consumers who increasingly demand good service and high quality food.

### 3.1.2 Food Retail Market in British Columbia

The retail food sector in British Columbia is a competitive industry with a high market concentration dominated by a small number of large supermarket chains. In 2,000, with a growing population having an increasingly large disposable income, the food retail sector in British Columbia had $14.5 \%$ of the market share in Canada and an increase of $3.6 \%$ in provincial sales from 1999 according to Drake (2001).

In British Columbia, the market competition in the retail food industry is intense with various food retail formats and sizes. Examples are: independent corner stores, convenience store chains, conventional supermarkets, and club warehouses. The largest five food retail companies are Safeway, Overwaitea, Loblaw, HY Louie, and Thrifty's. Together they control $90 \%$ of the total food distribution (Woodcock, 1999). Most supermarket chains were expanding to larger stores to achieve efficiency of scale and a greater selection of merchandise in order to attract price sensitive consumers at a lower margin and thereby achieve a higher sales volume. This includes those time constrained consumers who want one-stop shopping with selections other than the conventional food and grocery products. This expansion enables them to compete with the invasion of warehouse clubs and survive the intense competition of rivals, thus maintaining their market share. In the 1980's, large firm size and maximum market share were the philosophy of most prosperous firms; therefore, supermarket corporations invested huge amounts of money in expanding, either though acquisition, building new stores, or renovation of existing stores.

The social demographic is continuously changing in the Lower Mainland as people emigrate from all over the world or relocate from other cities in North America. The statistics from British Columbia Municipal and Regional District Population Estimates (BC Statistics, 2001) indicate that there is an increasing diversification in the cultural background of the population. At the same time, the economy is growing, so the consumer's willingness to pay for high quality food is increasing. Food retailers plan their marketing strategies, intended to maximize market share and profits, in accordance with this changing market environment.

### 3.2 History and Market Position of Supermarket Chains in this Study

### 3.2.1 IGA and Market Place IGA

In British Columbia there are eight corporate offices and 48 franchised supermarkets controlled by the H.Y. Louie Company Limited, under the IGA banner. This is a Vancouver-based company with headquarters in the City of Burnaby. According to Lazarus (2001), the HY Louie Company, the wholesaler for IGA in British Columbia, faced a critical situation in the 1980's when large format competitors (i.e. The Real Canadian Superstore) entered the market.

While most supermarkets were expanding in 1980's and the early 90 s , hoping to gain a greater share of the market, Louie decided instead to reposition. In 1999 the company asked IGA retailers to reinvest in existing stores by renovating and reducing the stores' size to the $25-30,000$ square foot range. Now most IGA stores in the Greater Vancouver area have been transformed into the new market place format - Market Place IGA. The new Market Place IGA introduced the "food boutique" concept, a more inviting and homey environment", to differentiate themselves from their competitors (Lazarus, 2001).

Lazarus indicates that the new Market Place IGA has shifted its position in the market and reinforced its new image as a neighbourhood supermarket with strong customer relationships and strong presence in the community". The new IGA stores make the store layout different from other supermarkets with brighter lighting, and hardwood flooring under the displays in the produce section. It also provides demonstration kitchens in some of the new stores which feature the IGA house labels Our Compliments and Smart Choice. They launched a "community card" initiative in September 2000, which does not track individual purchases but raises money to buy computers for local schools. Market Place IGA focuses on the low-volume but higher margin customer with a more expensive lifestyle. The transformation was a success with an average $17 \%$ increase in customers and a $22 \%$ increase in sales.

### 3.2.2 Canada Safeway

Canada Safeway is a division of Safeway U.S.. There are 215 Canada Safeway stores located across western Canada, all of them corporately owned and operated with headquarters in Calgary, Alberta. Merchandizing and procurement functions are centrally controlled in Calgary, with key warehouses and distribution points located in Vancouver,

Calgary, Edmonton and Winnipeg. Canada Safeway dominated the food retail industry in western Canada before the entrance of Loblaw's Real Canadian Superstore from eastern Canada, and before the expansion of the Jim Patterson Group's Save-On-Foods in the west. However, the company still has an advantage in the market, with its strength lying in the large number of stores and their strategic locations in intensively populated urban areas (Marketing Magazine pg 10, 11, 1996).

Safeway stores are $30-35,000$ square feet in size, and laid out in a cohesive format offering full services with a bakery, meat counter, deli, fresh produce, a floral section, houseware sections, and a pharmacy. Open and spacious aisles are well stocked and well organized with some cut-case display. Family size products are also available. Safeway maintains its share in the western food retail industry by having a strong merchandising program - Safeway Club Card - which tracks individual purchases. It has also shifted to the "neighbourhood store" concept with its focus on value added customer service.

Because of the payments from manufacturers for placing advertisements in their sales flyer, Safeway is playing a leading role vis à vis its competitors in flyer advertising. According to Debby McKinnon (personal communication, November 29, 2002), Safeway advertises over 1,000 items in its flyer each week, including sizes and flavours. Hence, there is high advertising frequency in most of the product categories, and Safeway's advertising strategy is used as a parameter in the cross-store analyses.

### 3.2.3 Save-On Foods

Save-On-Foods is one of the key retail banners operating within the Overwaitea Food Group, as a division of the Jim Pattison Group. The Overwaitea Group has 60 Save-On-Foods locations throughout British Columbia and Alberta, with the head office located in Langley, British Columbia.

The Save-On-Foods banner has been the growth banner within the Overwaitea Food Group, with five new locations in 1999. All these stores have adopted the new trend to smaller "neighbourhood markets" with sizes ranging from 25,000 to 30,000 square feet, instead of the traditional large format of 70 to 80,000 square feet (Woodcock, 1999). All BC stores have long hours, from 8 a.m. to 12 midnight, 7 days a week, convenient for customers with limited shopping time. Most of the stores provide full services with a bakery, meat counter, seafood, a floral boutique, photo finishing, cosmetic department, and pharmacy. They try to
appeal to people who have a more environmental-friendly and healthier life style. For example, they introduced a new brand called Brightlife Natural Foods, and set up a recycling centre called Changes. They also try to appeal to price-sensitive consumers, with a low cost, high volume bulk food section - an example of low margin marketing.

### 3.2.4 Real Canadian Superstore

The Real Canadian Superstore is an independent store under Loblaw's Company Limited, the most important subsidiary of George Weston Limited, founded in 1882 as a food processing company specializing in baked goods. Loblaw's, based in eastern Canada, is the largest food distributor in Canada. According to the report by Woodcock (1999), Loblaw's has annual sales of $\$ 2,596$ million. It has expanded into the west and now has almost 150 supermarkets under three different banners in western Canada: Real Canadian Superstore (RCSS), Super Valu and Extra Foods. The three different banners, with various store sizes and product selections, are designed to target different market segments. The majority of its business, approximately $70 \%$, is generated through the Real Canadian Superstore, with a regional head office in Calgary, Alberta. All RCSS outlets are corporately owned.

The marketing position for the Real Canadian Superstore is price-oriented and offers an "Everyday Low Price" to its customers; services and information are a lower priority and therefore not as complete as its rivals. The concept of Superstore is to be big in size, inventory, and selection, in order to achieve efficiency in scale which makes low prices feasible at minimum costs. RCSS's store format, selection, and shelving are similar to the warehouse style with displays that are huge and plentiful, thereby enabling it to compete effectively with club warehouses like Costco. The RCSS stores are typically 65-70,000 square feet in size and feature large grocery, dairy, meat, and bakery departments, and various specialty departments such as photo finishing and electronics, clothing, automotive, hardware sections, and even furniture. In-store merchandising is systematic and consistent with the company's strategy of supporting their own private label brands, President's Choice and No Name. The spacious aisles are well-stocked with many cut-case displays, where private label brands dominate the shelves. With their rock bottom prices, the RCSS is able to attract consumers from a distance, approximately within a 10 km radius (Marketing Magazine p10-16, 1996).

Because the store locations are large in size, most of the RCSS stores are located in industrial areas or major commercial areas, and the number of stores is relatively smaller
than its competitors. This helps to maintain a low operating cost. The RCSS has other ways to limit its expenditures such as low advertising costs: since the RCSS exercises the "Everyday Low Price" option, it only offers limited selections for price promotion in weekly advertising flyers. Information and services available from the RCSS are limited; the company provides little price information and few value added services.

## Chapter 4

## Theoretical Model

Similar to other profit-driven firms, food retailers would like to maximize their overall store performance by increasing store profit, sales volume, and market share. Each year supermarket chains spend millions of dollars on price advertising and temporary price discounts for food products. By offering discounts and providing price information supermarkets attempt to increase store traffic and thus attract potential customers as well as retain existing customers. Consumers are unlikely to buy the discounted items if those items will be their only purchase at a particular store, due to the transportation cost incurred for each shopping trip. Therefore, supermarkets aim for strategies other than just discounts; these strategies are intended to maximize store traffic and thus increase sales volume, store profit, and the store's market share in the industry. The subsequent research studies the price advertising pattern of major supermarket chains and investigates the price advertising decisions of the food retailers in two categories:
(1) same goods advertisement in competing stores in a given period.
(2) competing goods within a store in a given period.

The model developed in this section is a simple version of the one developed by Rao and Syam (2001). Before explaining the specifics of this model, it is useful to first discuss the general results. Firms can pursue one of three strategies when selecting which products to advertise: (1) promote the product at the same time as their competition; (2) promote the product at a time different from that of their competition; (3) make a random choice regarding which product will be promoted and when. This choice is the same for two competing supermarkets choosing when to advertise a particular product, or competing food manufacturers choosing when to advertise their respective products within one retail outlet. To simplify the discussion, the model is constructed from the perspective of two competing supermarkets, although the general result obtained does seem to apply to both situations.

Rao and Syam (2001) demonstrate that the equilibrium outcome of their price promotion game is the third strategy: randomize which product will be promoted and when. They argue that randomized advertising reduces competition and thus maximizes profit for
food retailers. Because consumers make their store choice based on advertised prices, if the retailers know in advance the goods that will be advertised by a competitor, there is a strong incentive for retailers to undercut each other's price in seeking a greater market share. Hence, competition becomes intense and yields a lower profit for the retailers. With randomized advertising, retailers advertise the same goods sometimes and different goods other times; thus, head-to-head competition is reduced and profit is greater for retailers advertising the same goods, at the same time.

Rao and Syam (2001) extend and alternate the work of Lal and Matutues (1994), which studies the pricing strategy of supermarkets and the effect of price advertising on increasing store traffic from the perspective of loss-leader pricing. The main difference is that Lal and Matutes focus on retail pricing and advertising in a multistage game framework, treating the decisions of both stores and consumers as endogenous. They find that loss-leader pricing can be the equilibrium outcome in a multiproduct situation. There is currently no price data available for unadvertised promoted products, so a simple model is developed and utilized to show why randomization is arranged as an equilibrium. The variable $\mu$ in the general model of Rao and Syam is very important as it is chosen endogenously in the third stage of the game; however, $\mu$ does not play a useful role in the modified model of this thesis.

### 4.1 Model Assumptions

There are two identical retailers, $A$ and $B$, located at the two end points of a straight line with unit length: $A$ on the left side and $B$ on the right. Each store carries two identical goods, $I$ and 2. These two goods are neither complements nor substitutes, the marginal cost of these procuring two goods are constant and identical for both stores. The advertising cost is zero.

Consumers whom are uniformly distributed along the line, have identical preferences. Each consumer will purchase one of each of both goods provided that the price of the good is less than the consumer's reservation price, $R$. A consumer located a distance $m, 0 \leq m \leq 1$, from Store $A$ is located at a distance $(1-m)$ from Store $B$. The unit transportation cost for each consumer is $c / 2$; thus, the consumer in question would incur a cost of cm for a round-trip visit to Store $A$, and a cost of $c(1-m)$ for a round-trip visit to Store $B$.

### 4.2 Consumer's Decision

Consumers are assumed to have full knowledge of both prices, advertised and unadvertised, at both stores. Consumers can choose to visit no store, visit only one store ( $A$ or $B$ ), or visit both stores, depending on product prices relative to $R$, and transportation costs. The price of the advertised goods is $R-D_{i}$ where $D_{i}$ is the advertised discount of price $i, i=A, B$. Let the price of the nonpromoted goods be $R-u$. In the model, $u$ is specified exogenously rather than chosen by the retailers; moreover, $u$ is assumed to be equal for both retailers.

### 4.3 Stores' Decision

Retailers can advertise the same good,

|  | Store $A$ | Store $B$ |
| :--- | :--- | :--- |
| Product 1 | $R-D_{A}$ | $R-D_{B}$ |
| Product 2 | $R-u$ | $R-u$ |
| or opposite goods, |  |  |
|  | Store $A$ | Store $B$ |
| Product 1 | $R-D_{A}$ | $R-u$ |
| Product 2 | $R-u$ | $R-D_{B}$ |

In the first table, product 1 is jointly advertised, and in the second table $A$ advertises Good $I$ and Store $B$ advertises Good 2. There is no need to consider the complementary case because the results are symmetric.

### 4.4 Pricing and Advertising Equilibrium of the model

Rao \& Syam present the price communication model as a three-stage game. In this simple three-stage game, retailers make the advertising decision in the first stage by selecting which goods to advertise and how much to discount. The price is revealed in the second stage, and consumers make their store choice based on the advertised prices. Following Rao \& Syam, the subgame perfect equilibrium to this multistage game is derived for the cases of same-goods advertising, opposite-goods advertising, and mixed strategy.

## Same-good Case

Suppose both stores devise a pure strategy to advertise the same goods with probability one in the first stage. In this case, each consumer will purchase both goods from just one of the
retailers. Let $m_{0}$ be the location of the marginal consumer who has no preference for either Store $A$ or Store $B$. The equation that implicitly defines $m_{0}$ can be written as

$$
\begin{equation*}
c m_{0}+R-D_{A}+R-u=c\left(1-m_{0}\right)+2 R-D_{B}-u \tag{4.1}
\end{equation*}
$$

This equation can be solved to obtain $m_{0}=\frac{c+D_{A}-D_{B}}{2 c}$.
The profit function of Store A is

$$
\begin{equation*}
\max _{D_{A}} \pi=\left(2 R-D_{A}-u\right)\left(\frac{c+D_{A}-D_{B}}{2 c}\right) \tag{4.2}
\end{equation*}
$$

The first-order condition for maximizing profits is

$$
\begin{equation*}
\frac{\partial \pi}{\partial D_{A}}=-\left(\frac{c+D_{A}-D_{B}}{2 c}\right)+\left(\frac{2 R-D_{A}-u}{2 c}\right) \tag{4.3}
\end{equation*}
$$

Solving the first-order condition given by equation (4.3) for the choice variable, $D_{\mathrm{A}}$, results in

$$
\begin{equation*}
D_{A}^{*}=\frac{2 R-u-c-D_{B}}{2} \tag{4.4}
\end{equation*}
$$

By symmetry, $D_{A}=D_{B}=D^{*}$. Setting $D_{A}=D_{B}=D^{*}$ in equation (4.4) and solving implies that
(4.5) $D^{*}=2 R-u-c$

This equation can be used to show that $m_{0}{ }^{*}=0.5$.

Now solve for the profit for Store $A$ by substituting the expression in equation (4.5) into equation (4.2), and then reducing

$$
\begin{equation*}
\pi_{A}^{*}=\frac{c}{2} \tag{4.6}
\end{equation*}
$$

Again by symmetry, $\pi_{A}^{*}=\pi_{B}^{*}=\frac{c}{2}$. The discount for the advertised good is the same at both stores and both stores share the market equally and earn the same level of profits.

## Opposite-good Case

Now suppose that both stores devise a pure strategy to advertise opposite goods with probability one, with Store $A$ advertising Goods 1 and Store $B$ advertising Goods 2.

Consumers near the end points will generally prefer to purchase both goods at either Store $A$ or Store $B$, whereas consumers near the middle will generally find it optimal to travel to both stores and purchase the advertised goods at each location.

Let $m_{1},\left(0<m_{1}<\frac{1}{2}\right)$, be the location of the marginal consumer who has no preference for buying either Goods 1 or Goods 2 at Store $A$ or buying the discounted good at either store. The implicit equation for $m_{1}$ is shown by

$$
\begin{equation*}
c m_{1}+2 R-D_{A}-u=c m_{1}+R-D_{A}+c\left(1-m_{1}\right)+R-D_{B} \tag{4.7}
\end{equation*}
$$

Solving this expression gives

$$
\begin{equation*}
m_{1}=\frac{c+u-D_{B}}{c} \tag{4.8}
\end{equation*}
$$

Let $m_{2},\left(m_{2}>\frac{1}{2}\right)$, be the location of the marginal consumer who has no preference for either Goods 1 or Goods 2 at Store $B$ or for buying the discounted good at either store. The associated equation is

$$
\begin{equation*}
c\left(1-m_{2}\right)+2 R-D_{B}-u=c m_{2}+R-D_{B}+c\left(1-m_{2}\right)+R-D_{A} \tag{4.9}
\end{equation*}
$$

and the solution to this equation is
(4.10) $\quad m_{2}=\frac{D_{A}-u}{c}$

Now substitute $m_{1}$ and $m_{2}$ into Store $A$ 's profit function

$$
\begin{equation*}
\max _{D_{A}} \pi=\left(R-D_{A}\right)\left(\frac{D_{A}-u}{2}\right)+(R-u)\left(\frac{c+u-D_{B}}{c}\right) \tag{4.11}
\end{equation*}
$$

The appropriate first-order equation is

$$
\begin{equation*}
\frac{\partial \pi_{A}}{\partial D_{A}}=-\left(\frac{D_{A}-u}{2}\right)+\left(\frac{1}{2}\right)\left(R-D_{A}\right) \tag{4.12}
\end{equation*}
$$

Solving the first-order condition given by equation (4.12) gives

$$
\begin{equation*}
D_{A}^{*}=\frac{R+u}{2} \tag{4.13}
\end{equation*}
$$

By Symmetry, $D_{A}^{*}=D_{B}^{*}=D^{*}$. Now substitute the expression for $D_{A}^{*}$ and $D_{B}^{*}$ into the expression for $m_{1}$ and $m_{2}$ given by equation (4.8) and (4.10) to obtain

$$
\begin{equation*}
m_{1}^{*}=1-\left(\frac{R-u}{2 c}\right) \text { and } m_{2}^{*}=\left(\frac{R-u}{2 c}\right) \tag{4.14}
\end{equation*}
$$

Substitute the expression for $D^{*}, m_{1}^{*}$ and $m_{2}^{*}$ given by equation (4.13) and (4.14) into profit function given by equation (4.11) to obtain

$$
\begin{equation*}
\pi_{A}^{*}=\pi_{B}^{*}=R-u-\frac{(R-u)^{2}}{4 c} \tag{4.15}
\end{equation*}
$$

As before, symmetry ensures $\pi_{\mathrm{A}}{ }^{*}=\pi_{\mathrm{B}}{ }^{*}$

## Comparison of Pure Strategy Outcomes

Now we would like to compare the firms' profit from Case 1 to Case 2 to see which advertising strategy is preferred. Keep in mind that from equation (4.6) and (4.15)

$$
\pi^{1}=\frac{c}{2} \quad \text { and } \quad \pi^{2}=R-u-\frac{(R-u)^{2}}{4 c}
$$

In Appendix A it is established that if the parameters, $R$, $u$, and $c$, satisfy the feasible restriction $R>u>\sqrt{8} c$, then $\pi_{2}>\pi_{1}$ is true and firms collectively prefer opposite goods advertising rather than same goods advertising. Advertising opposite goods with this set of parameter restrictions results in a relatively less elastic implicit demand curve facing each firm and thus each firm is able to exert relatively more market power.

## Non-existence of Pure Strategy Equilibrium

Even though the two firms jointly prefer to advertise opposite goods rather than the same goods, it is important to check to ensure that the opposite-goods outcome is indeed an equilibrium. It is shown below that when firm $B$ sets price according to the opposite-goods advertising strategy, $D_{2}^{*}=\frac{R+u}{2}$ (see equation 4.13); firm $A$ can earn higher profits by advertising the same goods as $B$ and charging the appropriate optimal price. This incentive to deviate implies that a pure strategy equilibrium does not exist.

Now let's formally establish these results. If Store $B$ continues to price at $D_{B}^{*}=\frac{R+u}{2}$, the profit function for $A$, given that $A$ deviates by advertising the same goods as B , can be written as

$$
\begin{equation*}
\pi_{A}=\left(2 R-D_{A}-u\right)\left(\frac{2 c+2 D_{A}-R-u}{4 c}\right) \tag{4.16}
\end{equation*}
$$

The price discount that maximizes this profit function is given by

$$
\begin{equation*}
D_{A}^{*}=\frac{5 R-u-2 c}{4} \tag{4.17}
\end{equation*}
$$

If this expression is substituted back into equation (4.16), an expression for optimized profit emerges.

$$
\begin{equation*}
\pi_{A}^{*}=\frac{(3 R-3 u+2 c)^{2}}{16 c} \tag{4.18}
\end{equation*}
$$

In order to show that Store $A$ has an incentive to deviate, the parameters $R, u$, and $c$, need to fit the restriction $R-u<\frac{1}{3}$ (see Appendix B for the proof). If this restriction holds, then $\pi_{\text {deviate }}-\pi_{\text {no-deviate }}>0$.

## Mixed Strategy Advertising Equilibrium

It has now been established that firms collectively prefer opposite-goods advertising to same goods advertising. Moreover, a pure strategy equilibrium for opposite-good advertising does not exist since there is a strong incentive for each retailer to deviate from the pure strategy. These two results imply that the equilibrium must involve a mixed strategy. A mixed strategy for Store $A$ consists of advertising Goods 1 with probability $P_{A}>$ 0 , and Goods 2 with probability of $1-P_{\mathrm{A}}$. Similarly, a mixed strategy, for Store $B$ consists of advertising Goods 1 with probability $P_{\mathrm{B}}>0$, and Goods 2 with probability $1-P_{\mathrm{B}}$. The implication of this result is that, from a data generating perspective, stores are randomly choosing when and which product to advertise. The mixed strategy equilibrium includes both outcomes of competing stores advertising opposite goods or same goods, and it is consistent with our hypothesis that the advertising strategies of competing firms are independent.

Rao and Syam find that supermarkets use unadvertised specials to retain consumers who patronize the store because they are familiar with the everyday unadvertised prices of the store's merchandise. In-store discount can reduce the probability for consumers to shop around and purchase only advertised items from each supermarket. Supermarkets also use unadvertised specials to attract new customers and to increase store traffic. Consumers are likely to buy other unadvertised items as well as the advertised product because they have already paid the transportation cost for the shopping trip, and their savings may decrease if they make a shopping trip to another supermarket. From this model, we know that all consumers purchase both goods at the same store when competing retailers advertise the same goods, given that consumers have no price knowledge of the unadvertised products. However, when competing retailers advertise different goods, some consumers shop around, and some purchase both goods at one store depending on the distance they have to travel and their transportation costs. The model yields a positive expected profit for Store A and Store B, keeping in mind that transportation costs play an important role in drawing store traffic. Therefore, supermarkets implement a mixed strategy in advertising, and randomize the price advertising for their selection. Supermarkets would choose to advertise opposite goods most of the time to avoid intense competition and to capture higher profit, and have same-goods advertising occasionally.

## Chapter 5

## Data and Methodology

The data set is described in Section 5.1; Section 5.2 describes the theoretical consideration and the procedures for testing the hypotheses concerning the advertising strategies of two competing supermarkets.

### 5.1 Data Description

The data set for this research was obtained by collecting advertising sales flyers from four major retail supermarket chains in the Vancouver metropolitan area during the period from May 6, 2001 to May 5, 2002. The data therefore gives us 52 weeks of price promotion information. The sales flyer advertising frequency of different brands in 22 processed food and beverage categories was recorded for four supermarket chains. The data only records whether a product is advertised or not advertised in the sales flyer in a given week, not the level of price discount for the product. If a brand is advertised in the sales flyer, regardless of size and flavour, it is counted as "advertised" for the brand. Advertisement frequency is recorded in $2 \times 2$ contingency tables in the Appendix. From the collection of sales flyers, we see that discounts are often quite similar both across stores and across time. The 22 product categories and the corresponding name brands are listed in Table 5.1 and an explanation of how these products and name brands were selected is provided below.

| Table 5.1. Selected Products Categories and Name Brands |  |
| :--- | :--- |
| Product Category | Specified Brand |
| Bacon | Olympics |
| Breakfast Cereal | Kellogg's |
| Canned Fish | Clover Leaf |
| Canned Soup | Campbell |
| Dry Pasta | Catelli |
| Frozen Pizza | Kraft |
| Frozen Punch | McCain |
| Frozen Vegetables | Green Giant |
| Fruit Jam | Kraft |
| Ground Coffee | Maxwell |
| Instant Coffee | Maxwell |
| Juice from Concentrate | Sun Rype |
| Juice Not from Concentrate | Tropicana |
| Ketchup | Heinz |
| Margarine | Canola Harvest |
| Mayonnaise | Kraft |
| Pasta Sauce | Prego |
| Peanut Butter | Kraft |
| Potato Chip | Lay's |
| Processed Cheese Slices | Kraft |
| Tea Bag | Tetley |
| Waffle | Kellogg's |
|  |  |

### 5.1.1 Selection of Retail Supermarket Chains

Most food retailers place their sales flyers in the free community paper, including independent food retailers with one location, small local supermarket franchises, and national supermarket chains. However, not all food retailers can afford to have weekly advertisement throughout the year with plentiful coverage of their merchandise. Four major supermarket chains with numerous store locations in the Vancouver metropolitan area were selected in order to obtain consecutive observations within the 52 week sample period.

### 5.1.2 Choice of Food and Beverage Categories

There are usually more than 10,000 items in a medium size supermarket. For the purpose of control, twenty-two processed food and beverage categories were selected for this research given their non-perishable nature and standard quality. Fresh produce such as fruits and vegetables were avoided because of their seasonal nature and variation in quality: data collected in this study applies only to products which do not vary in nature over a 52 week period and are advertised in a more or less consistent manner. To minimize the seasonality effect, all of the product categories selected are processed food and beverage. The data set shows that most of the products have been consistently advertised throughout the year, however, there is an exception for Frozen Vegetable. Frozen Vegetable tends to be advertised more often during the winter months when the supply of Fresh Vegetable is not as sufficient as in the summer months.

### 5.1.3 Specification of Name Brands

The market competition for each food and beverage category is different according to the nature of the products, yet supermarkets carry numerous brands and labels for each grocery product in different packaging and sizes. It is typical for the large supermarket chains to have over 500 items on the sales flyer each week, but the advertisement frequency of most individual items is very low within the 52 week period. The different flavours, packaging, and sizes of the branded product are disregarded for simplicity. Mature name brands are selected for each category to prevent the "interest saturation" which sometimes occurs in the introductory period of a new product and because they show up relatively frequently in the flyer.

It is interesting to see that Breakfast Cereals and Canned Soup have the highest advertising frequency among the 22 product categories; and Kellogg's, Campbell's and Kraft's are the three food manufacturers who have the highest advertising frequency. All of them are mature established-product manufacturers. Our data shows similarity to LeBlanc's finding in 1998 that a mature established-product industry often use "cheap" information advertising and direct mainly to local markets. Although informative price advertising often neither creates new nor expand existing markets, it is an important feature of competition in many established markets because firms are aiming to capture the largest possible share of a fixed market.

### 5.2 Methodology

As explained above, the empirical component of this research investigates the statistical correlation of the advertising strategies of competing retail supermarkets and competing brands within a supermarket. The yes-no advertising status for each chosen product was collected during the sample period and analyzed with a simple test of independence. Specifically a chi-square test for $2 \times 2$ contingency table was used to test the various hypotheses. The between-store analysis compares the yes-no advertising status of specified national brands within various product categories between a pair of competing supermarkets. The study then turns to within-store analysis by comparing the advertising status of two competing brands within individual supermarkets. Section 5.2.1 presents the definition of the contingency table and explains the theoretical consideration of employing the chi-square test. Section 5.2.2 describes the techniques and test procedure as explained by Samuels (1989). Then the hypotheses testing for the between-store and within-store analyses are described in sections 5.3.

### 5.2.1 Theoretical Consideration

The theoretical analysis suggests that the joint decision of food manufacturers and retailers is to randomly choose when and what products to promote in the weekly sales flyer. This suggests that the data should reveal statistical independence. The advertising frequency of two competing supermarkets is constructed in a two-way contingency table. Rosner (2000) defines a 2 X 2 contingency table as a table composed of two rows cross-classified by two columns. It is appropriate to display data that can be classified by two different variables, each of which has only two possible outcomes. One variable is arbitrarily assigned to the rows and the other to the columns". The association between the advertising strategies of store $A$ and Store $B$ (or product $A$ and product $B$ ) is studied by testing the hypothesis of independence using the chi-square test. The chi-square test used in this study closely follows the test procedure as described in Samuels (1989). The chi-square test is a method of analyzing categorical variables rather than quantitative variables. A variable is categorical when each observation can be classified into one of two or more categories rather than taking on a numerical value. A categorical variable is said to be dichotomous if there are only two possible categories. The advertising status for each product category is a dichotomous variable in nature, as a product is either advertised or not advertised. Therefore, the chi-square test is employed to test the independence of advertising strategies within and between competing supermarkets.

### 5.2.2 The chi-square Test for the $2 \times 2$ Contingency Table

The observed categorical data is summarized into a two-way contingency table as shown in Table 5.2, which shows a general $2 \times 2$ contingency table used in our between-store analysis. There is a single sample of advertising flyer data with size $n=52$ weeks observed with respect to two dichotomous variables - advertising status (brand is advertised or not) and store (i.e. A or B). A 2 X 2 contingency table, as described by the name, consists of two rows and two columns. Each category in the contingency table is called a cell; hence, there are four cells in a $2 \times 2$ contingency table. The observed advertising frequencies are recorded in the four cells. There is an additional column and row to show the marginal frequencies which are the sum of the observed advertising frequencies across each row or each column, and the grand total of all the cell frequencies which should equal to the same size, $n$.

Let $i$ denote the advertising status for Store $A$, where $i=1$ implies the brand is advertised in the sales flyer of Store A and $i=2$ implies the brand is not advertised on the flyer of Store $A$. Similarly, let $j$ denote the advertising status for Store $B$, where $j=1$ represents the brand advertised in the sales flyer of Store $B$ and $j=2$ implies the brand is not advertised at Store $B$. Each $n_{i j}$ represents the observed count of positive advertising outcomes within the 52 -week period, so we have $0 \leq n_{i j} \leq 52(i, j=1,2)$ subject to the constraint $n=n_{11}+n_{12}+n_{21}+n_{22}=52$. For example, if Kraft peanut butter is observed to be advertised at both Store $A$ and Store $B \quad 14$ times during the sample period, then $n_{11}=14$. Let $x_{i}(i=1,2)$ denote the marginal total frequency, the sum of advertising frequency observed at Store $A$, and let $y_{i}(j=1,2)$ denote the marginal total frequency the sum of advertising frequency at Store $B$.

Therefore, we have the following notations:
$n_{11}=$ the observed frequency that the brand is advertised at both Store $A$ and $B$ in the same week
$n_{12}=$ the observed frequency that the brand is not advertised at Store $A$ but advertised at Store $B$
$n_{21}=$ the observed frequency that the brand is advertised at Store $A$ but not advertised at Store $B$
$n_{22}=$ the observed frequency that the brand is not advertised at both Store $A$ and Store $B$
$\hat{\mu}_{11}=$ the expected frequency that the brand is advertised at both Store $A$ and $B$ in the same week $\hat{\mu}_{12}=$ the expected frequency that the brand is not advertised at Store $A$ but advertised at Store $B$ $\hat{\mu}_{21}=$ the expected frequency that the brand is advertised at Store $A$ but not advertised at Store B $\hat{\mu}_{22}=$ the expected frequency that the brand is not advertised at both Store $A$ and Store $B$
$x_{1}=$ the marginal frequency that the brand is advertised at Store $A$
$x_{2}=$ the marginal frequency that the brand is not advertised at Store $A$
$y_{1}=$ the marginal frequency that the brand is advertised at Store $B$
$y_{2}=$ the marginal frequency that the brand is not advertised at Store $B$
$n=$ the sample size of the observation

Table 5.2 $2 \times 2$ Contingency Table for a product in Cross-Store Analysis

| Store A <br> Advertised |  |  | Not Advertised | Total |
| :--- | :--- | :--- | :--- | :--- |
| Store B | Advertised | $n_{11}\left(\hat{\mu}_{11}\right)$ | $n_{12}\left(\hat{\mu}_{12}\right)$ | $n_{11}+n_{12}=y_{1}$ |
|  | Not Advertised | $n_{21}\left(\hat{\mu}_{21}\right)$ | $n_{22}\left(\hat{\mu}_{22}\right)$ | $N_{21}+n_{22}=y_{2}$ |
| Total | $n_{11}+n_{21}=x_{1}$ | $n_{12}+n_{22}=x_{2}$ | $n$ |  |

The chi-square statistic measures discrepancy between the observed frequencies and the expected frequencies. It is calculated to test the independence of weekly advertisement between two competing supermarkets. Independence means that the probability of the product being advertised is the same for both stores; in other words, there is no direct association with the other store.

For the case of competing supermarkets, the following hypotheses are to be tested:
$H_{0}$ : Advertising strategies for the chosen brand between two competing supermarkets are independent
$H_{\mathrm{A}}$ : Advertising strategies for the chosen brand between two competing supermarkets are dependent
The null, represented by $H_{0}$, states that the advertising strategies between two competing supermarkets for a specified brand are independent; and the alternative, represented by $H_{\mathrm{A}}$, states that the advertising strategies between two competing supermarkets for a specified brand are dependent. Similar hypotheses can be written for the case of two food manufacturers promoting their products within a store.

The chi-square test statistic for testing $H_{0}$ is calculated as follows:

where the sum is taken over all four cells in the $2 \times 2$ contingency table. When the null hypothesis is true, i.e., the advertising strategies for a specified brand between two competing supermarkets are independent, the test statistic $\chi_{s}^{2}$ follows an approximate chi-square distribution with one degree of freedom. The degree of freedom is calculated as the product of the number of rows in the table less one and the number of columns in the table less one.

When the null hypothesis is true, the expected frequencies in contingency table can be calculated using the marginal total frequencies as follows:

$$
\begin{equation*}
\hat{\mu}_{i j}=\frac{x_{i} y_{i}}{n} \tag{5.2}
\end{equation*}
$$

The value of $\hat{\mu}_{i j}$ in equation (5.2) is the expected value of $n_{\mathrm{ij}}$ when the null hypothesis is true.

A $95 \%$ confidence interval for the proportion of the time when a product is advertised in both stores can be constructed as follows:

$$
\begin{equation*}
\text { C.I. }=\left(\hat{p}_{i}-\hat{p}_{j}\right) \pm \sqrt{\frac{\left(\hat{p}_{i}-\hat{p}_{j}\right)\left(1-\left(\hat{p}_{i}-\hat{p}_{j}\right)\right)}{n}} \tag{5.3}
\end{equation*}
$$

For $\chi^{2}, \mathrm{df}=1$ at the $5 \%$ significant level; if $\chi^{2}>3.84, H_{0}$ is rejected, where 3.84 is the critical value such that there is a $5 \%$ probability that a test statistic exceeding the critical value is observed when the null is true.

There are two conditions that must hold true for the chi-square test to be valid:

1. It must be reasonable to regard the data as a random sample of categorical observations from a large population. Observations must be independent of each other over time.
2. The sample size must be large enough. Both the confidence interval and test are approximate, and the approximation is best for large samples.

It is important to note that the chi-square test can only test the association between the joint advertising strategies of any two competing retailers and the corresponding food manufacturers; it does not provide information on the existence of a positive or negative correlation if the advertising strategies are indeed dependent. Yet this information can still be obtained from the contingency tables (see Appendix B). If the frequencies $n_{11}$ and $n_{22}$ are relatively high then there is a positive correlation between the advertising strategies of Store $A$ and Store $B$ (product $A$ or product $B$ ). On the other hand, if the frequencies $n_{12}$ and $n_{21}$ are high then there is a negative correlation between the advertising strategies of Store $A$ and Store $B$ (product $A$ or product $B$ ).

### 5.3 Hypotheses Tests

### 5.3.1 Static Analysis

The chi-square test described in section 5.2 is applied to the case of two competing retailers promoting the chosen brand in three different pairs of supermarkets: (1) Safeway and Market Place IGA, (2) Safeway and Save-on Foods \& Drugs, and (3) Safeway and The Real Canadian Superstore. In the between-store analysis, the advertising frequency of Safeway Canada is used as a benchmark in pairing with other supermarket chains. Safeway was chosen because it is the advertising leader in the number of products advertised each week, and in the advertising frequency of the 22 product categories selected. Similarly, the chi-square test is applied to the case of two competing food manufacturers promoting their products within a store in three scenarios: (1) the chosen brand and the private label at each supermarket, (2) any national brand versus the private brand at each supermarket, and (3) the chosen brand versus any other national brand.

A problem occurs when marginal total frequency takes on the value zero, i.e. when the product was not advertised during the 52 weeks sample period. Referring to equation (5.2),
when one of the marginal total frequencies $\left(x_{i}\right.$ or $\left.y_{i}\right)$ is zero, then the expected frequency of the corresponding cell becomes zero. When one of the four expected frequencies in the 2 X 2 contingency table is zero, then the chi-square test statistic becomes undefined according to equation (5.1). An undefined test statistic does not provide information for our hypotheses. In order to eliminate this problem, a constant number, 0.5 , is added to all observations in the problematic contingency table. This would increase each marginal total frequency, $x_{i}$ and $y_{i}$, by 1 with the $n$ added up to 54 instead of 52 . This procedure only applies to the contingency tables with $x_{i}=0$ or $y_{i}=0$. The chi-square test statistics are not sensitive to this adjustment because the calculation of the test statistic, in equation (5.1), only considers the conditional probability of advertisement rather than the quantitative frequencies.

It is important to note that the chi-square test can only test the association between the advertising strategies of any two competing food manufacturers and retailers; it does not provide information on the existence of a positive or negative correlation if the advertising strategies are indeed dependent. Yet this information can still be obtained from the contingency table. If the frequencies $n_{11}$ and $n_{22}$ are relatively high then there is a positive correlation between the advertising strategies of Store A and Store B (product A or product $\mathrm{B})$. On the other hand, if the frequencies $n_{12}$ and $n_{21}$ are high then there is a negative correlation between the advertising strategies of Store A and Store B (product A or product $B)$.

### 5.3.2 Dynamic Analysis

The hypotheses tests in Section 5.3.1 can only analyze the static relationship among the advertising strategies between two competing supermarkets in the same week. In order to capture the dynamic aspects of the advertising environment over time, another set of chi-square testing procedure, as described in 5.2.2, is constructed for the time-lag analysis between pairs of competing supermarkets and with different brands combination in the 52 weeks sample period. The yes-no advertising status of a product in Store A in week $t$ is compared with the yes-no advertising status of the same product in Store B in week $\mathrm{t}-\mathrm{k}$, where $\mathrm{k}=\{1,2,3,4\}$.

The dynamic analysis tests the potential advertising leader and follower relationship among the supermarkets in a 4 weeks cycle. For instance, Store A is assumed to be a leader in advertising Brand A in week 4 and it is tested against the advertising status of Brand B at

Store B, as a follower, in the weeks $1,2,3$, and week 4.

Each supermarket is assumed to be a price leader; then it is paired with each of the three competing supermarkets as a price follower and tested with four different pairs of brands combination:

1) Specified Brand at Leading Supermarket and Specified Brand at Following Supermarket
2) Private Label at Leading Supermarket and Private Label at Following Supermarket
3) Price Leader's Specified Brand and Follower's Private Label
4) Price Leader's Private Label and Follower's Specified Brand

Therefore, we have a different set of notations for the contingency tables as shown in section 5.2.2, for example:
$n_{11}=$ the observed frequency that the brand is advertised at Store $A$ in week t and at $B$ in week t-k
$n_{12}=$ the observed frequency that the brand is not advertised at Store $A$ in week t but advertised at Store $B$ in week t -k
$n_{21}=$ the observed frequency that the brand is advertised at Store $A$ in week t but not advertised at Store $B$ in week t -k
$n_{22}=$ the observed frequency that the brand is not advertised at Store $A$ in week t and Store $B$ in week t-k

Thus, different hypotheses with the price leader-follower in the time-lag analysis:
$H_{0}$ : Advertising strategies for the chosen brand between Store A in week t and Store B in week t-k are independent
$H_{\mathrm{A}}$ : Advertising strategies for the chosen brand between Store A in week t and Store B in week t-k are dependent
The null, represented by $H_{0}$, states that the advertising strategies between Store A in week t and Store B in week t -k for a specified brand are independent; and the alternative, represented by $H_{\mathrm{A}}$, states that the advertising strategies between Store A in week t and Store $B$ in week $t-k$ for a specified brand are dependent.

## Chapter 6

## Results

The data concerning the advertising frequency of the products for the static analysis are recorded in the contingency tables in Appendix C. If one fails to reject the null hypothesis of independence, then the advertising strategies of two competing retailers are said to be statistically independent. If the null hypothesis of independence is rejected, then we can see if there is a positive or negative correlation between the advertising strategies of the two competing retailers from the cells in the corresponding contingency table in Appendix C. Table 6.1 reports the advertising frequency ( $\mathrm{x}_{1}$ 's and $\mathrm{y}_{1}$ ' s in the contingency tables) of different brands in each supermarket for each product category. For all discussions of correlation in this chapter, please refer to the contingency tables in Appendix C , and for discussions about the selected national brands benchmark, refer to Table 5.1.

There are 22 pages in Appendix C, with one page for each product category. Each page has four sets of contingency tables: (1) the table for the chosen brand versus the private label at each supermarket in the upper left hand corner, (2) the table for the chosen brand versus any other national brand at each supermarket in the upper right hand corner, (3) the table for any national brand versus the private label at each supermarket in the lower left hand corner, and (4) the table for the advertising status of the chosen brand sold by three pairs of competing supermarkets in the lower right hand corner of the page.

The chi-square statistics of each hypothesis testing for each product category are reported in the result tables. Each chi-square statistic measures the discrepancy between the observed data and the expected values under the null hypothesis of independence. The test statistic is very small in most cases, because the large value of test statistic $\chi^{2}$ indicates evidence against the null hypothesis of independence, thus the small values of test statistics in most of our results indicate that the data provides sufficient evidence that the joint advertising strategies of two competing retail stores and the corresponding manufacturers, are statistically independent on the selected product categories. Generally there is a strong evidence showing that competing firms randomly choose what product to advertise and when, coherent with the findings of previous researches by Varian (1980) and Lach (2002).

The result of the dynamic analysis for the leader-follower relationship is discussed in section 6.2. Each supermarket is assumed to be a price leader; then it is paired with each of the three competing supermarkets as a price follower and tested with four different pairs of brands combination. Because there are twelve hypothesis tests for each product, and there are 22 products in total, hence, the results are not formally presented here.

### 6.1 Static Analysis

### 6.1.1 Results on Across-Store Advertisement

The chi-square statistics of the across-store chi-square tests for each product category, chosen brand at Store A vs. chosen brand at Store B, are reported in Table 6.2. There is strong evidence that two competing firms randomly choose what product to advertise and when. The small values of test statistics in most of our across-store results indicate that the data provides sufficient evidence that the advertising decisions of competing stores are statistically independent.

In addition to the across-store analysis for the chosen brands as reported in Table 6.2, another across-store analysis for the private labels, private label of Store A vs. private label of Store B, has been carried out. Since the manufacturers have a certain degree of vertical intervention to the retailers' advertising consideration for the national name brands, the private label chi-square tests provide statistical information on the advertising strategies for the private labels, and see if the result would be similar to the findings in the across-store chosen brands analysis. The set of chi-square statistics for the across-store chi-square tests, private label of Store A vs. private label of Store B, for each product category, are reported in Table 6.3.

Although the null hypothesis of independent advertising is not rejected in majority of the cases, there are some exceptions. The chi-square test rejects the null hypothesis of independence in the comparison between Safeway and Market Place IGA in three categories: canned fish, frozen vegetables, and peanut butter. Data shows a positive correlation in these three cases, implying that there is intense competition between Safeway and Market Place IGA for those products because they are advertised together in the same week more than the expected frequency during the 52 weeks of the sample period. Another hypothesis of independence is rejected in the Safeway and The Real Canadian Superstore comparison for the canned fish category with a positive correlation in the advertising

Although the null hypothesis of independent advertising is not rejected in majority of the cases, there are some exceptions. The

| Product Category | Market Place IGA |  |  | Safeway Canada |  |  | Save-on Foods |  |  | The Real Canadian Superstore |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | A | B | C | A | B | C | A | B | C | A | B | C |
| Bacon | 17 | 31 | 0 | 8 | 31 | 4 | 0 | 40 | 2 | 0 | 0 | 42 |
| Breakfast Cereal | 28 | 27 | 12 | 48 | 47 | 1 | 40 | 37 | 19 | 11 | 14 | 8 |
| Canned Fish | 34 | 21 | 11 | 25 | 28 | 5 | 9 | 28 | 21 | 8 | 0 | 5 |
| Canned Soup | 39 | 13 | 14 | 31 | 12 | 0 | 29 | 12 | 12 | 5 | 2 | 7 |
| Dry Pasta | 15 | 17 | 18 | 19 | 15 | 0 | 9 | 20 | 20 | 0 | 4 | 7 |
| Frozen Pizza | 20 | 30 | 0 | 13 | 26 | 12 | 13 | 33 | 10 | 3 | 6 | 19 |
| Frozen Punch Beverage | 7 | 33 | 14 | 0 | 24 | 21 | 6 | 25 | 7 | 3 | 6 | 13 |
| Frozen Vegetable | 13 | 0 | 16 | 13 | 1 | 22 | 17 | 1 | 11 | 4 | 2 | 2 |
| Fruit Jam | 10 | 19 | 12 | 6 | 7 | 0 | 3 | 29 | 20 | 2 | 10 | 13 |
| Ground Coffee | 23 | 26 | 14 | 4 | 22 | 0 | 15 | 28 | 10 | 6 | 2 | 26 |
| Instant Coffee | 11 | 28 | 0 | 6 | 5 | 0 | 6 | 15 | 4 | 5 | 4 | 6 |
| Juice from Concentrate | 36 | 19 | 3 | 17 | 9 | 18 | 30 | 8 | 0 | 4 | 6 | 8 |
| Juice Not from Concentrate | 23 | 27 | 7 | 23 | 10 | 4 | 21 | 9 | 16 | 4 | 4 | 13 |
| Ketchup | 11 | 0 | 16 | 10 | 0 | 0 | 11 | 2 | 11 | 9 | 0 | 9 |
| Margarine | 1 | 20 | 22 | 10 | 44 | 2 | 2 | 32 | 16 | 2 | 8 | 14 |
| Mayonnaise | 40 | 6 | 11 | 26 | 12 | 0 | 12 | 17 | 0 | 11 | 7 | 1 |
| Pasta Sauce | 6 | 32 | 19 | 6 | 33 | 1 | 2 | 34 | 22 | 0 | 7 | 13 |
| Peanut Butter | 24 | 9 | 19 | 24 | 11 | 4 | 10 | 10 | 24 | 2 | 6 | 18 |
| Potato Chips | 12 | 34 | 12 | 19 | 16 | 7 | 14 | 19 | 15 | 1 | 2 | 19 |
| Processed Cheese Slices | 18 | 19 | 10 | 36 | 6 | 6 | 12 | 10 | 8 | 1 | 0 | 16 |
| Tea Bag | 14 | 20 | 19 | 7 | 14 | 18 | 20 | 31 | 4 | 4 | 9 | 9 |
| Waffle | 14 | 0 | 10 | 19 | 2 | 16 | 17 | 3 | 21 | 5 | 0 | 4 |

* A- the advertising frequency of the chosen brand
* B - the advertising frequency of any national brand other than the chosen brand
* C - the advertising frequency of the private label at the corresponding supermarket
frequencies. The competing supermarkets have the same advertising status in 31 weeks of the 52 weeks sample period. Referring to Table 5.1 for the national brands benchmark, note that all rejected cases are positively correlated. This implies that both food manufacturers and the retailers launched an aggregate merchandizing activity at the retail level to enhance the performance of both parties, with an increase of overall profit for the supermarkets and with an increase of sales for the individual products. The positive correlation in the advertising frequencies of Safeway and Market Place IGA, implies that Safeway and Market Place IGA have a similar target population segment of high profit margin, high service retailers. This is why the food manufacturers are advertising their products at both stores: they wish to increase sales in that particular market segment.

Similar to the across-store chosen brands results, there is strong evidence that two competing firms randomly choose what product to advertise and when in the across-store private labels analysis. The small values of test statistics in most of our across-store results indicate that the data provides sufficient evidence that the advertising strategies between competing stores are statistically independent. While the advertising decision for national brand is made jointly by manufacturers and retailers, the across-store private label advertising interaction does not demonstrate significant intervention by the manufacturers. However, in the five scenarios of rejected hypothesis in four product categories (Instant Coffee, Mayonnaise, Processed Cheese, and Waffle), the private labels advertising strategies between stores are negatively correlated compared to the positive correlation in the name brand analysis. With the national brands, when the across-store advertisement is not statistically independent, the product has the same advertising status; but when the across-store advertisement is not statistically independent for the private labels, the product has opposite advertising status instead. It is interesting to see that the chosen brands tend to be advertised together in a pair of competing retailers in a given week, where as the private labels of the supermarkets, tested pair-wise, have an opposite advertising schedule. Since the manufacturers have a certain influence on the retailers' advertising strategies on the national name brands, the same-good advertising across-stores would have been the manufacturers' marketing strategy in price advertising to increase product exposure and consumer awareness. With the assumption of Bertrand competition, and retailers do not have information of their competitors' action or strategy, it is doubtful that how the retailers achieve in avoiding head-on competition of their private label products. But the numbers on the contingency tables show that the negative correlation of the private labels in the scenarios of rejected hypothesis is often a result of low advertising frequency for both retailers, meaning that both
supermarkets do not advertise the product in most of the sample period. Thus, the supermarket might not be intentionally having same good advertising but the good is not advertised due to other reasons.

Across-store analyses for both national brands and private labels show that the advertising strategy of a supermarket is statistically independent from another supermarket. Supermarkets randomly advertise promoted items, thus randomly setting the promoted price of the advertised products. Although the advertising decision is somewhat influenced by the manufacturers, the jointly determined advertising behavior, by the manufacturers and the retailers, is to maximize individual firm's profit and optimize its performance. This result is consistent with the findings of Varian (1980) and Lach (2001), with informed and uninformed consumers making decisions on the basis of price. Random price advertising also reduces the intensity of competition among supermarket chains.

Table 6.2 Chi-Square Statistics on Across-Store Advertisement:
Safeway Canada vs. a Competing Supermarket Chain (National Name Brand)

| Product Category | IGA | Save-On | Superstore |
| :--- | ---: | ---: | ---: |
|  | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ |
| Bacon | 0.134 | 0.815 | 0.815 |
| Breakfast Cereal | 0.026 | 1.769 | 2.162 |
| Canned Fish | $5.385^{*}$ | 0.133 | $11.355^{*}$ |
| Canned Soup | 0.027 | 0.949 | 0.955 |
| Dry Pasta | 0.109 | 0.293 | 0.073 |
| Frozen Pizza | 0 | 1.675 | 0.118 |
| Frozen Punch Beverage | 0.999 | 1.239 | 2.695 |
| Frozen Vegetable | $4.137^{*}$ | 3.525 | 1.444 |
| Fruit Jam | 1.615 | 0.415 | 0.271 |
| Ground Coffee | 1.663 | 0.031 | 0.769 |
| Instant Coffee | 0.603 | 0.175 | 0.722 |
| Juice from Concentrate | 0.243 | 1.721 | 0.590 |
| Juice Not from Concentrate | 0.009 | 2.381 | 0.780 |
| Ketchup | 0.243 | 0.495 | 1.268 |
| Margarine | 0.243 | 0.495 | 1.268 |
| Mayonnaise | 0 | 0 | 0.115 |
| Pasta Sauce | 3.156 | 3.014 | 1.239 |
| Peanut Butter | $5.056^{*}$ | 0.189 | 0.012 |
| Potato Chips | 1.219 | 3.508 | 1.771 |
| Processed Cheese Slices | 0.085 | 0.048 | 0.453 |
| Tea Bags | 1.044 | 0.334 | 0.674 |
| Waffle | 3.508 | 0.234 | 0.029 |

[^0]Table 6.3 Chi-Square Statistics on Between-Store Advertisement:
Safeway Canada vs. a Competing Supermarket Chain (Private Label)

| Product Category | IGA | Save-On | Superstore |
| :--- | ---: | ---: | ---: |
|  | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ |
| Bacon | 2.013 | 0.173 | 0.093 |
| Breakfast Cereal | 0.306 | 0.587 | 0.185 |
| Canned Fish | 1.484 | 0.000 | 0.589 |
| Canned Soup | 0.251 | 0.375 | 0.999 |
| Dry Pasta | 0.098 | 0.053 | 0.999 |
| Frozen Pizza | 0.375 | 0.066 | 0.177 |
| Frozen Punch Beverage | 2.859 | 0.469 | 0.266 |
| Frozen Vegetables | 0.020 | 1.292 | 0.050 |
| Fruit Jam | 0.375 | 0.053 | 0.307 |
| Ground Coffee | 0.251 | 0.551 | 0.000 |
| Instant Coffee | $12.995^{*}$ | 2.013 | 1.239 |
| Juice from Concentrate | $6.014^{*}$ | 0.098 | 0.035 |
| Juice not from Concentrate | 0.674 | 1.926 | 1.444 |
| Ketchup | 0.162 | 0.455 | 0.669 |
| Margarine | 0.050 | 0.361 | 0.563 |
| Mayonnaise | 0.455 | $12.995^{*}$ | $6.123^{*}$ |
| Pasta Sauce | 1.771 | 0.748 | 0.340 |
| Peanut Butter | 0.014 | 0.539 | 0.002 |
| Potato Chips | 0.138 | 0.774 | 0.139 |
| Processed Cheese Slices | 0.868 | 1.233 | $4.103^{*}$ |
| Tea Bags | 2.748 | 0.308 | 0.391 |
| Waffle | 0.495 | $4.493^{*}$ | 0.068 |

[^1]
### 6.1.2 Results on Across-Brand Advertisement

### 6.1.2.1 The Chosen Brand vs. Private Label at Each Supermarket

The test statistics fail to reject the null hypothesis of independence between the advertising strategies of the chosen brand and the private label within a particular supermarket in the majority of cases. Table 6.4 reports the test statistics for the across-brand scenario between the chosen brand and the private label at each supermarket. The null hypothesis is rejected at IGA in the ketchup category, at Safeway for frozen vegetables with a negative correlation between opposite-goods advertising and processed cheese slices, but with a positive correlation with same-good advertising. A test statistic, $\chi^{2}>3.84$, rejected the null hypothesis of independence for instant coffee at Save-on Foods, and for juice from concentrate in Superstore; both have a strong positive correlation implying same-good
advertising between the chosen brand and the private labels in those retailers. From the five tests which the hypotheses are rejected, three of them have a positive correlation indicating a same-good advertising; however, the numbers in the contingency tables show that both the chosen brand and the private label were not advertised in more than 35 weeks in the sample period. The five product categories do not have high advertising frequency in the supermarket corresponding to the rejected cases.

There is a strong evidence to show that the advertising strategies, for the chosen brand and the private label, at each supermarket are independent in most of the tests. This indicates that the manufacturer of the chosen brand and the retailer are advertising on a random basis in general, so the two brands are being advertised together some of the time and alternately at other times. It is possible that the retailers have received payments or promotional allowances, so the private labels are not advertised at the same time as the national brands to avoid head-on competition for sales volume within the supermarket. In the rejected scenarios, the negative correlation means that the two brands avoid matching advertisement in a given week to reduce competition; the positive correlation implying the two brands are likely to be advertised in a given week. However, all of the three rejected hypotheses have positive correlation because there is no advertisement for both the chosen brand and private label for more than 35 week in the sample period. Since a designated budget is allocated for advertising, it is inefficient for the supermarket to advertise both the national brand and private label in the same week, while price promotion for one brand of a particular product is adequate to attract consumer to visit the store.

Table 6.4 Chi-Square Statistics on Within-Store Advertisement:
The Chosen Brand vs. Private Label at Each Supermarket

| Product Category | IGA | Safeway | Save-On | Superstore |
| :--- | ---: | ---: | ---: | ---: |
|  | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ |
| Bacon | 0.127 | 0.788 | 3.835 | 0.551 |
| Breakfast Cereal | 0.126 | 0.085 | 0.896 | 0.084 |
| Canned Fish | 0.724 | 0.145 | 1.491 | 0.091 |
| Canned Soup | 1.173 | 0.036 | 0.042 | 3.344 |
| Dry Pasta | 1.990 | 0.073 | 0.121 | 0.999 |
| Frozen Pizza | 0.053 | 0.578 | 0.578 | 1.246 |
| Frozen Punch Beverage | 0.011 | 0.023 | 1.055 | 2.948 |
| Frozen Vegetable | 1.926 | $8.509^{*}$ | 0.085 | 0.173 |
| Fruit Jam | 0.066 | 1.239 | 0.035 | 0.693 |
| Ground Coffee | 0.259 | 2.142 | 2.142 | 0.754 |
| Instant Coffee | 0.455 | 1.239 | $33.641^{*}$ | 0.722 |
| Juice from Concentrate | 0.010 | 1.371 | 0.023 | $3.989^{*}$ |
| Juice Not from Concentrate | 0.547 | 0.058 | 4.493 | 1.444 |
| Ketchup | $6.933^{*}$ | 0.551 | 1.217 | 0.292 |
| Margarine | 0.748 | 0.495 | 0.924 | 5.646 |
| Mayonnaise | 1.537 |  | 0 | 0.375 |
| Pasta Sauce | 0.530 | 0.133 | 0.050 | 0.274 |
| Peanut Butter | 1.045 | 3.714 | 3.408 | 0.307 |
| Potato Chips | 1.910 | 1.727 | 1.979 | 0.218 |
| Processed Cheese Slices | 0.117 | $8.798^{*}$ | 2.836 | 0.587 |
| Tea Bags | 1.886 | 0.008 | 2.708 | 0.453 |
| Waffle | 1.802 | 3.154 | 2.980 | 0.907 |
| I |  |  | 1.180 |  |

* Indicates the chi-square statistic that is larger than 3.84 and thus the null hypothesis is rejected at $5 \%$ significance level


### 6.1.2 2 Any National Brand vs. Private Label at Each Supermarket

Table 6.5 presents the result of the tests among national brands and private label at each supermarket. The number of rejected null hypotheses of independence is relatively higher than the last two analyses in section 6.1.1 and 6.1.2.1. The results indicate that the advertising strategies of any national brand and private brands in a supermarket are dependent and are mostly negatively correlated. Ten cases are rejected at Market Place IGA, four cases at Safeway, seven cases at Save-on Foods, and surprisingly only one case is rejected at Superstore.

All rejected cases in Market Place IGA, Safeway and Save-on Foods show a negative correlation between the national brands and the private labels. In these scenarios, both manufacturers and retailers would make the same decision to advertise opposite goods and
avoid head-on competition. From the perspective of manufacturers, it is inefficient to advertise their brand along with the private labels from the same category because this would reduce the effect of price promotion on the sales volume of the product. From the perspective of retailers, advertising two national brands in same category would increase their advertising costs. This increases traffic volume and sales increase as consumers are unlikely to purchase only the promoted items once they are at the store. Advertising products in the same category does not yield a sales increase effect as each consumer would only purchase one brand within the same product category; there is no brand switching effect. Consumers exhibit their usual purchasing behavior by stocking up when the price is reduced, and therefore retailers lose. Therefore, the advertising strategy between the national brands and private brands within a supermarket is either independent to conduct a random advertisement or has opposite-goods advertisement.

Unlike the three other retail chains, the only case rejected in Superstore is juice from concentrate with a positive correlation, a clear deviation from The Real Canadian Superstore and the other three supermarkets. In the cases where the null hypothesis is rejected, Superstore is the only retailer that shows a positive correlation between the national brands and its private label. This implies that Superstore has a strong private label program and it advertises the private label products at the same time as national brands. Since the retailer has a higher profit margin on private labels, Superstore attempts to increase its profit by featuring its private label products as substitutes for the national brand products, at a lower price. The differentiation in the results show that Superstore has a different market position and marketing strategy compared to the other three supermarket chains studied in this thesis.

Table 6.5 Chi-Square Statistics on Within-Store Advertisement:
Any National Brand vs. Private Label at Each Supermarket

| Product Category | IGA | Safeway | Save-On | Superstore |
| :--- | ---: | ---: | ---: | ---: |
|  | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ |
| Bacon | 1.900 | 0.752 | $6.933^{*}$ | 0.551 |
| Breakfast Cereal | 0.112 | 6.144 | 0.014 | 0.174 |
| Canned Fish | $6.281^{*}$ | $5.005^{*}$ | 0.156 | 0.091 |
| Canned Soup | $7.139^{*}$ | 0.307 | 1.997 | 2.284 |
| Dry Pasta | $5.967^{*}$ | 0.036 | 0.624 | 0.674 |
| Frozen Pizza | 0.203 | 0.069 | 0.334 | 0.004 |
| Frozen Punch Beverage | 2.472 | $7.077^{*}$ | 2.810 | 1.376 |
| Frozen Vegetable | 1.926 | 2.255 | 0.019 | 3.014 |
| Fruit Jam | 3.328 | 0.375 | $8.799^{*}$ | 2.311 |
| Ground Coffee | $4.535^{*}$ | 0.001 | $8.945^{*}$ | 1.486 |
| Instant Coffee | 0.001 | 0.862 | 2.935 | 1.420 |
| Juice from Concentrate | 0.408 | 0.340 | 0.073 | $4.690^{*}$ |
| Juice Not from Concentrate | 0.008 | 0.244 | $11.455^{*}$ | 0.495 |
| Ketchup | $6.933^{*}$ | 0.042 | 1.883 | 0.292 |
| Margarine | $4.938^{*}$ | 2.384 | 1.806 | 0.302 |
| Mayonnaise | 0.658 | 0.203 | 0.006 | 0.495 |
| Pasta Sauce | $5.409^{*}$ | 0.540 | 0.234 | 0.495 |
| Peanut Butter | $4.348^{*}$ | $8.922^{*}$ | $17.093^{*}$ | 1.477 |
| Potato Chips | $6.370^{*}$ | 0.729 | 2.703 | 0.014 |
| Processed Cheese Slices | 0.001 | $6.280^{*}$ | $6.405^{*}$ | 0.453 |
| Tea Bags | $15.117^{*}$ | 1.000 | $8.677^{*}$ | 0.878 |
| Waffle | 1.802 | 3.794 | 1.817 | 1.180 |

* Indicates the chi-square statistic that is larger than 3.84 and thus the null hypothesis is rejected at $5 \%$ significance level


### 6.1.2.3 The Chosen Brand vs. Any Other National Brand at Each Supermarket

The chi-square statistics are reported in Table 6.6. Again, more tests with $\chi^{2}$ statistics rejecting null hypotheses compared to the analysis in Section 6.1.1 and 6.1.2.1. Eight cases are rejected at IGA, eight cases rejected at Safeway, but only two cases are rejected at Save-on Foods, and four at Superstore.

Similar to the analysis of national brands and private labels, Market Place IGA, Safeway, and Save-on Foods have a negative correlation for the rejected cases. The products in the same category are advertised alternatively during the 52 weeks. It is obvious that manufacturers have some level of influence on these advertising decisions. They do not want to create an intensive competition with other national brands because this would reduce the overall profit in the industry. The incentive for collusion is high if the market concentration
is low in the manufacturing level.

The differentiation between Superstore and the other three supermarket chains occurs in the result in this section as well. All four scenarios of rejection have positive correlation, with over 45 weeks of none advertising between the chosen brand and any other national brand. Adequate information demonstrate that Superstore have a higher advertising frequency for its private labels compared to national brands, it is obvious that Superstore has a different marketing strategy focusing on its private label rather than the national brands.

Table 6.6 Chi-Square Statistics on Within-Store Advertisement:
The Chosen Brand vs. Any Other National Brand at Each Supermarket

| Product Category | IGA | Safeway | Save-On | Superstore |
| :--- | ---: | ---: | ---: | ---: |
|  | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ | $\chi^{2}$ |
| Bacon | $40.411^{*}$ | $8.717^{*}$ | 0.375 | $12.995^{*}$ |
| Breakfast Cereal | 3.714 | 0.265 | 0.112 | 0.542 |
| Canned Fish | $4.912^{*}$ | 0.662 | 0.387 | 0.815 |
| Canned Soup | $4.137^{*}$ | 0.599 | 1.258 | $3.903^{*}$ |
| Dry Pasta | $10.239^{*}$ | 2.487 | 1.213 | 2.013 |
| Frozen Pizza | 0.711 | $5.026^{*}$ | 2.239 | 1.482 |
| Frozen Punch Beverage | $4.247^{*}$ | 0.006 | 2.681 | $9.479^{*}$ |
| Frozen Vegetable | 0.307 | 0.340 | 0.495 | 0.173 |
| Fruit Jam | 0.117 | 0.060 | $4.014^{*}$ | 0.495 |
| Ground Coffee | $9.433^{*}$ | 0.532 | 0.437 | 3.014 |
| Instant Coffee | 1.665 | $12.728^{*}$ | 2.750 | 0.461 |
| Juice from Concentrate | 0.009 | 5.286 | 0.090 | $17.098^{*}$ |
| Juice Not from Concentrate | $11.028^{*}$ | $5.881^{*}$ | 1.491 | 1.828 |
| Ketchup | 0.375 | 0.559 | 0.558 | 0.669 |
| Margarine | 0.637 | $22.599^{*}$ | 0.117 | 0.378 |
| Mayonnaise | 2.770 | $10.833^{*}$ | $4.207^{*}$ | 0.229 |
| Pasta Sauce | 0.382 | $11.780^{*}$ | 0.218 | 0.999 |
| Peanut Butter | 0.013 | $11.958^{*}$ | 2.948 | 3.014 |
| Potato Chips | 1.631 | 0.279 | 1.886 | 0.041 |
| Processed Cheese Slices | 0.122 | 1.178 | 1.193 | 6.123 |
| Tea Bags | $11.974^{*}$ | 3.755 | 2.884 | 0.179 |
| Waffle | 0.251 | 0.163 | 1.670 | 1.560 |

* Indicates that chi-square statistic that is larger than 3.84 and thus the null hypothesis is rejected at $5 \%$ significance level


### 6.2 Dynamic Analysis

### 6.2.1 Leader - Follower Relationship

The dynamic analysis is performed to find out if there is any potential leader-follower relationship in the advertising status among the competing supermarkets over the sampling period. As stated in Section 5.3.2, there are 16 tests for each product category, since we are only interested in cases, with null hypotheses are rejected at $5 \%$ significant level, indicating a possible leader-follower relationship; hence, the tables in this section only present results when the chi-square statistic is larger than 3.84 . There are no significant patterns of leader-follower relationship emerged in these hypothesis tests. However, products categories, and supermarkets with a higher advertising frequency tend to have a higher possibility of advertising leader-follower relationship between two supermarkets over time. In this study, IGA and Safeway are the supermarkets that have higher advertising rates than Save-on Foods, while Superstore advertises least among the four supermarkets for the 22 selected products. The results of the five products, Breakfast Cereal, Canned Fish, Canned Soup, Peanut Butter and Potato Chips, are as shown in Table 6.7 to Table 6.11.

Tests with null hypotheses rejected at $5 \%$ significant level for the Breakfast Cereal product category is shown in Table 6.7. There is no pattern for a leading store and a particular following store. It is obvious that there are more null hypotheses being rejected when $\mathrm{k}=1$ and $\mathrm{k}=3$. There are quite a few cases with Private Labels as advertising followers, and this is coherent with the work by Sexton and Lavoie (2001). Retailer is advertising the Private Label following the advertisement by another retailer. Note that four of the five cases with Private Label as a follower appear when $k=3$ and $k=4$, this shows that retailer want to maximize the effect of the advertisement by responding to the competitor's action in advertising it's private label three weeks or four weeks after the competitor's advertisement. Because consumers would respond to the first wave of advertisement and make purchase at the advertising supermarket, if another retailer advertises immediately in the week after, when $k=1$; the cost of that particular advertisement would not be very effective in increasing sale volume of the product. Breakfast Cereal is a non-perishable product, and food is an inferior good; consumers may have stocked up with the sale advertisement or have not yet finished consuming the product, given the general packaging size of Breakfast Cereal. Therefore, consumer are unlikely to purchase the same product in the period when $k=1$. However, the advertisement of the Specified Brands are not as flexible, because manufacturers have scheduled the advertising
patterns with supermarkets months in advance, and it is unlikely for them to make last minute changes compared to the Private Labels.

Table 6.7 Leader-Follower Relationships for the Breakfast Cereal Product Category

| Lag | Leader (Brand) | Follower (Brand) | $\chi^{2}$ |
| :---: | :---: | :---: | :---: |
| $\mathrm{k}=1$ | IGA (specified) | Safeway (specified) | 4.833 |
|  | IGA (private) | Save-on (private) | 31.19 |
|  | Superstore (private) | Safeway (specified) | 3.84 |
| $\mathrm{k}=2$ | Save-on (specified) | IGA (specified) | 4.788 |
| $\mathrm{k}=3$ | IGA (private) | Save-on (private) | 9.228 |
|  | Safeway (private) | Superstore (specified) | 3.981 |
|  | Save-on (private) | Superstore (private) | 4.472 |
|  | Superstore (specified) | IGA (private) | 5.478 |
| $\mathrm{k}=4$ | Safeway (specified) | Save-on (specified) | 6.701 |
|  | Safeway (specified) | Save-on (private) | 7.273 |

In table 6.8, there are 3 cases with rejected null hypotheses when $\mathrm{k}=2$ in the Canned Fish product category. Only one null hypothesis is rejected when $k-3$ and when $k=4$. Compared to the difference results in Table 6.7, it is likely to be associated with the package size and the number of cans is consumed in preparing meals, resulting in a different purchasing pattern.

It looks like that Save-on Foods is playing a follower role to its competitor, especially Safeway, but it shows that Private Label is being advertised in three of the six cases when Save-on Foods is the follower. We know that retailer has the complete control of the advertising status for the Private Label, while the advertising pattern of the Specified Brand is planned by the manufacturer. In this situation, we do not have full knowledge if Save-on Foods is targeting Safeway and is acting as a follower in responding to Safeway's advertising schedule in the Canned Fish product category; or manufacturer selects the advertising sequence among the supermarkets. The data of this study shows the joint advertising decision between the manufacturers and the retailers, and cannot distinguish the individual player's initiative decision. Further Research is required to differentiate the advertising decision between retailer and manufacturer.

Table 6.8 Leader-Follower Relationships for the Canned Fish Product Category

| Lag | Leader (Brand) | Follower (Brand) | $\chi^{2}$ |
| :---: | :---: | :---: | :---: |
| $\mathrm{k}=1$ | Safeway (private) | Save-on (private) | 3.868 |
|  | Superstore (specified) | Save-on (private) | 6.122 |
| $\mathrm{k}=2$ | IGA (specified) | Save-on (specified) | 4.480 |
|  | Safeway (specified) | Save-on (specified) | 3.899 |
|  | Safeway (specified) | Save-on (private) | 5.773 |
| $\mathrm{k}=3$ | Safeway (private) | IGA (specified) | 6.639 |
| $\mathrm{k}=4$ | IGA (private) | Save-on (specified) | 4.769 |

Unexpectedly, there are very few null hypotheses rejected in the Canned Soup product category. Campbell's, as the Specified Brand, is having a very high market share in the Canned Soup industry, thus most of the advertisement in the flyers are placed by the same manufacturer, this explains why the advertising rate is one of the highest among the product categories but there are still only 5 cases with rejected null hypotheses. The result shows that the manufacturer in this category would schedule the advertisement precisely among the supermarkets in order to minimize advertising costs and achieve the goal of having sufficient exposure to reminder consumers of the existence of the brand. Again, Save-on Foods is acting as a follower by advertising its private label but to no specific leader. It is believed that Save-on Foods is responding to the competitor's advertisement of both Specified Brand and Private Labels by adjusting the advertising schedule of its Private Label.

Table 6.9 Leader-Follower Relationships for the Canned Soup Product Category

| Lag | Leader (Brand) | Follower (Brand) | $\chi^{2}$ |
| :---: | :---: | :---: | :---: |
| $\mathrm{k}=1$ | Safeway (specified) | Superstore (specified) | 3.868 |
|  | Superstore (specified) | Save-on (private) | 4.554 |
| $\mathrm{k}=2$ | Safeway (private) | Save-on (private) | 4.633 |
|  | Superstore (private) | Save-on (private) | 4.160 |
| $\mathrm{k}=4$ | IGA (private) | Save-on (specified) | 4.769 |

Peanut Butter has the highest number of rejected null hypotheses of the 22 product categories. It has a relatively high advertising frequency and the industry is rather competitive when compared to other product categories. Random leader-follower relationship occurs over time, with no specific leader or follower store-wise. Coherent with the previous discussion, more null hypotheses are bring rejected when $k>1$; the product is
not advertised immediately in the first week after the product is being advertised by a competitor. The randomness in this section could be a result of various package sizes for Peanut Butter, because the data records the advertising pattern for Peanut Butter regardless of package size. Yet, it is difficult to compare this with the result in the Breakfast Cereal category, since the consumption rate of the two products are different and consumers' purchasing behavior would be different as well. Further research is required to discover the detail relationship of the advertising decision with regard to different packaging sizes of a product.

Table 6.10 Leader-Follower Relationships for the Peanut Butter Product Category

| Lag | Leader (Brand) | Follower (Brand) | $\chi^{2}$ |
| :---: | :---: | :---: | :---: |
| $\mathbf{k}=1$ | Safeway (private) | IGA (specified) | 3.858 |
|  | Save-on (specified) | Superstore (specified) | 8.534 |
| $\mathrm{k}=\mathbf{2}$ | IGA (specified) | Save-on (specified) | 5.128 |
|  | Superstore (specified) | IGA (specified) | 6.254 |
|  | Superstore (private) | IGA (private) | 4.740 |
| $\mathrm{k}=3$ | IGA (specified) | Safeway (specified) | 16.593 |
|  | IGA (private) | Superstore (specified) | 3.925 |
|  | Superstore (private) | IGA (private) | 4.013 |
| $\mathrm{k}=4$ | Save-on (specified) | IGA (private) | 7.257 |
|  | Save-on (specified) | Superstore (specified) | 6.074 |
|  | Superstore (private) | Save-on (specified) | 4.042 |

In general, there are random leader-follower relationships between different pairs of supermarkets, but there is no specific indication for a strong leader-follower relationship between supermarkets, or a definite suggestion for a particular store as the leader or as the follower. Although Save-on Foods is acting as a follower in the Canned Fish and Canned Soup product categories, we cannot clearly distinguish if that is a result of the manufacturer's advertising schedule or pure decision by the retailer as a direct response to competitor's action. The random occurrence of advertising leader-follower relationships differs among product categories; it is possible that the advertising pattern is schedule depending on the consuming habits, package sizes, and the nature of the products, and further research is required in finding out the answer to that.

## Chapter 7

## Summary and Conclusion

In this thesis we have looked at the association between the advertising patterns in sales flyers of competing supermarkets, and the advertising strategy of each supermarket that is jointly determined by competing manufacturers and the corresponding retailers. Our results show that there is strong evidence to support the null hypothesis that competing supermarkets have mixed strategies in product advertising. The results are consistent with our hypothesis of independent advertising strategies on the part of two competing firms.

### 7.1 Summary

The sales flyer is a commonly used form of advertisement among retailers, especially in the food retailing industry. It is an effective tool for supermarkets to communicate price information to large numbers of consumers, given the many products discounted every week and their corresponding price changes. This research focuses on the advertising frequency of 22 selected product categories from four supermarket chains with sales flyers distributed in the Vancouver lower mainland, and investigates the association of the explicit advertising strategies of competing retailers with the advertising patterns in the sales flyers over a sample period of 52 weeks.

The results of our across-store hypothesis testing show strong evidence to support the null hypothesis that the advertising strategies of two competing retailers are independent. These results are consistent with the conclusion of Varian (1980) and Lach (2002) although their approach is other than the spatial model used in this thesis. Most of the advertisement in the flyers is planned approximately three months in advance of the effective dates of the sales flyers with some last minute changes and corrections prior to the printing of flyers. Thus, it is believed that there is a lag relationship between two competing supermarkets with similar market position and target population segment during the sample period of 52 weeks, as both manufacturers and retailers attempt to maximize their profit by reducing their competition in the market. From the result in the time lag analysis, lagged relationships emerge in a random pattern across-brand and across-store, but the occurrences of lagged relationship for most of the cases concentrate in lag period with $\mathrm{k}=\{1,3$,$\} .$

A retailer does not have information about its competitors' pricing and marketing strategies in Bertrand competition, thus each advertisement in the sales flyers is treated as a independent promotional event. Because the competing supermarkets are selling products from the same major food processors, the wholesale price of the same product to these same sized supermarkets would be very similar. The price variation among the retailers is determined by their mark-up margin on the products, and retailers with similar target segment and market position are likely to set products in similar price range, and the competition between these supermarkets would be more rigorous compared to supermarkets in different market segment. Although the price of private label products is lower than the national branded products, the retailer's profit margin on its private label product is higher than those of the national branded products because the products are contracted to food processors in attempting to mimic the products of the popular brand names. Therefore, an increase in the sales of private label would yield a higher profit compared to an increase in the sales of national brands proportionally.

On the other hand, food retailers receive promotional allowances and payments from national brand manufacturers who want to form strategic alliances with individual retailers, with the goal of reducing brand switching within individual stores. Some of the test statistics reject the null hypothesis of independence between the advertising strategies of all national brands available within a store, and those of any national brand and the private label at each supermarket. This implies that the competition across brands is reduced if the manufacturers give payments or advertising allowances to the retailers. However, this is not the case for The Real Canadian Superstore even though there is a positive correlation rather than a negative correlation in most other cases. As indicated in the work of Rostoks (2002), Superstore has the strongest private label program in Canada, and the profit margin of the private label is higher than that of the national brand. To maximize profit, Superstore lowers its advertising cost by featuring the promotion of national brand only but encourage brand switching, once the consumer has visited the store, by positioning the private label product next to the advertised brand and highlight the price difference as indicated by Morton and Zettelmeyer (2001) and Sayman et al. (2002). In fact, consumers are unlikely to purchase the promoted item only but also other unadvertised goods as well; therefore, Superstore "uses store brands to exploit the marginal-average cost gap of national brands"(p23). In general, manufacturers and each retailer determine their joint advertising strategies from two different perspectives but they would want to maximize the overall industry profit by reducing the competition at the retail level in randomizing advertisement
in the supermarket sales flyers.

### 7.2 Limitation

There are several limitations to this thesis because of the data available and the static model applied as described in Chapter 4. Sexton and Lavoie (2001) point out that in perfect competition, firms recognize no active rivalries, but in imperfection competition, rival firms would response or react to one another; thus, an oligopoly would have a Cournot competition and an leader-follower relationship among the sellers is likely to emerge overtime. Since the model does not encounter the dynamic aspects of the advertising environment, additional tests are complied to analyze the lag relationship between the advertising strategies between the retailers.

Same chi-square testing procedure as in Chapter 5 is constructed to test the existence of lag relationship between pairs of competing supermarket chains and with different brand combination of leader-follower in a Cournot setting. The yes-no advertising status of a brand in Store A in week $t$ is compared with the yes-no advertising status of the same brand in Store $B$ in week $t-1$, where $k=\{1,2,3,4\}$. There are four leader-follower brand combinations: (1) chosen brand - chosen brand (2) chosen brand - private label (3) private label - chosen brand (4) private label - private label.

The result of the time lag analyses varies with product categories and shows no particular pattern of leader-follower relationship across-store and across-brand. The lag relationships emerge in a random basis between stores in different brand combination. For example, Save-on Foods tends to be a follower in the Canned Fish and Canned Soup categories with different brand $\&$ store combination, and no significant lag relationships emerge between Save-on Foods and other retailers in other product categories. The null hypothesis of independence between the advertising strategies is rejected in many cases in the time lag analyses, and there are two interesting points. Firstly, most of the tests with rejected null hypotheses are in the product categories with higher advertising frequency. Secondly, most of the lag relationships emerge when $k=\{1,3$,$\} . It is obvious that if the$ advertising frequency is high in the 52 week period, the probability of having a lag relationship overtime is higher. The existence of lag relationship across-store is noticeably higher with $\mathrm{k}=\{1,3$,$\} . If Store \mathrm{A}$ is advertising a product in week t , Store B is likely to advertise a product in the same category in week $t-1$ and $t-3$. This is coherent with the Sexton and Lavoie (2001) that oligopoly sellers response or react to the action of one
another with a Cournot competition. However, the manufacturers also play an important role in advertising, since there is no particular pattern indicating a specific retailer as a leader or follower, the lag relationship across-store may be a schedule for manufacturer to advertise its product at each supermarket in different time frame because it is too expensive for manufacturer to have price advertising every week with each retailer. The advertisement is more efficient this way, in reminding the forgetful consumers who patronized with different supermarket, and maximize the manufacturer's sales and profit. Therefore, the assumption of Bertrand competition and independence of advertisement overtime may be unrealistic.

Another question arises in the course of this study, there are private label products being advertised in the supermarket flyers without indicating the price. Although this situation is very rare, this occurred twice in Safeway only with the Private Label product during the 52 weeks sample period. However, it is often seen in the Superstore flyer that Superstore advertises its private label product by comparing the price of national brand, indicating the amount saved in large font while the actual price of the product printed in a much smaller font. The main feature of advertising flyer is providing price information to mass consumer, even though the image of the product also plays an important role of reminding the forgetful consumer the existence of the product in a visual form, it is very unlike for a product to be advertised without the price information. In some issues of Safeway's flyer, the pictures of a set of Private Label products are group together and the prices are layout separately underneath the pictures. There may be problem with this form of advertising layout as the consumers cannot immediately associate the price information with the image of the particular product, and this would reduce the effectiveness of the advertisement.

### 7.3 Conclusion

The purpose of advertising, given the specification of the product in all objective respects and given prices, is to increase the number of consumer who will prefer that product to its competitors. There are two ways in achieving the purpose: purely informative, provide consumers with information to exercise their choice and persuasive, increase the preference for the product. This thesis focuses on the information advertising because information is essential to the functioning of markets. Information affects the conduct of all firms in the market, and the simultaneously vertical and horizontal interactive behavior between firms.

With assumption of Bertrand competition between the supermarket chains, the hypotheses testing provide strong evidence that the across-store advertising strategies, which are jointly determined by the manufacturers and the corresponding supermarket, are statistically independent of each other in a static model. In the across-brand analyses within each supermarket, sufficient evidence shows that the jointly determined advertising strategies of chosen brand and the private label at each supermarket are statistically independent, but the null hypothesis of independence is rejected in a considerable number of cases when the advertising status of any national brand is tested against the chosen brand and when it is tested against the private label at each supermarket. Certain product categories in IGA, Safeway, and Save-on Foods show negative correlation when the hypotheses are rejected; this implies an opposite advertising situation between the brands. The behavior is understood because it is inefficient to advertise more than one brand of the same product category from the perspectives of both manufacturers and retailers. Manufacturer would want to have its product advertised solely in a given week, because when competing brands of the same category is advertised, the objective of identifying the specific product to consumer cannot be achieved as the effect of advertising is reduced. In general, the advertising strategies between two competing brands are statistically independent in Superstore. But it shows a positive correlation when the hypotheses of independence are rejected in the across-brand analyses. A positive correlation should imply same-good advertising between two competing brands, and this result contradicts with our prediction, but the contingency tables in Appendix C indicate that the result of same-good advertising emerges because the two competing brands have a no-no advertising status in most of the sample period. Superstore's behavior has a clear distinction from its horizontal competitors, low advertising frequency keeps advertising expenditure low and this is the operation objective in setting the market position of Superstore as discussed in section 3.2.4.

However, the static model employed in this study does not consider the dynamic aspect of the advertising environment for a possible leader-follower relationship across-store or across-brand over time, and repetitive advertisement desired by both manufacturers and retailers to remind forgetful consumers of the identification of product and the existence of sellers. Price cut can be carried out in a very short time, but an advertising campaign takes time to mount; therefore further research is required to attend the dynamic environment of advertising and to distinguish the role of vertical and horizontal players in advertising strategy if possible.

### 7.4 Scope for Future Research

This study has examined the independence of the across-store and across-brand advertising strategies, which are jointly determined by manufacturer and retailer. The result follows the theory of previous researches showing that competing firms want to randomize their price advertising. Although the purpose of advertisement is to provide information for consumer to make their choice in which brand and where to purchase, a carefully designed advertising campaign by the manufacturers and retailers determines a selection of products to be advertised on the sales flyer in particular time frame. This would actually create an imperfect information environment then rational consumers cannot learn which store has the lowest price for specific brands. According to Lach (2002), this allows price dispersion to persist, thus reduce the competition in the food retailing industry and the suppliers, in this case both manufacturer and retailer, can obtain a higher profit than the profit at perfect competition equilibrium.

The study only considered the data in form of yes-no advertising status patterns in the sales flyer, with no pricing information on advertised and unadvertised products in the supermarket. If both the price-advertising data and price information are available, it would be interesting to find out if there is any correlation between the pricing and the advertising strategy of a product over time. A more complete dynamic model can be constructed in future research to interpret if a product is advertised only when there is a price promotion, with a price reduction to boost up sales volume and gain market share in short run, or a product is simply advertised repetitively to increase consumer's awareness in the long run.

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## Appendix A

Compare the firms' profit from Case 1 (same-good advertising) and Case 2 (opposite-good advertising) and find out which strategy is preferred.

Recall that: $\quad \pi^{1}=\frac{c}{2} \quad$ and $\quad \pi^{2}=R-u-\frac{(R-u)^{2}}{4 c}$
Generally speaking, it is believed that firms would chose opposite good advertising to avoid intensive competition. $\pi_{2}>\pi_{1}$ is required to show that this is true.

If $R-u-\frac{(R-u)^{2}}{4 c}>\frac{c}{2} \quad$ is true, then firms would choose opposite-goods advertising
Let $\Delta=\left[R-u-\frac{(R-u)^{2}}{4 c}\right]-\frac{c}{2} \quad \Rightarrow \Delta>0$
Find out what value of $c$ makes $\Delta=0$ and solve for $c^{*}$ using quadratic formula $c^{*}=\frac{2 \pm \sqrt{2}}{2}(R-u)$
If we assume that $(R-u)=0$, then $c_{\text {high }}^{*}>0$. and $c_{\text {low }}^{*}>0$

Consumers make their store choice depend on the transportation cost, $c$, therefore, we would like to find out how the change in $c$ affects the profit difference, $\Delta$, between Case 1 and Case 2.

Take the first order condition for $\Delta$ with respect to $c$ $\frac{\partial \Delta}{\partial c}=\frac{R-u-\sqrt{8} c}{4 c}$
If the FOC is positive then firms would prefer Case 2 over Case 1.
Recall that $c^{*}=\frac{2 \pm \sqrt{2}}{2}(R-u)>0$, then the restriction for the parameters $R, u$ is
$R>u>\sqrt{8} c$
for firms to choose opposite-goods advertising strategy.

## Appendix B

We can see if Store A has an intention to deviate from the pure strategy of opposite-good advertising by comparing the profits if deviate or not.

This is similar to the procedure in Appendix A. Let $\Delta=\pi_{\text {deviate }}-\pi_{\text {no-deviate }}>0$
Set $\Delta=0$ and solve for $c^{*}$ using quadratic formula.
$\Delta=\frac{(3 R-3 u+2 c)^{2}}{16 c}-\left[R-u \frac{(R-u)^{2}}{4 c}\right]=0$
$c *=\frac{-(R+u) \pm[(R+u)-\sqrt{13}(R-u)]}{2}$
If we assume that $(R-u)=0$, then $c_{\text {high }}^{*}>0$ and $c_{\text {low }}^{*}>0$

Now we would like to see how the change in $c$ affects the profit difference, $\Delta$, with deviation and without deviation.
Take the derivative of $\Delta$ with respect to $c$
$\frac{\partial \Delta}{\partial c}=\frac{3 u-3 R+1}{4 c^{2}}$
Recall that $c^{*}>0$, so the restriction for the parameters $R, u$ for the firm to deviate is $R-u>\frac{1}{3}$ for $\Delta>0$.

## Appendix C

## Contingency Tables

## Contingency Tables for Bacon

Olympic vs Private Label within Store


|  |  | Olympic Superstore. <br>  |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $0(0.00)$ | $42(42.00)$ | 42 |
| Superstore | Not Advertise | $0(0.00)$ | $10(10.00)$ | 10 |
| Total | 0 | 52 | 52 |  |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| IGA | Not Advertise | $48(48.00)$ | $4(4.00)$ | 52 |
| Total |  | 48 | 4 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $2(1.23)$ | 4 |  |
| Safeway | Not Advertise | $34(33.23)$ | $14(14.77)$ | 48 |
| Total |  | 36 | 16 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $2(0.46)$ | 2 |
| Private Label | Advertise | $0(1.54)$ | $10(11.54)$ | 50 |
| Save-on | Not Advertise | $40(38.46)$ | 10 | 12 |
| Total |  | 40 | 52 |  |


|  |  National Brands Superstore <br>  Advertise$\quad$ Not Advertise |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
| Private Label | Advertise | $0(0.00)$ | $42(42.00)$ | 42 |
| Superstore | Not Adverise | $0(0.00)$ | $10(10.00)$ | 10 |
| Total |  | 0 | 52 | 52 |

Olympic vs Other National Brands within Store

|  |  | Olympic IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Other | Advertise | $0(10.46)$ | $32(21.54)$ | 32 |
| IGA | Not Advertise | 17 | $(6.54)$ | $3(13.46)$ |
| Total |  | 17 | 35 | 20 |


|  |  | Olympic Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |  |
| Other | Advertise | $1(4.77)$ | $30(26.23)$ | 31 |  |
| Safeway | Not Advertise | $7(3.23)$ | $14(17.77)$ | 21 |  |
| Total |  | 8 | 44 | 52 |  |


|  | Olympic Save-on |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $40(40.00)$ | 40 |
| Other | Advertise | $0(0.02)$ | $12(12.02)$ | 12 |
| Save-on | Not Advertise | $0(0.00)$ | 52 | 52 |
| Total |  | 0 | 52 |  |


|  |  | Olympic 'Superstore |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Other | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Superstore | Not Advertise | $0(0.00)$ | $52(52.00)$ | 52 |
| Total |  | 0 | 52 | 52 |

Olympic vs Olympic across Store

|  |  | Olympic Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtis |  |  |
| Olympic | Advertise | 3 | (2.55) |  | (14.38) | 17 |
| IGA | Not Advertise | 5 | (5.45) | 30 | (29.62) | 35 |
| Total |  | 8 |  | 44 |  | 52 |



## Contingency Tables for Breakfast Cereal

Kellogg's vs Private Label within Store

|  |  | Kellogg's IGA |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |  |  |
| Private Label | Advertise | 7 | (6.47) |  | (5.54) | 12 |
| IGA | Not Advertise | 21 | (21.54) | 19 | (18.46) | 40 |
| Total |  | 28 |  | 24 |  | 52 |



Kellogg's vs Other National Brands within Store

|  |  | Kellogg's IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Other | Advertise | $18(14.54)$ | $9(12.46)$ | 27 |
| IGA | Not Advertise | $10(13.46)$ | $15(11.54)$ | 25 |
| Total |  | 28 | 24 | 52 |


|  |  | Kellogg's Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |
| Other | Advertise | 44 | 4 | 48 |
| Safeway | Not Advertise | 4 | 0 | 4 |
| Total |  | 48 | 4 | 52 |


|  |  | Kellogg's Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $9(8.54)$ | 37 |
| Other | Advertise | $28(28.46)$ | $9(3)$ | 15 |
| Save-on | Not Advertise | $12(11.54)$ | $3(3.46)$ | 52 |
| Total |  | 40 | 12 |  |


|  | Kellogg's Superstore |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $2(2.96)$ | $12(11.04)$ | 14 |
| Superstore | Not Advertise | $9(8.04)$ | $29(29.96)$ | 38 |
| Total |  | 11 | 41 | 52 |

## Kellogg's vs Kellogg's across Store



|  |  | Kellogg's Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  |  |
| Kellogg's | Advertise | 38 (36.92) | 2 (3.08) | 35 |
| Save-on | Not Advertise | 10 (11.08) | 2 (0.92) | 9 |
| Total |  | 48 | 4 | 52 |


|  | Kellogg's Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Kellogg's | Advertise | $9(10.15)$ | $2(0.85)$ | 11 |
| Superstore | Not Advertise | $39(37.85)$ | $2(3.15)$ | 41 |
| Total |  | 48 | 4 | 52 |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $3(3.54)$ | $5(4.46)$ | 8 |
| Superstore | Not Advertise | $20(19.46)$ | $24 .(24.54)$ | 44 |
| Total |  | 23 | 29 | 52 |

Clover Leaf vs Private Label within Store

|  |  | Clovet Leaf IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $5(3.81)$ | 11 |
| Private Label | Advertise | $6(7.19)$ | $13(14.19)$ | 41 |
| IGA | Not Advertise | $28(26.81)$ | 18 | 52 |
| Total |  | 34 | 18 |  |


|  |  | Clover Leaf Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |  |
| Private Label | Advertise | 2 | (2.40) | 3 | (2.60) | 5 |
| Safeway | Not Advertise | 23 | (22.60) | 24 | (24.40) | 47 |
| Total |  | 25 |  | 27 |  | 52 |


|  | Clover Leaf Save-on |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $2(3.64)$ | $19(17.37)$ | 21 |
| Save-on | Not Advertise | $7(5.37)$ | $24(25.64)$ | 31 |
| Total |  | 9 | 43 | 52 |


|  |  | Clover Leaf Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $1(0.77)$ | $4.23)$ | 5 |
| Superstore | Not Advertise | $7(7.23)$ | $40(39.77)$ | 47 |
| Total |  | 8 | 44 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $7(9.52)$ | $4(1.48)$ | 11 |
| IGA | Not Advertise | $38(35.48)$ | $3(5.52)$ | 41 |
| Total |  | 45 | 7 | 52 |



|  |  | National Brands Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | 14 (13.33) | $7(7.67)$ | 21 |
| Save-on | Not Advertise | $19(19.67)$ | $12(11.33)$ | 31 |
| Total |  | 33 | 19 | 52 |



Clover Leaf vs Other National Brands within Store

|  |  | Clover Leaf IGA |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | ertise |  |
| Other | Advertise | 10 (13.73) | 11 (7.27) | 21 |
| IGA | Not Advertise | 24 (20.27) | 7 (10.73) | 31 |
| Total |  | 34 | 18 | 52 |
|  |  | Clover Leaf Safeway |  | Total |
|  |  | Advertise | rrise |  |
| Other | Advertise | 12 (13.46) | 16 (14.54) | 28 |
| Safeway | Not Advertise | 13 (11.54) | 11 (12.46) | 24 |
| Total |  | 48 | 27 | 52 |


|  |  | Clover Leaf Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $4(4.85)$ | $24(23.15)$ | 28 |
| Save-on | Not Advertise | $5(4.15)$ | $19(19.85)$ | 24 |
| Total |  | 9 | 43 | 52 |


|  | Clover Leaf Superstore |  | Total |  |
| :--- | :---: | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Other | Advertise | $0(0.00)$ | $44(44.00)$ | 0 |
| Superstore | Not Advertise | $8(8.00)$ | 44 | 52 |
| Total |  | 8 | 44 |  |

Clover Leaf vs Clover Leaf across Store

|  |  | Clover Leaf Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $15(17.65)$ |
| Clover Leaf | Advertise | $19(13.89)$ | 124 |  |
| lGA | Not Advertise | $6(11.11)$ | $12(9.35)$ | 18 |
| Total |  | 25 | 27 | 52 |


|  |  | Clover Leaf Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $5(17.65)$ |
| Clover Leaf | Advertise | $4(4.63)$ | (14) |  |
| Save-on | Not Advertise | $21(20.37)$ | $22(22.33)$ | (1) |
| Total |  | 25 | 27 | 52 |


|  |  | Clover Leaf Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $2(4.67)$ | 8 |
| Clover Leaf | Advertise | $6(1.85)$ | $25(22.85)$ | 44 |
| Superstore | Not Advertise | $19(23.15)$ | 25 | 52 |
| Total |  | 25 | 27 |  |

Contingency Tables for Canned Soup

Campbell vs Private Label within Store

|  |  | Campbell IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise |  | Not Advertise | Total |
| Private Label | Advertise | $12(10.50)$ | $2(3.50)$ | 14 |
| IGA | Not Advertise | $27(28.50)$ | $11(9.50)$ | 38 |
| Total |  | 39 | 13 | 52 |


|  |  | Campbell Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Private Label | Advertise | $0(0.00)$ | 0 |  |
| Safeway | Not Advertise | $31(31.00)$ | $21(21.00)$ | 52 |
| Total |  | 31 | 21 | 52 |


|  |  | Campbell Save-on |  |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $7(6.69)$ | $5(5.31)$ | 12 |  |
| Save-on | Not Advertise | $22(22.31)$ | $18(17.69)$ | 40 |  |
| Total |  | 29 | .23 | 52 |  |


|  |  | Campbell Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $2(0.67)$ | $5(6.33)$ | 7 |
| Superstore | Not Advertise | $3(4.33)$ | $42(40.67)$ | 45 |
| Total |  | 5 | 47 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $13(8.89)$ | $1(5.12)$ | 14 |
| IGA | Not Advertise | $20(24.12)$ | $18(13.89)$ | 38 |
| Total |  | 33 | 19 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Private Label | Advertise | $0(0.00)$ | 0 |  |
| Safeway | Not Advertise | $13(13.00)$ | $39(39.00)$ | 52 |
| Total |  | 13 | 39 | 52 |



|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $4(5.52)$ | 7 |
| Private Label | Advertise | $3(1.48)$ | $37(35.48)$ | 45 |
| Superstore | Not Advertise | $8(9.52)$ | 37 | 52 |
| Total |  | 11 | 41 |  |

Campbell vs Other National Brands within Store

|  |  | Camphell IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $6(3.25)$ |
| Other | Advertise | $7(9.75)$ | 13 |  |
| IGA | Not Advertise | $32(28.25)$ | $7(9.75)$ | 39 |
| Total |  | 39 | 13 | 52 |


|  |  | Campbell Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $6(4.85)$ | 12 |
| Other | Advertise | $6(7.15)$ | $15(16.15)$ | 40 |
| Safeway | Not Advertise | $25(28.85)$ | 21 | 52 |
| Total |  | 48 |  |  |


|  |  | Campbell Save-on |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rise |  |  |
| Other | Advertise | 5 | (6.69) | 7 | (5.31) | 12 |
| Save-on | Not Advertise | - 24 | (22.31) | 16 | (17.69) | 40 |
| Total |  | 29 |  | 23 |  | 52 |


|  |  | Campbell Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $1(1.81)$ |
| Other | Advertise | $1(0.19)$ | 2 |  |
| Superstore | Not Advertise | $4(4.81)$ | $46(45.19)$ | 50 |
| Total |  | 5 | 47 | 52 |

Campbell vs Campbell across Store

|  |  | Campbell Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Campbell | Advertise | $23(23.25)$ | $16(15.75)$ | 39 |
| IGA | Not Advertise | 8 | $8(7.75)$ | $5(5.25)$ |
| Total |  | 31 | 21 | 13 |


|  |  | Campbell Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
|  |  | $19(11.71)$ | 7 |  |
| Campbell | Advertise | $19.29)$ | $11(9.29)$ | 12 |
| Save-en | Not Advertise | $21(13.71)$ | 11 | 61 |
| Total |  | 40 | 21 |  |


|  |  | Campbell Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  |  |  |  |
| Campbell | Advertise | 4 | (2.98) |  | (2.02) | 5 |
| Superstore | Not Advertise | 27 | (28.11) | 20 | (18.98) | 47 |
| Total |  | 31 |  | 21 |  | 52 |

## Contingency Tables for Canned Dry Pasta

Catelli vs Private Label within Store

|  |  | Catelli IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $3(5.19)$ | $15(12.81)$ | 18 |
| IGA | Not Advertise | $12(9.81)$ | $22(24.19)$ | 34 |
| Total |  | 15 | 37 | 52 |


|  |  | Catelli Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Safeway | Not Advertise | $19(19.00)$ | $33(33.00)$ | 52 |
| Total |  | 19 | 33 | 52 |



Catelli vs Other National Brands within Store

|  | Catelli IGA |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
|  | $0(4.90)$ | $17(12.10)$ | 17 |  |
| Other | Advertise | $15(10.10)$ | $20(24.90)$ | 35 |
| IGA | Not Advertise | 15 | 37 | 52 |
| Total |  | 15 |  |  |


|  |  | Catelli Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | Not Advertise |  |  |
| Other | Advertise | 3 (5.48) |  |  | (9.52) | 15 |
| Safeway | Not Advertise | 16 | (13.52) | 21 | (23.48) | 37 |
| Total |  | 48 |  | 33 |  | 52 |


|  | Catelli Save-on |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | - |
| Other | Advertise | $2(3.46)$ | $18(16.54)$ | 20 |
| Save-on | Not Advertise | $7(5.54)$ | $25(26.46)$ | 32 |
| Total |  | 9 | 43 | 52 |


|  |  Catelli Superstore <br>  Not Advertise |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
| Other | Advertise | $0(0.00)$ | $4(4.00)$ | 4 |
| Superstore | Not Advertise | $0(0.00)$ | $48(48.00)$ | 48 |
| Total |  | 0 | 52 | 52 |

Catelli vs Catelli across Store

|  |  | Catelli Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rise |  |
| Catelli | Advertise | 6 (5.48) | 9 (9.52) | 15 |
| IGA | Not Advertise | 13 (13.52) | 24 (23.48) | 37 |
| Total |  | 19 | 33 | 52 |


|  |  | Catelli Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Catelli | Advertise | $4(3.29)$ | $5(51)$ | $(2)$ |
| Save-on | Not Advertise | $15(15.71)$ | $28(27.29)$ | $(12)$ |
| Total |  | 19 | 33 | $\mathbf{5 2}$ |


|  | Catelli Safeway |  |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $0(0.00)$ | 0 |
| Catelli | Advertise | $0(0.00)$ | $033(33.00)$ | 52 |
| Superstore | Not Advertise | $19(19.00)$ | 33 | 52 |
| Total |  | 19 | 33 |  |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $0(0.54)$ | $7(6.46)$ | 7 |
| Superstore | Not Advertise | $4(3.46)$ | $41(41.54)$ | 45 |
| Total |  | 4 | 48 | 52 |

## Contingency Tables for Frozen Pizza

Kraft vs Private Label within Store

|  |  | Kraft IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $0(0.00)$ | 0 |
| Private Label | Advertise | $0(0.00)$ | $0(32.00)$ | 52 |
| IGA | Not Advertise | $20(20.00)$ | $32(32$ | 52 |
| Total |  | 20 | 32 |  |


|  |  | Kraft Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $2(3.00)$ | $10(9.00)$ | 12 |
| Safeway | Not Advertise | $11(10.00)$ | $29(30.00)$ | 40 |
| Total |  | 13 | 39 | 52 |


|  |  | Kraft Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Private Label | Advertise | 4 (3.00) | 8 (9.00) | 12 |
| Save-on | Not Advertise | 9 (10.00) | 31 (30.00) | 40 |
| Total |  | 13 | 39 | 52 |


|  | Kraft Superstore |  |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $17(17.90)$ | 19 |
| Private Label | Advertise | $2(1.10)$ | 19 | $32(31.10)$ |
| Superstore | Not Advertise | $1(1.90)$ | 39 | 52 |
| Total |  | 3 | 49 |  |

## Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | 0 | $(0.00)$ | $0(0.00)$ |
| IGA | Not Advertise | $37(37.00)$ | $15(15.00)$ | 0 |
| Total |  | 37 | 15 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $4(4.39)$ |
| Private Label | Advertise | $8(7.62)$ | 12 |  |
| Safeway | Not Advertise | $25(25.39)$ | $15(14.62)$ | 40 |
| Total |  | 33 | 19 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $7.69)$ | $3(2.31)$ | 10 |
| Save-on | Not Advertise | $33(32.31)$ | $9(9.69)$ | 42 |
| Total |  | 40 | 12 | 52 |


|  | National Brands Superstore |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $3(2.92)$ | $16(16.08)$ | 19 |
| Superstore | Not Advertise | $5(5.08)$ | $28(27.92)$ | 33 |
| Total |  | 8 | 44 | 52 |

Kraft vs Other National Brands within Store

|  |  | Kraft IGA |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Other | Advertise | 13 (11.54) | 17 (18.46) | 30 |
| IGA | Not Advertise | 7 (8.46) | 15 (13.54) | 22 |
| Total |  | 20 | 32 | 52 |


|  |  | Kraf Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Other | Advertise | $3(6.50)$ | $23(19.50)$ | 26 |
| Safeway | Not Advertise | $10(6.50)$ | $16(19.50)$ | 26 |
| Total |  | 48 | 39 | 52 |


|  | Kraft Save-on |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $6(8.25)$ | $27(24.75)$ | 33 |
| Save-on | Not Advertise | $7(4.75)$ | $12(14.25)$ | 19 |
| Total |  | 13 | 39 | 52 |


|  | $\begin{array}{rl}\text { Kraft Superstore } & \text { Total } \\ & \\ & \text { Advertise }\end{array}$ |  |  | Not Advertise |
| :--- | :--- | ---: | ---: | ---: |$)$

Kraft vs Kraft across Store


|  | Kraf Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Kraft | Advertise | $5(3.25)$ | $8(9.75)$ | $(5)$ |
| Save-on | Not Advertise | $8(9.75)$ | $31(29.25)$ | $(21)$ |
| Total |  | 13 | 39 | 52 |



## Contingency Tables for Frozen Punch Beverage

McCain vs Private Label within Store

|  |  | McCain IGA |  | Total |
| :--- | :--- | :---: | :---: | :---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $2(1.89)$ | $12(12.12)$ | 14 |
| IGA | Not Advertise | $5(5.12)$ | $33(32.89)$ | 38 |
| Total |  | 7 | 45 | 52 |


|  |  | McCain Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rise |  |
| Private Label | Advertise | 0 (0.00) | 22 (22.00) | 22 |
| Safeway | Not Advertise | 0 (0.00) | $30 \quad(30.00)$ | 30 |
| Total |  | 0 | 52 | 52 |


|  |  | McCain Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $7(12.25)$ | 7 |
| Private Label | Advertise | $0(0.81)$ | $39(39.81)$ | 45 |
| Save-on | Not Advertise | $6(5.19)$ | 46 | 52 |
| Total |  | 6 | 39 |  |

McCain vs Other National Brands within Store

|  | McCain IGA |  |  | Total |  |
| :--- | :--- | ---: | ---: | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |  |
|  | Advertise | $2(4.44)$ | $31(28.56)$ | 33 |  |
| Other | IGA | Not Advertise | $5(2.56)$ | $14(16.44)$ | 19 |
| Total | 7 | 7 | 45 | 52 |  |


|  | McCain Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $0(0.00)$ | $24(24.00)$ | 24 |
| Safeway | Not Advertise | $0(0.00)$ | $28(28.00)$ | 28 |
| Total |  | 48 | 52 | 52 |


|  |  | McCain Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Other | Advertise | 1 (2.89) | 24 (22.12) | 25 |
| Save-on | Not Advertise | 5 (3.12) | 22 (23.89) | 27 |
| Total |  | 6 | 46 | 52 |


|  |  | McCain Superstore |  |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $4(5.65)$ | 6 |
| Other | Advertise | $2(0.35)$ | $45(43.35)$ | 46 |  |
| Superstore | Not Advertise | $1(2.65)$ | 49 | 52 |  |
| Total |  | 3 |  | 49 | 4 |

McCain vs McCain across Store

|  |  | McCain Safeway |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  | Advertise | Not Advertise | $7(7.00)$ | 7 |
| McCain | Advertise | $0(0.00)$ | $45(45.00)$ | 45 |
| IGA | Not Advertise | $0(0.00)$ | $45(2)$ | 52 |
| Total |  | 0 | 52 |  |


|  | McCain Safeway  <br>   <br>  Advertise$\quad$ Not Advertise |  |  | Total |
| :--- | :--- | :---: | ---: | ---: |
| McCain | Advertise | $0(0.00)$ | $6(6.00)$ | $(6)$ |
| Save-on | Not Advertise | $0(0.00)$ | $46(46.00)$ | $(46)$ |
| Total |  | 0 | 52 | 52 |


|  | McCain Safeway |  |  | Total |
| :--- | :--- | :---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $3(3.00)$ |
| McCain | Advertise | $0(0.00)$ | 3 |  |
| Superstore | Not Advertise | $0(0.00)$ | $49(49.00)$ | 49 |
| Total |  | 0 | 52 | 52 |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $3(1.75)$ | $10(11.25)$ | 13 |
| Superstore | Not Advertise | $4(5.25)$ | $35(33.75)$ | 39 |
| Total |  | 7 | 45 | 52 |

## Contingency Tables for Frozen Vegetable

Green Giant vs Private Label within Store

|  | Green Giant IGA |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $14(12.00)$ |
| Private Label | Advertise | $2(4.00)$ | 16 |  |
| IGA | Not Advertise | $11(9.00)$ | $25(27.00)$ | 36 |
| Total |  | 13 | 39 | 52 |


|  |  | Green Giant Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $1(5.50)$ | $21(16.50)$ | 22 |
| Safeway | Not Advertise | $12(7.50)$ | $18(22.50)$ | 30 |
| Total |  | 13 | 39 | 52 |


|  |  | Green Giant Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $7(7.40)$ |  |
| Private Label | Advertise | $4(3.60)$ | 11 |  |
| Save-on | Not Advertise | $13(13.40)$ | $28(27.60)$ | 41 |
| Total |  | 17 | 35 | 52 |


|  |  | Green Giant Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $0(0.15)$ | $2(1.85)$ | 2 |
| Superstore | Not Advertise | $4(3.85)$ | $46(46.15)$ | 50 |
| Total |  | 4 | 48 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $2(4.00)$ | $14(12.00)$ | 16 |
| lGA | Not Advertise | $11(9.00)$ | $25(27.00)$ | 36 |
| Total |  | 13 | 39 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $1(2.96)$ | $10(8.04)$ | 11 |
| Safeway | Not Advertise | 13 (11.04) | $28(29.96)$ | 41 |
| Total |  | 14 | 38 | 52 |


|  | National Brands Save-on |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $7(7.19)$ | 11 |
| Private Label | Advertise | $4(3.81)$ | $27(26.81)$ | 41 |
| Save-on | Not Advertise | $14(14.19)$ | 24 | 52 |
| Total |  | 18 | 34 |  |


|  |  | National Brands Superstore |  | Total |  |
| :--- | :--- | ---: | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $1(1.77)$ | 2 |
| Private Label | Advertise | $1(0.32)$ | 1 | 2 |  |
| Superstore | Not Advertise | $5(5.77)$ | $45(44.23)$ | 50 |  |
| Total |  | 6 | 46 | 52 |  |

Green Giant vs Other National Brands within Store


|  |  | Green Giant Safeway |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  | Advertise | Not Advertise | $1(0.75)$ | 1 |
| Other | Advertise | $0(0.25)$ | $38(38.25)$ | 51 |
| Safeway | Not Advertise | $13 \quad(12.75)$ | 39 | 52 |
| Total |  | 48 |  |  |


|  |  | Green Giant Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $1(0.67)$ |
| Other | Advertise | $0(0.33)$ | 1 |  |
| Save-on | Not Advertise | $17(16.67)$ | $34(34.33)$ | 51 |
| Total |  | 17 | 35 | 52 |


|  | Green Giant Superstore |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $2(1.85)$ | 2 |
| Other | Advertise | $0(0.15)$ | $46(46.15)$ | 50 |
| Superstore | Not Advertise | $4(3.85)$ | 48 | 52 |
| Total |  | 4 | 48 |  |

Green Giant vs Green Giant across Store

|  |  | Green Giant Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Notal Advertise |  |
| Green Giant | Advertise | $6.25)$ | $7(9.75)$ | 13 |
| IGA | Not Advertise | $7(9.55)$ | $32(29.25)$ | 39 |
| Total |  | 13 | 39 | 52 |


|  |  | Green Giant Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Green Giant | Advertise | $7(4.25)$ | $10(12.75)$ | 17 |
| Save-on | Not Advertise | $6(8.75)$ | $29(26.25)$ | 35 |
| Total |  | 13 | 39 | 52 |


|  |  | Green Giant Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $4(3.00)$ | 4 |
| Green Giant | Advertise | $0(1.00)$ | $35(36.00)$ | 48 |
| Superstore | Not Advertise | $13(12.00)$ | 39 | 52 |
| Total |  | 13 |  | 39 |

## Contingency Tables for Fruit Jam

Kraft vs Private Label within Store

|  |  | Kraft IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $2(2.31)$ | $10(9.69)$ | 12 |
| IGA | Not Advertise | $8(7.69)$ | $32(32.31)$ | 40 |
| Total |  | 10 | 42 | 52 |


|  |  | Kraft Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rise |  |
| Private Label | Advertise | 0 (0.00) | 0 (0.00) | 0 |
| Safeway | Not Advertise | 6 (6.00) | 46 (46.00) | 52 |
| Total |  | 6 | 46 | 52 |


|  |  | Kraft Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $1(1.15)$ | $19(18.85)$ | 20 |
| Save-on | Not Advertise | $2(1.85)$ | $30(30.15)$ | 32 |
| Total |  | 3 | 49 | 52 |


|  |  | Kraft Superstore |  |  |
| :--- | :--- | ---: | ---: | ---: |
| Not | Total |  |  |  |
| Private Label | Advertise | $0(0.50)$ | $13(12.50)$ | 13. |
| Superstore | Not Advertise | $2(1.50)$ | $37(37.50)$ | 39 |
| Total |  | 2 | 50 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | 3 | 5.77 | $9(6.23)$ |
| IGA | Not Advertise | $22(19.23)$ | 18 | 12 |
| Total |  | 25 | 27 | $40.77)$ |


|  |  | National Brands Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |  |
| Private Label | Advertise | 012 | $\begin{aligned} & \hline 0.00 \\ & (12.00) \end{aligned}$ |  | (0.00) | 0 |
| Safeway | Not Advertise |  |  | 40 | (40.00) | 52 |
| Total |  | 12 |  | 40 |  | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $9(4.62)$ | $11(15.39)$ | 20 |
| Save-on | Not Advertise | $3(7.39)$ | $29(24.62)$ | 32 |
| Total |  | 12 | 40 | 52 |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $1 \quad(3.00)$ | $12(10.00)$ | 13 |
| Superstore | Not Advertise | $11 \quad(9.00)$ | $28 \quad(30.00)$ | 39 |
| Total |  | 12 | 40 | 52 |

Kraft vs Other National Brands within Store

|  | Kraft IGA |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $3(3.46)$ | $15(14.54)$ | 18 |
| IGA | Not Advertise | $7(6.54)$ | $27(27.46)$ | 34 |
| Total |  | 10 | 42 | 52 |


|  |  | Kraf Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | atise |  |
| Other | Advertise | 1 (0.81) | 6 (6.19) | 7 |
| Safeway | Not Advertise | 5 (5.19) | 40 (39.81) | 45 |
| Total |  | 48 | 46 | 52 |


|  |  | Kraft Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Other | Advertise | 0 (1.67) | 29 (27.33) | 29 |
| Save-on | Not Advertise | 3 (1.33) | 20 (21.67) | 23 |
| Total |  | 3 | 49 | 52 |


|  | Kraft Superstore |  |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $0(0.39)$ | $10(9.62)$ | 10 |
| Superstore | Not Advertise | $2(1.62)$ | $40(40.39)$ | 42 |
| Total |  | 2 | 50 | 52 |

## Kraft vs Kraft across Store

|  |  | Kraft Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rise |  |
| Kraft | Advertise | 0 (1.15) | 10 (8.85) | 10 |
| IGA | Not Advertise | 6 (4.85) | 36 (37.15) | 42 |
| Total |  | 6 | 46 | 52 |



|  |  | Kraft Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Kraft | Advertise | $0(0.23)$ | $2(1.77)$ | 2 |
| Superstore | Not Advertise | $6(5.77)$ | $44(44.23)$ | 50 |
| Total |  | 6 | 46 | 52 |

## Contingency Tables for Ground Coffee

Maxwell vs Private Label within Store

|  |  | Maxweli IGA |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $7(6.19)$ | $7(7.81)$ | 14 |
| IGA | Not Advertise | $16(16.81)$ | $22(21.19)$ | 38 |
| Total | 23 |  | 29 | 52 |


|  |  | Maxwell Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Safeway | Not Advertise | $4(4.00)$ | $48(48.00)$ | 52 |
| Total |  | 4 | 48 | 52 |


|  |  | Maxwell Save-on |  |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $9(7.12)$ | 10 |
| Private Label | Advertise | $1(2.89)$ | $28(29.89)$ | 42 |  |
| Save-on | Not Advertise | $14(12.12)$ | 28 | 52 |  |
| Total |  | 15 | 37 |  |  |


|  |  | Maxwell Superstore |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $2(3.00)$ | $24(23.00)$ | 26 |
| Superstore | Not Advertise | $4(3.00)$ | $22(23.00)$ | 26 |
| Total |  | 6 | 46 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |  |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | 9 (11.58) | 5 | $(2.42)$ | 14 |
| IGA | Not Advertise | 34 | $(31.42)$ | $4(6.58)$ |  |
| Total |  | 43 | 9 | 38 |  |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise. | Not Advertise |  |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Safeway | Not Advertise | $25(25.00)$ | $27(27.00)$ | 52 |
| Total |  | 25 | 27 | 52 |


|  |  | National Brands Save-on |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise . Not Advertise |  |  |  |
| Private Label | Advertise | 3 | (6.92) | 7 (3.08) | 10 |
| Save-on | Not Advertise | 33 | (29.08) | (9) (12.92) | 24 |
| Total |  | 36 |  | (2) | 34 |


|  |  | National Brands Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | 2 (3.50) | 24 (22.50) | 26 |
| Superstore | Not Advertise | 5 (3.50) | 21 (22.50) | 26 |
| Total |  | 7 | 45 | 52 |

Maxwell vs Other National Brands within Store

|  | Maxwell IGA |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise |  | Not Advertise |  |
| Other | Advertise | $6(11.50)$ | $20(14.50)$ | 26 |
| IGA | Not Advertise | $17(11.50)$ | $9(14.50)$ | 26 |
| Total |  | 23 | 29 | 52 |


|  |  | Maxwell Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Other | Advertise | $1(1.69)$ | $21(20.31)$ | 22 |
| Safeway | Not Advertise | $3(2.31)$ | $27(27.69)$ | 30 |
| Total |  | 48 | 48 | 52 |


|  |  | Maxwell Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | 7 (8.08) | 21 (19.92) | 28 |
| Save-on | Not Advertise | 8 (6.92) | 16 (17.08) | 24 |
| Total |  | 15 | 37 | 52 |


|  | Maxwell Superstore |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $1(1.77)$ | 2 |
| Other | Advertise | $1(0.23)$ | $45(44.23)$ | 50 |
| Superstore | Not Advertise | $5(5.77)$ | 46 | 52 |
| Total |  | 6 | 46 |  |

## Maxwell vs Maxwell across Store

|  |  | Maxwell Safeway |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Maxwell | Advertise | $3(1.77)$ | $20(21.23)$ | 23 |
| IGA | Not Advertise | $1(2.23)$ | $28(26: 77)$ | 29 |
| Total |  | 4 | 48 | 52 |


|  |  | Maxwell Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Maxwell | Advertise | (1.15) | 14 (13.85) | (13) |
| Save-on | Not Advertise | 3 (2.85) | 34 (34.15) | (31) |
| Total |  | 4 | 48 | 52 |


|  |  | Maxwell Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Maxwell | Advertise | $1(0.54)$ | 6 |  |
| Superstore | Not Advertise | $3(3.54)$ | $43(42.46)$ | 46 |
| Total |  | 4 | 48 | 52 |

## Contingency Tables for Instant Coffee

Maxwell vs Private Label within Store


|  |  | Maxwell Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
| Private Label | Advertise | Advertise | Not Advertise | $0(0.00)$ |
| Safeway | Not Advertise | $0(0.00)$ | 0 | 0 |
| Total | $6(6.00)$ | $46(46.00)$ | 52 |  |


|  |  | Maxwell Save-on |  |
| :--- | :---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ |
| Save-on | Not Advertise | $2(6.00)$ | $50(50.00)$ |
| Total |  | 2 | 50 |



Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Private Label | Advertise | $0(0.00)$ | 0 |  |
| IGA | Not Advertise | $27(27.00)$ | $25(25.00)$ | 52 |
| Total |  | 27 | 25 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $0 \quad 0.00$ | $0(0.00)$ | 0 |
| Safeway | Not Advertise | $8(8.00)$ | $44(44.00)$ | 52 |
| Total |  | 8 | 44 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $4(2.39)$ | 4 |
| Private Label | Advertise | $0 \quad(1.62)$ | $27(28.62)$ | 48 |
| Save-on | Not Advertise | $21 \quad(19.39)$ | 21 | 31 |
| Total |  | 21 | 21 | 52 |


|  |  | National Brands Superstore |  |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |  |
| Private Label | Advertise | $0(1.04)$ | $67.96)$ | 6 |  |
| Superstore | Not Advertise | $9(7.96)$ | $37(38.04)$ | 46 |  |
| Total |  | 9 | 43 | 52 |  |

Maxwell vs Other National Brands within Store


|  | Maxwell Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $2(4.42)$ | 5 |
| Other | Advertise | $3(0.58)$ | $4(5.42)$ | $44(41.58)$ |
| Safeway | Not Advertise | $3(2)$ | 47 |  |
| Total |  | 48 | 46 | 52 |


|  |  | Maxwell Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | 0 (1.73) | 15 (13.27) | 15 |
| Save-on | Not Advertise | 6 (4.27) | 31 (32.73) | 37 |
| Total |  | 6 | 46 | 52 |


|  |  | Maxwell Superstore |  |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  | Advertise | Not Advertise | $4(3.62)$ | 4 |  |
| Other | Advertise | $0(0.39)$ | $43(43.39)$ | 48 |  |
| Superstore | Not Advertise | $5(4.62)$ | 43 |  |  |
| Total |  | 5 | 47 | 52 |  |

Maxwell vs Maxwell across Store

|  |  | Maxwell Safeway <br>  <br>  |  | Advertise |
| :--- | :--- | ---: | ---: | ---: |
| Maxwell | Advertise | $2(0.69)$ | Not Advertise | $5(5.31)$ |
| lGA | Not Advertise | $4(4.73)$ | $41(40.69)$ | 7 |
| Total |  | 6 | 46 | 45 |


|  | Maxwell Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Maxwell | Advertise | 1 | $(0.69)$ | $5(5.31)$ |
| Save-on | Not Advertise | $5(5.31)$ | $41 \quad 40.69$ | $(4)$ |
| Total |  | 6 | 46 | 46 |


|  |  | Maxwell Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $5(4.42)$ | 5 |
| Maxwell | Advertise | 0 | $(0.58)$ | $41(41.58)$ | 47 |
| Superstore | Not Advertise | 6 | $6(5.42)$ | 46 | 52 |
| Total |  | 6 |  |  |  |

Contingency Tables for Juice from Concentrate
Sun Rype vs Private Label within Store

|  |  | Sun Rype IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $2(2.08)$ | $1(0.92)$ | 3 |
| IGA | Not Advertise | $34(33.92)$ | $15(15.08)$ | 49 |
| Total |  | 36 | 16 | 52 |


|  |  | Sun Rype Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $4(5.89)$ | $14(12.12)$ | 18 |
| Safeway | Not Advertise | $13(1.12)$ | $21(22.89)$ | 34 |
| Total |  | 17 | 35 | 52 |


|  |  | Sun Rype Save-on |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |
| Private Label | Advertise | 0 | (0.00) | 0 (0.00) | 0 |
| Save-on | Not Advertise | 30 | (30.00) | 22 (22.00) | 52 |
| Total |  | 30 |  | 22 | 52 |

Sun Rype vs Other National Brands within Store

|  |  | Sun Rype IGA |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  |  |  |  |
| Other | Advertise | 13 (13.15) | 6 (5.85) | 19 |
| IGA | Not Advertise | 23 (22.85) | 10 (10.15) | 33 |
| Total |  | 36 | 16 | 52 |
|  |  | Sun Rype Safeway |  | Total |
|  |  | Advertise | rtise |  |
| Other | Advertise | 0 (2.94) | 9 (6.06) | 9 |
| Safeway | Not Advertise | 17 (14.06) | 26 (28.94) | 43 |
| Total |  | 48 | 35 | 52 |


|  |  | Sun Rype Save-on |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |  |  |
| Other | Advertise | 5 | (4.62) |  | (3.39) | 8 |
| Save-on | Not Advertise | 25 | (25.39) | 19 | (18.62) | 44 |
| Total |  | 30 |  | 22 |  | 52 |


|  |  | Sun Rype Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | 3 (0.46) | 3 (5.54) | 6 |
| Superstore | Not Advertise | 1 (3.54) | 45 (42.46) | 46 |
| Total |  | 4 | 48 | 52 |

Sun Rype vs Sun Rype across Store

|  | Sun Rype Safeway |  |  | Total |  |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |  |
| Sun Rype | Advertise | 11 | 11.77 | $25(24.23)$ | 36 |
| IGA | Not Advertise | 6 | $(5.23)$ | $10(10.77)$ | 16 |
| Total |  | 17 | 35 | 52 |  |


|  |  | Sun Rype Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $18(20.19)$ | $(8)$ |
| Sun Rype | Advertise | $12(9.81)$ | $17(14.81)$ | $(10)$ |
| Save-on | Not Advertise | $5(7.19)$ | 17 | 52 |
| Total |  | 17 | 35 |  |


|  |  | Sun Rype Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |  |
| Sun Rype | Advertise | 2 | (1.31) | 2 | (2.69) | 4 |
| Superstore | Not Advertise | 15 | (15.69) | 33 | (32.31) | 48 |
| Total |  | 17 |  | 35 |  | 52 |


|  |  | National Brands Superstore |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |  |
| Private Label | Advertise | 3 (1.08) | 5 | (6.92) | 8 |
| Superstore | Not Advertise | 4 (5.92) | 40 | (38.08) | 44 |
| Total |  | 7 | 45 |  | 52 |

Contingency Tables for Juice Not from Concentrate

Tropicana vs Private Label within Store

|  |  | Tropicana IGA |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rise |  |  |
| Private Label | Advertise | 4 | (3.10) |  | (3.90) | 7 |
| IGA | Not Advertise | 19 | (19.90) | 26 | (25.10) | 45 |
| Total |  | 23 |  | 29 |  | 52 |


| . |  | Tropicana Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |  |
| Private Label | Advertise | 2 | (1.77) |  | (2.23) | 4 |
| Safeway | Not Advertise | 21 | (21.23) | 27 | (26.77) | 48 |
| Total |  | 23 |  | 29 |  | 52 |


|  |  | Tropicana Save-on |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | tise |  |
| Private Label | Advertise | 3 | (6.46) | 13 (9.54) | 16 |
| Save-on | Not Advertise | 18 | (14.54) | 18 (21.46) | 36 |
| Total |  | 21 |  | 31 | 52 |


|  |  | Tropicana Superstore |  | Total |
| :--- | :--- | :---: | :---: | ---: |
| Private Label | Advertise | Advertise | Not Advertise |  |
| Superstore | Not Advertise | $0(1.00)$ | $13(12.00)$ | 13 |
| Total | $4(3.00)$ | $35(36.00)$ | 39 |  |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $1(1.08)$ |
| Private Label | Advertise | $6(5.92)$ | 7 |  |
| IGA | Not Advertise | $38(38.08)$ | $7(6.92)$ | 45 |
| Total |  | 44 | 8 | 52 |


|  |  | National Brands Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $2.46)$ | $2 \cdot(1.54)$ | 4 |
| Safeway | Not Advertise | 30 | 29.54 | $18(18.46)$ |
| Total |  | 32 | 20 | 48 |


|  |  | National Brands Save-on |  | Total |  |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | - |  |
| Private Label | Advertise | $3(8.62)$ | $13(7.39)$ | 16 |  |
| Save-on | Not Advertise | $25(19.39)$ | $11(16.62)$ | 36 |  |
| Total |  | 28 | 24 | 52 |  |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $1(1.75)$ | $12(11.25)$ | 13 |
| Superstore | Not Advertise | $6(5.25)$ | $33(33.75)$ | 39 |
| Total |  | 7 | 45 | 52 |

Tropicana vs Other National Brands within Store

|  |  | Tropicana IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Other | Advertise | $6(11.94)$ | $21(15.06)$ | 27 |
| IGA | Not Advertise | $17(11.06)$ | $8(13.94)$ | 25 |
| Total |  | 23 | 29 | 52 |


|  |  | Tropicana Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | ertis |  |  |
| Other | Advertise | 1 | (4.42) |  | (5.58) | 10 |
| Safeway | Not Advertise | 22 | (18.58) | 20 | (23.42) | 42 |
| Total |  | 48 |  | 29 |  | 52 |


|  |  | Tropicana Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $7(5.37)$ | 9 |
| Other | Advertise | $2(3.64)$ | $24(25.64)$ | 43 |
| Save-on | Not Advertise | $19(17.37)$ | 21 | 52 |
| Total |  | 21 | 31 |  |


|  | Tropicana Superstore |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $3(3.69)$ | 4 |
| Other | Advertise | $1(0.31)$ | 45 | 48 |
| Superstore | Not Advertise | $3(3.69)$ | $45(44.31)$ | 48 |
| Total |  | 4 | 48 | 52 |

Tropicana vs Tropicana across Store

|  |  | Tropicana Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $13(12.83)$ | 23 |
| Tropicana | Advertise | $10(10.17)$ | $16(16.17)$ | 29 |
| IGA | Not Advertise | $13(12.83)$ | 29 | 52 |
| Total |  | 23 |  | 29 |


|  |  | Tropicana Safeway |  | Total |  |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $9(11.71)$ | -0 |
| Tropicana | Advertise | $12(9.29)$ | $20(16.17)$ | 31 |  |
| Save-on | Not Advertise | $11(13.71)$ | 29 | 52 |  |
| Total |  | 23 | 29 | 29 |  |


|  | Tropicana Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $3(2.15)$ |
| Tropicana | Advertise | $1(1.85)$ | 4 |  |
| Superstore | Not Advertise | $23(22.15)$ | $25(25.85)$ | 48 |
| Total |  | 24 | 28 | 52 |

Contingency Tables for Ketchup
Heinz vs Private Label within Store

|  |  | Heinz IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $0(3.69)$ | $16(12.31)$ | 16 |
| IGA | Not Advertise | $12(8.31)$ | $24(27.69)$ | 36 |
| Total |  | 12 | 40 | 52 |


|  |  | Heinz Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Safeway | Not Advertise | $10(10.00)$ | $42(42.00)$ | $\mathbf{5 2}$ |
| Total |  | 10 | 42 | 52 |


|  |  | Heinz Save-on |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $1(0.00)$ | $10(8.67)$ | 11 |
| Save-on | Not Advertise | $10(10.00)$ | $31 \quad(32.33)$ | 41 |
| Total |  | 11 | 41 | 52 |


|  |  | Heinz Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Private Label | Advertise | 1 (1.56) | 8 (7.44) | 9 |
| Superstore | Not Advertise | 8 (7.44) | $35 \quad(35.56)$ | 43 |
| Total |  | 9 | 43 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
|  |  | $0(3.69)$ | $16(7.44)$ | 16 |
| Private Label | Advertise | $12(8.31)$ | $24(27.69)$ | 36 |
| IGA | Not Advertise | 12 | 40 | 52 |
| Total |  | 12 | 40 |  |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Private Label | Advertise | $0(0.00)$ | 0 |  |
| Safeway | Not Advertise | $10(10.00)$ | $42(42.00)$ | 52 |
| Total |  | 10 | 42 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $10(8.25)$ | 11 |
| Private Label | Advertise | $1(2.75)$ | $29(30.75)$ | 41 |
| Save-on | Not Advertise | $12(10.25)$ | 29 | 59 |
| Total |  | 13 | 39 | 52 |


|  | National Brands Superstore |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $8(7.44)$ | 9 |
| Private Label | Advertise | $1(1.56)$ | $35(35.56)$ | 43 |
| Superstore | Not Advertise | $8(7.44)$ | 35 | 52 |
| Total |  | 9 | 43 |  |

Heinz vs Other National Brands within Store

|  |  | Heinz IGA |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Other | Advertise | $0(0.00)$ | 0 |  |
| IGA | Not Advertise | $12(12.00)$ | $40(40.00)$ | 52 |
| Total |  | 12 | 40 | 52 |


|  |  | Heinz Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | tis |  |  |
| Other | Advertise | 0 | (0.00) |  | (0.00) | 0 |
| Safeway | Not Advertise | 10 | (10.00) | 42 | (42.00) | 52 |
| Total |  | 48 |  | 42 |  | 52 |


|  |  | Heinz Save-on |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | Not Advertise |  |  |
| Other | Advertise | . 0 | (0.42) |  | (1.58) | 2 |
| Save-on | Not Advertise | 11 | (10.58) | 39 | (39.42) | 50 |
| Total |  | 11 |  | 41 |  | 52 |


|  |  | Heinz Superstore |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | crise |  |  |
| Other | Advertise | 0 (0.00) | 0 | (0.00) | 0 |
| Superstore | Not Advertise | 9 (9.00) | 43 | (43.00) | 52 |
| Total |  | 9 | 43 |  | 52 |

## Heinz vs Heinz across Store

|  |  | Heinz Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Heinz | Advertise | 3 (2.31) | 9 (9.69) | 12 |
| IGA | Not Advertise | 7 (7.69) | 33 (32.31) | 40 |
| Total |  | 10 | 42 | 52 |


|  |  | Heinz Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  |  |
| Heinz | Advertise | 4 (2.12) | 7. (8.89) | (5) |
| Save-on | Not Advertise | 6 (7.89) | 35 (33.12) | 41 |
| Total |  | 10 | 42 | 52 |


|  |  | Heinz Safeway <br>  <br>  <br>  |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Heinz | Advertise | $2(1.73)$ | $7(7.27)$ | 9 |
| Superstore | Not Advertise | $8(8.27)$ | $35(34.73)$ | 43 |
| Total |  | 10 | 42 | 52 |

## Contingency Tables for Margarine

Canola Harvest vs Private Label within Store

|  |  | Canola Harvest IGA |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $0(0.42)$ | $22(21.58)$ | 22 |
| IGA | Not Advertise | $1(0.58)$ | $29(29.42)$ | 30 |
| Total |  | 1 | 51 | 52 |


|  |  | Canola Harvest Safeway |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $2(1.62)$ |
| Private Label | Advertise | $0(0.39)$ | 2 |  |
| Safeway | Not Advertise | $10(9.62)$ | $40(40.39)$ | 50 |
| Total |  | 10 | 42 | 52 |


|  |  | Canola Harvest Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $16(15.39)$ |
| Private Label | Advertise | $0(0.62)$ | 16 |  |
| Save-on | Not Advertise | $2(1.39)$ | $34(34.62)$ | 36 |
| Total |  | 2 | 50 | 52 |

Canola Harvest vs Other National Brands within Store

|  |  | Canola Harvest IGA |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |
| Other | Advertise | (0.39) | 20 (19.62) | 20 |
| IGA | Not Advertise | $11 .(0.62)$ | 31 (31.39) | 32 |
| Total |  | 1 | 51 | 52 |


|  | Canola Harvest Safeway |  |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Other | Advertise | $2(7.69)$ | $38(32.31)$ | 40 |
| Safeway | Not Advertise | $8(2.31)$ | $42(9.69)$ | 12 |
| Total |  | 48 | 42 | 52 |


|  | Canola Harvest Save-on |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
|  | $1(1.23)$ | $31(30.77)$ | 32 |  |
| Other | Advertise | $1(0.77)$ | $19(19.23)$ | 20 |
| Save-on | Not Advertise | 1 | 50 | 52 |
| Total |  | 2 | 50 |  |


|  |  | Canola Harvest Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
|  | $0(0.31)$ | $8(7.69)$ | 8 |  |
| Other | Advertise | $2(1.69)$ | $42(42.31)$ | 44 |
| Superstore | Not Advertise | 2 | 50 | 52 |
| Total |  | 2 | 50 |  |

Canola Harvest vs Canola Harvest across Store

|  | Canola Harvest Safeway  <br> Advertise Not Advertise |  | Total |
| :--- | :---: | :---: | ---: |
| Canola Haryest Advertise | $0(0.19)$ | $1(0.81)$ | 1 |
| IGA | Not Advertise | $10(9.81)$ | $4141: 19$ |
| Total | 10 | 42 | 51 |


|  | Canola Harvest Safeway |  | Total |
| :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $(1.62)$ |
| Canola Harvest Advertise | $0(0.39)$ | $20(2)$ |  |
| Save-on | Not Advertise | $10(9.62)$ | $40(40.39)$ |
| Total | 10 | 42 | 50 |


|  | Canola Harvest Safeway |  | Total |
| :---: | :---: | :---: | :---: |
|  | Advertise | ertise |  |
| Canola Harvest Advertise | (0.39) | 1 (1.62) | 2 |
| Superstore Not Advertise | 9 (9.62) | 41 (40.39) | 50 |
| Total | 10 | 42 | 52 |

## Contingency Tables for Mayonnaise

Kraft vs Private Label within Store

|  |  | Kraft IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $10(8.46)$ | $1.54)$ | 11 |
| IGA | Not Advertise | $30(31.54)$ | $11(9.46)$ | 41 |
| Total |  | 40 | 12 | 52 |



Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Private Label | Advertise | $10(9.10)$ | $1.90)$ | 11 |
| IGA | Not Advertise | $33(33.90)$ | $\mathbf{8 ( 7 . 1 0 )}$ | 41 |
| Total |  | 43 | 9 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Safeway | Not Advertise | $37(37.00)$ | $15(15.00)$ | 52 |
| Total |  | 37 | 15 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $0(0.00)$ |
| Private Label | Advertise | $0(0.00)$ | 0 | 0 |
| Save-on | Not Advertise | $28(28.00)$ | $24(24.00)$ | 52 |
| Total |  | 28 | 24 | 52 |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $1(0.67)$ | 1 |
| Private Label | Advertise | $0(0.33)$ | $34(34.33)$ | 51 |
| Superstore | Not Advertise | $17(16.67)$ | 35 | 52 |
| Total |  | 17 | 35 |  |

Kraft vs Other National Brands within Store

|  | Kraft IGA |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Other | Advertise | $3(4.62)$ | $3(1.39)$ | 6 |
| IGA | Not Advertise | $37(35.39)$ | $9(10.62)$ | 46 |
| Total |  | 40 | 12 | 52 |


|  |  | Kraft Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | ris |  |  |
| Other | Advertise | 1 | (6.00) |  | (6.00) | 12 |
| Safeway | Not Advertise | 25 | (20.00) | 15 | (20.00) | 40 |
| Total |  | 48 |  | 26 |  | 52 |


|  |  | Kraft Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | (3.92) | 16 (13.08) | 17 |
| Save-on | Not Advertise | 11 (8.08) | 24 (26.92) | 35 |
| Total |  | 12 | 40 | 52 |


|  | Kraft Superstore |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $6(5.52)$ | 7 |
| Other | Advertise | $1.48)$ | $6{ }^{(1.48)}$ |  |
| Superstore | Not Advertise | $10(9.52)$ | $35(35.48)$ | 45 |
| Total |  | 11 | 41 | 52 |

## Kraft vs Kraft across Store

|  |  Kraft Safeway  <br>  Advertise Not Advertise |  |  | Total |
| :--- | :--- | :---: | :---: | ---: |
| Kraft | Advertise | $20(20.00)$ | $20(20.00)$ | 40 |
| IGA | Not Advertise | $6(6.00)$ | $6(6.00)$ | 12 |
| Total |  | 26 | 26 | 52 |


|  |  | Kraft Safeway |  |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |  |
| Kraft | Advertise | $6(6.00)$ | $6(6.00)$ | 0 |  |
| Save-on | Not Advertise | $20(20.00)$ | $20(20.00)$ | 40 |  |
| Total |  | 26 | 26 | 52 |  |


|  |  | Kraft Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $6(5.50)$ | 11 |
| Kraft | Advertise | $5(5.50)$ | $20(20.50)$ | 41 |
| Superstore | Not Advertise | $21(20.50)$ | 26 | 52 |
| Total |  | 26 | 26 |  |

## Contingency Tables for Pasta Sauce

Prego vs Private Label within Store

|  |  | Prego IGA <br>  <br>  |  |  |
| :--- | :--- | ---: | ---: | ---: |
| Advertise | Total |  |  |  |
| Private Label | Advertise | $3(2.19)$ | $16(16.81)$ | 19 |
| IGA | Not Advertise | $3(3.81)$ | $30(29.19)$ | 33 |
| Total | 6 | 46 | 52 |  |



|  |  | Prego Save-on |  |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |  |
| Private Label | Advertise | 1 | $(0.85)$ | $21(21.15)$ | 22 |
| Save-on | Not Advertise |  | 1 | $(1.15)$ | $29(28.85)$ |
| Total |  | 2 | 50 | 30 |  |



Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $9(12.79)$ | $10(6.21)$ | 19 |
| IGA | Not Advertise | $26(22.21)$ | $7(10.79)$ | 33 |
| Total |  | 35 | 17 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $0(0.35)$ | 1 |
| Private Label | Advertise | $1(0.65)$ | 0 | $(0)(17.65)$ |
| Safeway | Not Advertise | $33(33.35)$ | 18 | 51 |
| Total |  | 34 | 18 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $8(7.19)$ |
| Private Label | Advertise | $14(14.81)$ | 22 |  |
| Save-on | Not Advertise | $21(20.19)$ | $9(9.81)$ | 30 |
| Total |  | 35 | 17 | 52 |


|  |  | National Brands Superstore |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Private Label | Advertise | $1(1.75)$ | $12(11.25)$ | 13 |
| Superstore | Not Advertise | $6(5.25)$ | $33(33.75)$ | 39 |
| Total |  | 7 | 45 | 52 |

Prego vs Other National Brands within Store

|  |  | Prego IGA <br>  <br>  |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | Total |  |
| Other | Advertise | $3(3.69)$ | $29(28.31)$ | 32 |
| IGA | Not Advertise | $3(2.31)$ | $17(17.69)$ | 20 |
| Total |  | 6 | 46 | 52 |


|  |  | Prego Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | 0 (3.81) | 33 (29.19) | 33 |
| Safeway | Not Advertise | 6 (2.19) | 13 (16.81) | 19 |
| Total |  | 48 | 46 | 52 |


|  | Prego Save-on |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $1(1.31)$ | $33(32.69)$ | 34 |
| Save-on | Not Advertise | $1(0.69)$ | $17(17.31)$ | 18 |
| Total |  | 2 | 50 | 52 |


|  | Prego Superstore |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $7(7.00)$ | 7 |
| Other | Advertise | $0(0.00)$ | $45(45.00)$ | 45 |
| Superstore | Not Advertise | $0(0.00)$ | 52 | 52 |
| Total |  | 0 | 52 | 4 |

Prego vs Prego across Store

|  |  | Prego Safeway |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
|  |  | $4(5.31)$ | 6 |  |
| Prego | Advertise | $2(0.69)$ | $42(40.69)$ | 46 |
| IGA | Not Advertise | $4(5.31)$ | 46 | 52 |
| Total |  | 6 | 46 |  |



|  |  | Prego Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | Not Advertise |  |  |
| Prego | Advertise | - 0 | (0.00) | 0 | (0.00) | 0 |
| Superstore | Not Advertise | 6 | (6.00) | 46 | (46.00) | 52 |
| Total |  | 6 |  | 46 |  | 52 |

## Contingency Tables for Peanut Butter

Kraft vs Private Label within Store

|  |  | Kraft IGA |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $12(10.23)$ | 19 |
| Private Label | Advertise | $7(8.77)$ | $16(17.77)$ | 33 |
| IGA | Not Advertise | $17(15.23)$ | $16(28$ | 52 |
| Total |  | 24 | 28 |  |


|  |  | Kraft Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | 4 |  |
| Private Label | Advertise | $0(1.85)$ | $(2.15)$ | 4 |
| Safeway | Not Advertise | $24(22.15)$ | $24(25.85)$ | 48 |
| Total |  | 24 | 28 | 52 |


|  |  | Kraft Save-on <br>  |  |  |
| :--- | :--- | ---: | ---: | ---: |
| Not Advertise | Total |  |  |  |
| Private Label | Advertise | $2(4.62)$ | $22(19.37)$ | 24 |
| Save-on | Not Advertise | 8 | $(5.39)$ | $20(22.62)$ |
| Total |  | 10 | 42 | 28 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | Not Advertise |  |  |
| Private Label | Advertise | 7 | (10.60) |  | (8.40) | 19 |
| IGA | Not Advertise | 22 | (18.40) |  | (14.60) | 33 |
| Total |  | 29 |  | 23 |  | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $4(1.31)$ |
| Private Label | Advertise | 0 | $(2.69)$ | 4 |
| Safeway | Not Advertise | $35(32.31)$ | $13(15.69)$ | 48 |
| Total |  | 35 | 17 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $2(9.23)$ | $22(14.77)$ | 24 |
| Save-on | Not Advertise | $18(10.77)$ | $10(17.23)$ | 28 |
| Total |  | 20 | 32 | 52 |



Kraft vs Other National Brands within Store

|  |  | Kraft IGA |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  | Advertise | Not Advertise | $5(4.85)$ | 9 |
| Other | Advertise | $4(4.15)$ | 23 |  |
| IGA | Not Advertise | $20(19.85)$ | $23(23.15)$ | 43 |
| Total |  | 24 | 28 | 52 |


|  | Kraft Safeway |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
|  | $0(5.08)$ | $11(5.92)$ | 11 |  |
| Other | Advertise | $24(18.92)$ | $17(22.08)$ | 41 |
| Safeway | Not Advertise | 28 | 28 | 52 |
| Total |  | 48 | 28 |  |


|  |  | Kraft Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | 0 (1.92) | 10 (8.08) | 10 |
| Save-on | Not Advertise | 10 (8.08) | 32 (33.92) | 42 |
| Total |  | 10 | 42 | 52 |



## Kraft vs Kraft across Store

|  |  | Kraft Safeway |  |  |
| :--- | :--- | ---: | :---: | ---: |
|  |  | Advertise | Not Advertise | Total |
| Kraft | Advertise | $4(1.85)$ | $0(2.15)$ | 4 |
| IGA | Not Advertise | $20(22.15)$ | $28(25.85)$ | 48 |
| Total |  | 24 | 28 | 52 |


|  |  | Kraft Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Kraft | Advertise | 4 (4.62) | 6 (5.39) | 10 |
| Save-on | Not Advertise | 20 (19.39) | 22 (22.62) | 42 |
| Total |  | 24 | 28 | 52 |


|  |  | Kraft Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rise |  |  |
| Kraft | Advertise | 1 | (0.92) | 1 | (1.08) | 2 |
| Superstore | Not Advertise | 23 | (23.08) | 27 | (26.92) | 50 |
| Total |  | 24 |  | 28 |  | 52 |

## Contingency Tables for Potato Chips

Lay's vs Private Label within Store

|  |  | Lay's IGA |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  |  |
| Private Label | Advertise | 1 (2.77) | 11 (9.23) | 12 |
| IGA | Not Advertise | 11. (9.23) | 29 (30.77) | 40 |
| Total |  | 12 | 40 | 52 |


|  |  | Lay's Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Private Label | Advertise | (2.56) | 6 (4.44) | 7 |
| Safeway | Not Advertise | 18 (16.44) | 27 (28.56) | 45 |
| Total |  | 19 | 33 | 52 |


|  |  | Lay's Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
| Private Label | Advertise | Advertise | $2(4.04)$ | Not Advertise |
| Save-on | Not Advertise | $12(9.96)$ | $13(10.96)$ | 15 |
| Total |  | 14 | $25(27.04)$ | 37 |


|  |  | Lay's Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Private Label | Advertise | 0 (0.37) | 19 (18.64) | 19 |
| Superstore | Not Advertise | $1.0 .64)$ | 32 (32.37) | 33 |
| Total |  | 1 | 51 | 52 |

Private Label vs Other National Brands within Store


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $4(2.96)$ |
| Private Label | Advertise | $\mathbf{3}(\mathbf{4 . 3 1 )}$ | $\mathbf{7}$ |  |
| Safeway | Not Advertise | $27(25.96)$ | $18(19.04)$ | 45 |
| Total |  | 30 | 22 | 52 |



Lay's vs Other National Brands within Store

|  |  | Lay's IGA |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |
| Other | Advertise | (7.85) | 28 (26.15) | 34 |
| IGA | Not Advertise | 6 (4.15) | 12 (13.85) | 18 |
| Total |  | 12 | 40 | 52 |


|  |  | Lay's Safeway |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |  |
| Other | Advertise | 5 | (5.85) |  | (10.15) | 16 |
| Safeway | Not Advertise | 14 | (13.15) | 22 | (22.85) | 36 |
| Total |  | 48 |  | 33 |  | 52 |


|  | Lay's Save-on |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $16(13.89)$ | 19 |
| Other | Advertise | $3(5.12)$ | $11(8.89)$ | $22(24.12)$ |
| Save-on | Not Advertise | 11 | 33 |  |
| Total |  | 14 | 38 | 52 |


|  |  | Lay's Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
|  | $0(0.04)$ | $2(1.96)$ | 2 |  |
| Other | Advertise | 1 | $49(49.04)$ | 50 |
| Superstore | Not Advertise | 1 | $(0.96)$ | 51 |
| Total |  | 1 |  | 52 |

Lay's vs Lay's across Store


|  | Lay's Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $6(8.89)$ | 14 |
| Lay's | Advertise | $8(5.12)$ | $27(24.12)$ | 38 |
| Save-on | Not Advertise | $11 \quad(13.89)$ | 27 | 52 |
| Total |  | 19 | 33 |  |


|  |  | Lay's Safeway. |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Lay's | Advertise | (0.37) | 0 (0.64) | 1 |
| Superstore | Not Advertise | 18 (18.64) | 33 (32.37) | 51 |
| Total |  | 19 | 33 | 52 |

Contingency Tables for Processed Cheese Slices

Kraft vs Private Label within Store


|  |  | Kraft Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Private Label | Advertise | (4.15) | 5 (1.85) | 6 |
| Safeway | Not Advertise | 35 (31.85) | 11 (14.15) | 46 |
| Total |  | 36 | 16 | 52 |


|  |  | Kraft Save-on |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $0(1.85)$ | $8(6.15)$ | 8 |
| Save-on | Not Advertise | $12(10.15)$ | $32(33.85)$ | 44 |
| Total |  | 12 | 40 | 52 |


|  |  | Kraft Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Private Label | Advertise | 0 (0.31) | 16 (15.69) | 16 |
| Superstore | Not Advertise | 1 (0.69) | 35 (35.31) | 36. |
| Total |  | 1 | 51 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $4(4.04)$ |
| Private Label | Advertise | $6.96)$ | 10 |  |
| IGA | Not Advertise | $25(25.04)$ | $17(16.96)$ | 42 |
| Total |  | 31 | 21 | 52 |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $2(4.50)$ | $4.50)$ | 6 |
| Safeway | Not Advertise | $37(34.50)$ | $9(11.50)$ | 46 |
| Total |  | 39 | 13 | 52 |



|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $0(0.31)$ | $16.69)$ | 16 |
| Superstore | Not Advertise | $1(0.69)$ | $35(35.31)$ | 36 |
| Total |  | 1 | 51 | 52 |

Kraft vs Other National Brands within Store

|  | Kraft IGA |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $13(12.42)$ | 19 |
| Other | Advertise | $6(6.58)$ | 19 | 33 |
| IGA | Not Advertise | $12(11.42)$ | $21(21.58)$ | 52 |
|  |  | 18 | 34 | 34 |


|  | Kraft Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $3(1.85)$ | 6 |
| Other | Advertise | $3(4: 15)$ | $13(15.15)$ | 46 |
| Safeway | Not Advertise | $33(31.85)$ | 16 | 52 |
| Total |  | 48 | 16 |  |


|  |  | Kraft Save-on |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Other | Advertise | 1 (2.31) ${ }^{\prime}$ | 9 (7.69) | 10 |
| Save-on | Not Advertise | 11 (9.69) | 31 (32.31) | 42 |
| Total |  | 12 | 40 | 52 |


|  |  | Kraft Superstore  <br>   <br>   <br>  Advertise |  |  |
| :--- | :--- | ---: | ---: | ---: |
| Not Advertise | Total |  |  |  |
| Other | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Superstore | Not Advertise | $1(1.00)$ | $51(51.00)$ | 52 |
| Total | - | 1 | 51 | 52 |

## Kraft vs Kraft across Store

|  |  | Kraft Safeway <br> Not Advertise |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | (12.54) |  |  |
| Kraft | Advertise | $12(12.46)$ | $6(54)$ | 18 |
| IGA | Not Advertise | $24(23.54)$ | $10(10.46)$ | 34 |
| Total |  | 36 | 16 | 52 |


|  |  | Kraft Safeway |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  | rtise |  |
| Kraft | Advertise | 8 | (8.31) | 4 (3.69) | 12 |
| Save-on | Not Advertise | 28 | (27.69) | 12 (12.31) | 40 |
| Total |  | 36 |  | 16 | 52 |


|  |  | Kraft Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | tise |  |
| Kraft | Advertise | 1 (0.37) | 0 (0.31) | 1 |
| Superstore | Not Advertise | 35 (35.31) | 16 (15.69) | 51 |
| Total |  | 36 | 16 | 52 |

## Contingency Tables for Tea Bags

Tetley vs Private Label within Store

|  |  | Tetley IGA |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $3(5.12)$ | $16(13.89)$ | 19 |
| IGA | Not Advertise | $11(8.89)$ | $22(24.12)$ | 33 |
| Total |  | 14 | 38 | 52 |


|  |  | Tetly Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Private Label | Advertise | 1 (1.08) | 7 (6.92) | 8 |
| Safeway | Not Advertise | 6 (5.92) | 38 , (38.08) | 44 |
| Total |  | 7 | 45 | 52 |


|  |  | Tetly Save-on |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $4(2.46)$ | 4 |
| Private Label | Advertise | $0(1.54)$ | $28(29.54)$ | 48 |
| Save-on | Not Advertise | $20(18.46)$ | 28 | 52 |
| Total |  | 20 | 32 |  |


|  |  | Tetly Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
| Private Label | Advertise | 0 (0.69) | 9 (8.31) | 9 |
| Superstore | Not Advertise | 4 (3.31) | 39 (39.69) | 43 |
| Total |  | 4 | 48 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  |  | Total |
| :--- | :--- | :---: | :---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $6 .(12.42)$ | $13(6.58)$ | 19 |  |
| IGA | Not Advertise | $28(21.58)$ | $5(11.42)$ | 33 |  |
| Total |  | 34 | 18 | 52 |  |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise. | Not Advertise |  |
| Private Label | Advertise | $1(2.15)$ | $7.85)$ | 8 |
| Safeway | Not Advertise | $13(11.85)$ | $31(32.15)$ | 44 |
| Total |  | 14 | 38 | 52 |


|  | National Brands Save-on |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $(3.23)$ | $3(0.77)$ |
| Private Label | Advertise | $1(3.23)$ | 4 |  |
| Save-n | Not Advertise | $41(38.77)$ | $7(9.23)$ | 48 |
| Total |  | 42 | 10 | 52 |


|  |  | National Brands Superstore |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | 1 (2.08) | 8 (6.92) | 9 |
| Superstore | Not Advertise | 11 (9.92) | 32 (33.08) | 43 |
| Total |  | 12 | 40 | 52 |

Tetley vs Other National Brands within Store

|  |  | Tetly IGA |  |  |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | Total |
|  | $0(5.39)$ | $20(14.62)$ | 20 |  |
| Other | Advertise | $14(8.62)$ | $18(23.39)$ | 32 |
| IGA | Not Advertise | 14 | 38 | 52 |


|  | Tetly Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $4(1.89)$ | $10.12)$ | 14 |
| Safeway | Not Advertise | $3(5.12)$ | $35(32.89)$ | 38 |
| Total | 48 | 45 | 52 |  |


|  |  | Tetly Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $9(11.92)$ | $22(19.08)$ | 31 |
| Save-on | Not Advertise | $11(8.08)$ | $10(12.92)$ | 21 |
| Total |  | 20 | 32 | 52 |


|  | Tetly Superstore |  |  | Total |
| :--- | :--- | ---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $1(0.69)$ | $8(8.31)$ | 9 |
| Superstore | Not Adverise | $3(3.31)$ | $40(39.69)$ | 43 |
| Total |  | 4 | 48 | 52 |

Tetly vs Tetly across Store

|  |  | Tetly Safeway <br>  <br>  |  |  |
| :--- | :--- | :--- | :--- | :--- |
|  | Advertise | Not Advertise | Total |  |
| Tetly | Advertise | $3(1.89)$ | $11(12.12)$ | 14 |
| IGA | Not Advertise | $4(5.12)$ | $34(32.89)$ | 38 |
| Total |  | 7 | 45 | 52 |


|  | Tetly Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Tetly | Advertise | $2(2.69)$ | $18(17.31)$ | 20 |
| Save-on | Not Advertise | $5(4.31)$ | $27(27.69)$ | 32 |
| Total |  | 7 | 45 | 52 |


|  |  | Tetly Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | rtise |  |
| Tetly | Advertise | 0 (0.54) | 4 (3.46) | 4 |
| Superstore | Not Advertise | 7 (6.46) | 41 (41.54) | 48 |
| Total. |  | 7 | 45 | 52 |

## Contingency Tables for Waffle

Kellogg's vs Private Label within Store

|  |  | Kellogg's IGA |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise | e Not Advertise |  |  |  |
| Private Label | Advertise | 1 | 2.69 |  | (7.31) | 10 |
| IGA | Not Advertise | 13 | (11.31) | 29 | (30.69) | 42 |
| Total |  | 14 |  | 38 |  | 52 |


|  |  | Kellogg's Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $13(10.15)$ |
| Private Label | Advertise | $3(5.85)$ | 16 |  |
| Safeway | Not Advertise | $16(13.15)$ | $20(22.87)$ | 36 |
| Total |  | 19 | 33 | 52 |


|  |  | Kellogg's Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise | $17(14.14)$ | 21 |
| Private Label | Advertise | 4 (6.87) | 17 |  |
| Save-on | Not Advertise | $13(10.14)$ | $18(20.87)$ | 31 |
| Total |  | 17 | 35 | 52 |


|  |  | Kellogg's Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Private Label | Advertise | $1(0.39)$ | $3(3.62)$ | 4 |
| Superstore | Not Advertise | $4(4.62)$ | $44(43.39)$ | 48 |
| Total |  | 5 | 47 | 52 |

Private Label vs Other National Brands within Store

|  |  | National Brands IGA |  | Total |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise | $9(7.31)$ | 10 |
| Private Label | Advertise | $1(2.69)$ | $29(30.69)$ | 42 |
| IGA | Not Advertise | $13(11.31)$ | 29 | 52 |
| Total |  | 14 | 38 |  |


|  |  | National Brands Safeway |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $13(9.85)$ |
| Private Label | Advertise | $3.15)$ | 16 |  |
| Safeway | Not Advertise | $17(13.85)$ | $19(22.15)$ | 36 |
| Total |  | 20 | 32 | 52 |


|  |  | National Brands Save-on |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise | $16(13.73)$ |
| Private Label | Advertise | $5(7.27)$ | 21 |  |
| Save-on | Not Advertise | $13(10.73)$ | $18(20.17)$ | 31 |
| Total |  | 18 | 34 | 52 |


|  |  | National Brands Superstore |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  |  | Advertise | Not Advertise |  |
| Private Label | Advertise | $1(0.39)$ | $3(3.62)$ | 4 |
| Superstore | Not Advertise | $4(4.62)$ | $44(43.39)$ | 48 |
| Total |  | 5 | 47 | 52 |

Kellogg's vs Other National Brands within Store

| . |  | Kellogg's IGA |  |  |  | Total |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise Not Advertise |  |  |  |  |
| Other | Advertise | 0 | (0.00) | 0 | (0.00) | 0 |
| IGA | Not Advertise | 14 | (14.00) | 38 | (38.00) | 52 |
| Total |  | 14 |  | 38 |  | 52 |


|  | Kellogg's Safeway |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  |  | Advertise | Not Advertise | $1(1.27)$ |
| Other | Advertise | $1(0.73)$ | 2 |  |
| Safeway | Not Advertise | $18(18.27)$ | $32(31.73)$ | 50 |
| Total |  | 48 | 33 | 52 |


|  | Kellogg's Save-on |  | Total |  |
| :--- | :--- | ---: | ---: | ---: |
|  | Not Advertise |  |  |  |
|  | Advertise | $2(2.02)$ | 3 |  |
| Other | Advertise | $2.98)$ | $34(32.98)$ | 49 |
| Save-on | Not Advertise | $15 \quad 16.02$ | 35 | 52 |
| Total |  | 17 | 35 |  |


|  | Kellogg's Superstore |  | Total |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Other | Advertise | $0(0.00)$ | $0(0.00)$ | 0 |
| Superstore | Not Advertise | $5(5.00)$ | $47(47.00)$ | 52 |
| Total |  | 5 | 47 | 52 |

## Kellogg's vs Kellogg's across Store

|  |  | Kellogg's Safeway |  |  |
| :--- | :--- | :---: | :---: | ---: |
|  | Advertise | Notal |  |  |
| Kellogg's | Advertise | $8.5 .12)$ | $6(8.89)$ | 14 |
| IGA | Not Advertise | $11(13.89)$ | $27(24.12)$ | 38 |
| Total |  | 19 | 33 | 52 |


|  |  | Kellogg's Safeway |  | Total |
| :---: | :---: | :---: | :---: | :---: |
|  |  | Advertise |  |  |
| Kellogg's | Advertise | 7 (6.21) | 10 (10.79) | 17 |
| Save-on | Not Advertise | 12 (12.79) | 23 (22.21) | 35 |
| Total |  | 19 | 33 | 52 |


|  | Kellogg's Safeway |  |  | Total |
| :--- | :--- | ---: | ---: | ---: |
|  | Advertise | Not Advertise |  |  |
| Kellogg's | Advertise | $2(1.83)$ | $3(3.17)$ | 5 |
| Superstore | Not Advertise | $17(17.17)$ | $30(29.83)$ | 47 |
| Total |  | 19 | 33 | 52 |


[^0]:    * Indicates the chi-square statistic that is larger than 3.84 , null hypothesis is rejected at $5 \%$ significance level

[^1]:    * Indicates the chi-square statistic that is larger than 3.84 and thus the null hypothesis is rejected at $5 \%$ significance level

