IN-STORE MARKETING: SALES DRIVING FACTORS. THE CASE OF HAIR CARE PRODUCTS IN MODERN TRADE RETAILERS

by

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Abstract

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This paper aims to determine in-store marketing strategies that are most efficient in terms of sales pay-off. The focus of the research is on such in-store presentation indicators as promotions (bundling and buy-and-get promotion), displays, out-of-stocks, price of the product and its competitor, presentation on the shelf in terms of its layout and occupied space. The estimated results suggest that in-store marketing techniques differ in their ability to bring additional sales. The most positively significant factors are promotions and additional displays and the most negatively significant factor is out-of-stocks. Relative insignificance presentation on the shelf gives evidence that Ukrainian consumers are more sensitive to stimuli that arouse smart-shopper feelings, like monetary gain or free gifts, than to visual stimulation.

TABLE OF CONTENTS

Page Number

Table of Contents i
Chapter 1. Introduction 1
Chapter 2. Literature Review 4
Chapter 3. Local Context 16
Chapter 4. Data Description and Methodology 18
Chapter 5. Results and Their Interpretations 27
Chapter 6. Conclusions 36
Bibliography 38
Appendix 1 43
Appendix 2 51
Appendix 3 52

Chapter 1

INTRODUCTION

In recent years, the Ukrainian retail sector has faced drastic changes in the market structure and level of consumer expectations and knowledge. Consumers become more and more sophisticated in their shopping habits and demanding as to the ratio of service to price. In the attempts to stand out among other stores competing for consumers, bigger supermarkets and supermarket chains employ elaborate marketing strategies and increase the quality of service. Service in its broad sense includes all the human and non-human aspects of the store performance that correspond to easy-shopping principles: convenient store lay-out, effective assortment, logical product placement, offers of bargains, personnel proficiency, etc. The retailing sector is developing towards a greater degree of concentration (especially in the capital and big cities), enabling store managers to have an upper hand in negotiations with manufacturers and sometimes even dominate them. Nevertheless, producers, besides using conventional advertising techniques (TV commercials, outdoor advertisement, image-building advertising and so on), in their competition for market share are highly motivated to utilize available in-store marketing techniques. Furthermore, due to high competition in beauty care products and mainly in hair care segment (in Ukraine, 87% of the value share of the market is made by 18 producers) manufacturers try to cooperate with retailers in order to ensure the best presentation of their products at the stores. While conventional advertising has a very strong effect on shaping consumer preferences, producers and distributors realize that there are

considerable possibilities to influence consumer choices already at the point of sale. According to the research in the sphere of consumer behavior, about 60% of shopping decisions are made when already in front of a shelf (Maskulka, 1999). Thus, effectively utilizing in-store marketing possibilities becomes one of the priorities in the strategy of increasing sales. Therefore, in the sector under study (as well as other highly competitive industries) manufacturers came to actively negotiate such in-store presence and distribution indicators as share of shelf space occupied, in-store promotions, product placement on the shelves, number of facings, definition of product assortment, spreading of advertising point-of-sale materials.

Thus, the main question I want to address in the research paper is in-store factors that help products "win the first moment of truth", i.e. determine consumer final shopping choice in a store. From the point of view of practical application, the work will attempt to develop a rationale for choosing effective in-store marketing techniques and help producers and distributors make efficient marketing budget allocation decisions. The study will explicitly determine what aspects of in-store product presentation are most efficient in terms of the sales payoff.

The previous research on the impact of in-store marketing strategies on sales concentrated on the effect of various determinants taking into account product attributes, store attributes, consumer preferences and others. In this paper, I am going to develop a multifactor model with a unique set of determinants. The research will attempt to develop the relationship between sales figures as a dependent variable and the following explanatory variables: percentage of out-of-stocks (absence on the shelf of the products from the distribution list) in comparison with competitors' availability, share of shelf space (percentage out of all the shelf space in the hair care category occupied by the product under study), prices of the product and competing brands, share of in-store displays

(percentage of the additional product placement occupied by the product under study out of all displays), brand block shelving (products are shelved not by the product type, for example shampoos are placed separately from conditioners and balsams, but by brand, i.e. products of one brand are situated together on the shelf) and eye-level shelving (dummy variables), also promotion activities with the focus on bundling and buy-and-get promotions. To my knowledge, none of the works on the topic considered the combination of variables I am going to use. Mainly, the research considering the impact of the shelving and such its aspects as eye-level positioning and brand-block placement on sales is scarce.

The rest of the work proceeds as follows. The second chapter includes literature review of the most important works on the subject. Works pertaining to each determinant of the model are looked at separately. The third chapter introducers the reader to the specifics of the hair care sector in Ukraine and Kiev and mentions main players of the sector: major producers of the industry and most popular brands. The fourth chapter describes the method of data collection and elaborates the description of the data set. The fifth part of the paper presents the description of the methodology of the research and econometric specifications and estimation techniques used. This chapter also discusses the results obtained and major implications and is followed by the main conclusions of the paper.

Chapter 2

LITERATURE REVIEW

My literature review will be structured to reflect research conducted on each (separately or jointly) in-store determinant that I m going to include in my model. I first look at the impact of product assortment (listing of items at a store) and availability of products (their actual presence in the trading place). Then, I will focus on the effect of product placement in a store: primary shelves and additional displays. I will also touch upon other dimensions of product placement: eye-level placement and brand-blocking. Next I examine extensive research on the impact of monetary and non-monetary promotions on sales; mainly, effects of bundling and price reductions and price comparison among competitors. Also, more general implications of promotions on social welfare will be investigated.

One aspect of in-store marketing activity that I include in the paper is that of **product availability** on the store shelf. Certainty of stock-keeping units (SKUs), different products with individual bar-code, availability on the shelf can influence consumer utility and their choice because inconsistency in the product presence on the shelf causes additional risk and can make the product less attractive (Swait and Erdem, 2002). Bell and Fitzsimons (1999) confirmed the assumption after conducting an experiment on response to stock-outs (absence on the shelf of the products from the distribution list) that was found highly negative.

Another issue closely connected to product availability is **product assortment**, often defined as "the number of different items in a merchandise category" (Levy

and Weitz, 1995). Arnold et al (1983) verified a conventional belief that reduction in assortment (in the number of SKUs) will lower consumer assortment perception and thus store evaluation and increase the probability of store switching. However, a bigger number of SKUs on the shelves does not necessarily imply a decrease in assortment perception, consumer utility and, consequently, sales. Broniarczyk et. al. (1998) argued that the risk inherent in SKU reduction is less severe than is generally perceived. The authors suggest that a reduction in shelf items will not cause a substantial change in assortment perception if the shelf space allocated to the category will stay the same especially in the short run. The more important to the assortment perception is the availability of the favorite item. The suggestion to implement efficient assortment (delisting of less popular items) somewhat contradicts the finding by Bell and Fitzsimons (1999) of an existence of a substantial negative effect of the stock-outs of SKUs, that were previously available, on the purchases even in a short-run perspective. Since the products included in the sample are highly popular (occupy a substantial share of the market), I will be able to judge which of the effects prevail in this case.

Retailers often perceive **product display** to influence unit sales. That is why product placement space is often manipulated to increase sales. The relationship occurs due to the specifics of human visual perception. It is believed that consumers walking along the aisles of a store have "a flattened cone of peripheral vision" through which they subconsciously scan shelves with products (Phillips and Bradshaw, 1993). Consequently, the more space is allocated to the product, the larger is the possibility that a consumer will notice it. Consumers walking around a store have a flattened cone of peripheral vision through which they automatically and subconsciously scan the merchandise they pass. There are two major possibilities for merchandise placement in a store: primary shelves and additional displays.

There exist two basic academic research lines on the issues of **shelf space**: theoretical approach which is based on models created to solve the shelf space allocation problem (SSAP) and empirical approach which is based on empirical proof of the relationship between inventories and other factors and sales. Regarding the theoretic models, there are numerous studies published in academic journals. For example, Urban (1998) developed a model that relates demand to the displayed inventories differentiating between shelf and backroom inventories and reflects the effect of not fully stocked shelves. Hwang et al. (2004) formulated a mathematical model that assumed demand rate as a function of displayed inventory levels and location of each brand on the multi-level shelves. Another mathematical model for the shelf space allocation problem was developed by Yang (2001) who proposed to allocate shelf space according to the priority index received from the rankings of the products with respect to the profit they bring per displayed length. Empirical perspective of the shelf space allocation problem received less attention in the academic literature. A survey conducted by Dubelaar et al. (2001) found that only 5 studies empirically examined the relationship between sales and shelf space. The empirical studies mainly used regressions to test the relationship between sales (dependent variables) and different explanatory variables: inventory levels, store size and service measures, assortment, and availability. The studies concluded that there was a significant, positive relationship between the variables. Significant attention was paid to estimating shelf space elasticity, defined as the ratio of relative change in unit sales to relative change in shelf space. Curhan (1972) emphasized that space elasticity is not uniform and proved in his large-scale work that some product and store attributes can influence the sales-space relationship. Diverse empirical results seem to support this hypothesis: estimates of space elasticity vary between 0.15 and 0.8 (Desmet and Renaudin, 1998). Researches argue that when the shelf space is allocated non-optimally, marginal returns are supposed

first to increase and then to decline (Drèze et al., 1994). However, Curhan (1972) argues that in large supermarkets, items are allocated enough space so as to push them to a point of declining marginal returns; thus, space elasticity weakness in some of the studies can be explained by overallocation of space.

Besides inventories situated on the shelves, retailers have one more means of product placement that has a significant impact on the dynamics of sales (Nessl, 2000; Alexander, 1999; Kaufman, 1994). **Displays** are additional out of shelf product placements (end-of-aisle or within-aisle) which serve to attract shoppers' attention and stimulate unplanned purchases. Displays are a powerful means of increasing sales because they are viewed by the consumers as a special bargain and create additional excitement in the store. Chevalier (1975) showed that displays exhibit different degrees of efficiency on different product types: they exercise greater selling power on "mature product category" i.e. products already known to the shoppers than on the new items. The market structure of the given product also matters in determining the success of a display: display turned out to be more effective when the market is very competitive and there are no clearly defined leaders as to the market share (Chevalier, 1975). When comparing productivity of additional placements (displays) with usual product placements (shelves), displays bring a larger increase in sales than extended shelf space (Wilkinson et al., 1982).

One more dimension of shelving technique is a choice of the height of product placement on multi-level shelves. Intuitively, products situated on the **eye-level shelves** are bound to be chosen more frequently because they are easier noticeable and correspond to the principles of easy-shopping (taking products from the upper or lower shelves requires additional efforts). This intuitive assumption was verified in a number of field experiments which showed that a

placement of a product within a display, especially the height of the shelf has a considerable effect on sales (Dreze et al. 1994).

Shelving techniques can often present elements of **brand-building** practices. With a coming era of supermarkets with self-service, consumers are often left to decide on their purchase without the help of selling assistants (Maskulka, 1999). A choice of a brand becomes one of the first steps in consumer decision-making trees. If a brand is well known to consumers, its presentation at the marketing place reinforces its media advertisement. Thus, products displayed in brand-blocks (shelving of products not by the product type, for example shampoos are placed separately from conditioners and balsams, but by brand, i.e. products of one brand are situated together on the shelf) correspond to the principles of easy-shopping and thus increase consumer utility from shopping. Also, brand-block shelving makes the products more salient on the shelf and increases the possibility of a branded product to be chosen. There is little attention in the academic literature paid directly to brand-blocking. However, a closely related issue, which is an intermediary between brand-blocking effect and space allocation effect, impact of a number of facings (product units presented in front) on sales has been discussed. There is no consensus in the literature as to the scope of the impact. Urban (1998) concluded that a number of facings had a strong effect on the sales when other variables in the sales equation were held constant. On the other hand, Dreze et al. (1994) claim that changes in a number of facings devoted to a brand did not have a significant effect on sales as long as a threshold was maintained.

Recently **sales promotions** have attracted acute attention of retailers and researchers. This increasing interest stems from the understanding of an importance of sales promotions in developing marketing strategy. Promotions are classified into trade promotions, targeted at firm's customers, and consumer

promotions, aimed to persuade final consumers to buy a product (Peter and Olson, 2002). In the case of my research, only consumer promotions are relevant with the focus on buy-and-get promotions and bundling. A lot of research was made in order to understand the response of consumers to promotions. The results show that consumers react to promotions in a highly complicated manner and the mechanism of reaction differ depending on the type of the deal (Henderson, 1994). The models that describe promotions look at different aspects of human reaction: behavioral learning approach, cognitive approach, social judgment theory, attribution theory, risk reduction theory (Gardner and Strang, 1984; Oliver, 1980). For example, Peter and Olson (2002) claim that promotion on an existing brand (as in my case) helps to reduce the risk of trying the brand for consumers with indifferent or slightly positive view on the product and to strengthen the loyalty of existing consumers. Another approach to classification of promotions looks at the monetary side of sales promotions: it groups promotions into monetary and non-monetary. Depending on the type sales promotions can be perceived as reduced losses or as gains. Non-monetary promotions are more likely to be separated from the price value of the product and framed as gains, while price promotions are directly associated with the purchase price and perceived as reduced losses (Diamond and Campbell, 1989).

I will examine previous research on both non-monetary and price sales promotions. One of the types of non-monetary promotional activity I will focus on is **bundling**. By bundling I mean bundling in the narrow sense – physical tying of two products together and selling them as one unit, as opposed to bundling in a broad sense – "products that are implicitly linked by complementary usage situations" (Harris, 1997). Bundling and consumer reactions to bundling have attracted a considerable interest among researchers. Theoretical issues pertaining to bundling raise both economics and psychology of consumer evaluation of the product (Krish and Paul, 1994). Harris (1997)

suggests that bundling can increase quality perception of the product and simultaneously reduce risk of the purchase thus increasing overall evaluations of the product. On the contrary, Wilson et al. (1990) argue that bundling can actually decrease product evaluations due to additional restrictions and lack of flexibility associated with purchasing bundled products. Appropriateness and profitability of bundling is widely discussed by researches. Shy (2001) among other marketing tactics explores the issue of bundling and its profitability to producers. Mainly, he claims that in a competitive industry, tying can be used as a means of differentiating competing products and, consequently, increasing profit/volume. Carbajo et al. (1990) argue that bundling present no strategic incentives for firms under two extreme market structures: monopoly and perfect competition. Only in imperfect competition there is strategic motivation for bundling. The authors suggest that bundling generates less aggressive competing strategies from rivals. They outline two possible responses of the rivals: they can either sell at a higher price and thus create an explicitly advantageous situation for the bundling firm, or cut price, in the case of which the bundling firm will still face positive returns because the additional share of the market they acquire will offset a lower margin.

Apart from promotions based on association of a product with a tangible free object, a product on sale can be "bundled" with an associated reduced, or in some other way attractive, price. With regards to **price promotion** I am going to concentrate on the following two aspects. First, factors that determine the inclination of consumers to be influenced by price manipulations and second, the influence of the difference in prices across competing brands on purchase decisions.

Looking at the reasons of consumer response to monetary promotions, previous studies recognize two major groups of response determinants: economic and psychological or, in a different terminology, utilitarian and ego-expressive (Mano

and Elliott, 1997; Schindler, 1989). The utilitarian consequence of a price includes opportunity cost of money spent, i.e. utility gained from alternative purchases that must be foregone. Thus, if a product is offered at a reduced price, a consumer can increase utility by buying additional items with saved money (Mano and Elliott, 1997). Ego-expressive consequences of a price include all the effects that a price may have on an individuals' self-perception. The range of emotions aroused by a price may include a feeling of being smart, competent and thrifty, or a sense of a small victory over large corporations (Schindler, 1989). The scope of the ego-related effects which a price may provoke in a consumer is often described by the term "smart-shopper feelings". Smart shopping is more precisely defined as "a tendency for consumers to invest considerable time and effort in seeking and utilizing promotion-related information to achieve price savings" (Mano and Elliott, 1997). Schindler (1989) tested the hypothesis that the extent to which consumers are subject to smart-shopper feelings depends on the degree of responsibility they feel for getting the discount or savings. The concept of smart-shopping is crucial in evaluating the effect of price promotions on consumer decisions. First of all, the sequence of actions in the decision process can be altered: price searching activity can become dominant and lead a consumer to consider items which were not previously in his/her shopping plan. Also, the anticipation of smart-shopping feelings can result in a distorted evaluation of the item's attributes: the prospect of these feelings may be considered another attribute of the item, the aspiration of the smart-shopping feeling may lead a consumer to assess other attributes differently, in order to rationalize the purchase, and also the price evaluation activities may distract a consumer from the consideration of other attributes, for example whether the benefits of the item really justify its costs (Schindler, 1989; Gardner and Strang, 1984).

Price management, besides its possible effect on consumer choice, is one of the key mechanisms in competing with market rivals. Temporary price discounting is

a well known merchandising technique with which manufacturers, retailers, or both, offer consumers an economic incentive to induce them to purchase a particular brand. Research in the area of price discounting has focused on three major issues: the effect price discounts have on market share, brand-switching and purchase quantity and timing.

A market share increase induced by the price promotion depends on the age of the brand. Hinkle (19665) found that new brands are most susceptible to price discounts and tend to result in higher gains with smaller price reductions that more established brands. Later this finding was confirmed by Dodson, Tybout and Sternthal (1978) who showed that price discounting increased the brand's market share, at least in the short run. However, Shoemaker and Shoaf (1977) suggested that that market share gain was only temporary and after the end of promotion consumers returned to their prior purchasing patterns.

Another effect closely connected to that of a market share increase is brand switching. Bronnenberg et al (1996) found that consumer response to price variations may be limited by the fact that consumers evaluate only those brands already in their choice set to choose a single brand. Instead of assuming that a change in price of one brand affects all other existing brands (global price response), the researchers adopted a theory of local price response. The formation of the choice set, in its turn, is based on the salience of a brand in comparison to other brands. Bronnenberg et al (1996) hypothesized that brand salience depends on a number of factors. First, they assume that brand saliency is positively related to the store activities attempting to emphasize the brand as a choice option (various forms of price discount announcements). Second, they proposed that brand salience is related to the recency of the previous purchase. The relation may be either positive or negative depending on the type of choice behavior. If choice behavior is of "reinforcing type", the brand salience of a

recently purchases brand is high and the relation is positive. The relation will be negative when choice behavior is of "variety-seeking" type, and recently purchased brands are less salient. Third, the researches suggested that consumers generally switch only among brands in certain price tier. For every consumer, brands in one price range may be more salient than others.

Price promotions may also influence other aspects of consumer behavior, such as the quantity of product they purchase and the length of interval between purchases. Previous studies concluded that price reductions have greater impact on the quantities of product purchased than on the inter-purchase intervals (Hoek and Roleants, 1991).

The above mentioned research concentrated on the beneficial, from the point of view of manufactures and retailers, aspects of price discount. However, there is evidence that price manipulations can fail to accomplish an intended effect. One of the explanations lies in the psychological realm of price variation consequences: apart from smart-shopping feeling, price discounts can actually cause anger and regret, for example when previously purchased item was later found on sale (Schindler, 1989). Price promotions can also decrease consumer feelings towards the brand. This may occur due to the erosion of reference price (amount consumers expect to pay or are willing to pay for a product or brand) which is closely related to the perceived quality of the product (Diamond and Campbell, 1989). Another factor that can contribute to the diminished effect of price promotion is the bounds of the consumer choice set: consumers may fail to consider the promotion if the product is not in their price range (Bronnenberg et al, 1996). Bronnenberg et al. (1996) argued shelf prices play limited role in the choice process. If consumers are not self motivated to check prices, price reductions can remain unnoticed if not announced additionally. Also, price discount can actually cause competitors' sales to increase. If a price reduction of

an item resulted in its stockouts, consumers who would ordinarily buy the item under promotion, may instead purchase a substitute brand, thus causing the sales of competing product to rise. This potential beneficial effect on competitors may become more serious when the price promotions do not lead to an increase in profitability of a brand. In the worst case, manufacturers may aggravate the losses they incurred during promotion by enhancing, rather than weakening, the competitor's position (Hoek and Roleants, 1991).

Since the consequences of promotion for producers were looked at, its effects on consumers should also be considered for the purpose of completeness. I intend to briefly outline the research made on the impact of promotion on consumers, and social welfare in general. If promotion is regarded as a specific type of advertisement, it can also be classified into informational and persuasive. Informational advertising presents consumers with accurate information about price, quality and location. Persuasive advertising, on the other hand, aims at creating a subjective image of a brand or a good (Waldman and Jensen, 2001). Kaul and Wittink (1995) developed advertisement categories similar to informational and persuasive advertising: they distinguish between price advertising, which informs consumers about price and availability, and non-price advertising, "geared toward brand positioning and the communication of unique brand characteristics", but without price information. Depending on its type, advertising can have a positive or a negative social impact. Kaul and Wittink found that higher levels of price advertising, the major form of advertising used by local retailers, tend to increase the price elasticity of demand and lower price. Waldman and Jensen (2001), by establishing a negative relation between the effect of advertising on social welfare and that on price, concluded that a decrease in price implies increase in welfare. A more controversial aspect of product differentiation is persuasive advertising aimed at creating subjective differences between products. According to the analysis of Kaul and Wittink, non-price

advertising (comparable to persuasive advertising), which is a main tool of national advertisers, tends to lower the price elasticity of demand. The expected result in imperfectly competitive markets is an increase in prices which implies that such advertising is welfare-reducing (Martin, 2002). On the other hand, persuasive advertising may provide useful information about the quality of experience goods (goods whose qualities can be discovered only through trial after the purchase of the good). A producer of a high-quality product has more incentives to advertise (promote) than a producer of low-quality goods because advertising will result not only in initial purchase (often referred to as "winning the first moment of truth") but also in repeat purchases due to high quality of the good ("winning the second moment of truth"). In this context, Waldman and Jensen conclude that large advertising expenditures by manufacturers signal consumers about high quality of the advertised product. Advertising through its effect on product differentiation puts pressure on manufacturers to produce high-quality products. Even a placement of a trademark on a product can serve as some guarantee of high-quality and an indicator that a producer is ready to stand behind it (Mizuno, 1990).

The effect of the above mentioned in-store determinants on product sales cannot be regarded individually. Researches are unanimous in using multi-factor models to analyze the relationship. The method used for collecting data is mostly experimental design in natural or artificial settings (e.g. Kwon and Schumann, 2001; Wilkinson et al., 1982). A different possibility – direct observation or passive data collecting is used less extensively (e.g. Fernandez and Suarez, 2004). The methodology used for analyzing the data varies from graphical analysis (Hock and Roelants, 1991) to multiple regression analysis with various estimation techniques (e.g. OLS, ML) (e.g. Bronnenberg et al., 1996; Desmet and Renaudin, 1998). ANOVA and ACNOVA analyses are also widely used in the surveys (e.g. Wilkinson et al., 1982; Broniarczyk et al., 1998).

Chapter 3

LOCAL CONTEXT

In the process of transition, Ukrainian retail sector has gone through major changes in the market structure, approach to business and consumer preferences and expectations. This sector is developing towards a greater degree of concentration, enabling store managers to have an upper hand in negotiations with manufacturers and sometimes even dominate them. The development of big store chains in the capital and other big cities of Ukraine is marked by rapid growth and high level of concentration. Retailers that attract considerable share of consumers became able to have a favorable position when debating with manufacturers. The pressure on retailers from the part of distributors and producers is even more aggravating for the industries with high competition. Therefore, in these sectors manufacturers came to actively negotiate such in-store presence and distribution indicators as share of shelf space occupied, in-store promotions, product placement on the shelves, number of facings, definition of product assortment, spreading of advertising point-of-sale materials. I am going to investigate hair care sector which is marked by high competition in Ukraine. 87% of the value share is made by 18 producers, with Procter&Gamble (35.3%), Unilever (10.7%), Aroma Pharmahim (9.8%) being top three of them. The process of attaining a desirable in-store representation is challenging for the distributors of hair care products, because the market is saturated (in Kiev, 85% of the market share by value is made by as many as 250 top brands). The hair care products can be classified into four main categories: cosmetic, natural, everyday, antidandruff. In Ukraine, judging from the market share, the most popular is the category of everyday shampoos (35%), second most popular is the category of

cosmetic shampoos (28%), natural and antidandruff shampoos occupy equal market share of 15%. The information on the top three most popular brands in Kiev in each category with corresponding market shares by value are provided in the table

Cosmetic		Natural		Everyday		antidandruff	
brand name	market share	brand name	market share	brand name	market share	brand name	market share
Pantene	11.4	Timotei	4.7	Shamtu	9.0	Head&Shoulders	11.7
Nivea	3.9	Clairol	1.8	Shandy	8.9	Seborin	0.2
Dove	2.7	Cliven	1.7	Shauma	5.3	-	-

Chapter 4

DATA DESCRIPTION AND METHODOLOGY

The goal of the empirical research is to test the expected influence and significance of different in-store marketing determinants on product sales and compare results with the findings in the literature. We are also interested in finding the relative importance of the factors which will help allocate funds on marketing purposes optimally. The empirical model is based on the specification standard to empirical research in the existing literature.

The panel dataset used was collected by marketing department of one of the producers on the market. Data sample consists of information across six Kiev stores of modern trade situated in different districts of the city, belonging to different store chains and trading type (stock and retail stores). The variation across store characteristics diminishes the chance of selection bias and makes the sample more representative. The data are available for 16 weekly periods (May-August 2004) on four of hair-care product brands. Since the brands belong to different price tiers (for example, Brand 4 – low price tier, Brand 1 – middle tier, Brand 2 and Brand 3 – high price tier) and to different categories (for example, Brand 3 belongs to the cosmetic category, Brand 1 to the natural segment), we assume they have different price elasticity and run a separate regression for each brand.

We will use the method of estimation appropriate for the panel data, mainly, random effects and fixed effects and compare the results with pooled estimation. The following regression will be run:

$Sales_{it} = \alpha_{0} + \alpha_1 * SV_{it} + \alpha_2 * SS_{it} + \alpha_3 * DS_{it} + \alpha_4 * OOS_{it} + \alpha_5 * promo_{it} + \alpha_6 * OP_{it} + \alpha_7 * CP_{it} + u_{it,}$ where the variables are described below with the name of the variables given in parenthesis.

The **dependent variable (Sales)** in the regressions is product sales of the brand for the period measured in milliliters. Since each brand is packaged in two bottle sizes: small (200ml) and large (400ml or 380ml for Brand 4), we aggregated the sales by weighing number of bottles sold by the bottle size:
(Sales in ml) = (number of small size bottles sold)*200ml + (number of large size bottles sold)*400(or 380).
The data set does not allow us to treat each bottle size as a separate variable because values of some of the explanatory variables are observed for the whole brand without discriminating between different bottle sizes. For example, shelf vision criterion was applied to the visual presentation of the brand in general.

The **explanatory variables** are described below. The data for some of the variables (for example, sales and promotion) are given for a period of time and for some the values were taken at a point of time not for the whole period. In order to make the data coherent, we assume that the values taken at a point of time at the beginning of a period are true for the whole period.

- **Price per milliliter in kopecks (OP):** the sales figures are not available for each SKU of the brand (only for the sales of different bottle size for the brand overall) and price values are available for each SKU at a point of time; however, we cannot treat different bottle size as separate products, because the rest of the variables give value for both bottle sizes simultaneously, i.e. observations were taken for the brand overall. As a result, we need first to aggregate SKU prices for each bottle size by weighing each price by the number of occurrences for the given bottle size (for example, at a point of time, two types of Brand 3 200 ml

shampoo cost X and three other types of Brand 3 200 ml cost Y, then the weighted price will be 2/5X +3/5Y) and then we aggregate two prices for each bottle size by the milliliters sold of each bottle size to get a weighted price for a brand in general:

(Weighted price of a brand kop per ml) = (Average price of 200ml bottle*Number of 200ml bottles sold*200ml + Average price of 400ml bottle*Number of 400ml bottles sold*400ml)/(Number of 200ml bottles sold*200ml + Number of 400ml bottles sold*400ml). The expected sign is negative since the good is assumed to be normal.

- **Price per milliliter in kopecks of the main competitor (CP)**: in order to avoid the problem of micronumerosity, we do not include price information on all the competitors into the regression but single out one major competitor. The main competitor for each brand based on the share of sales is not available for each store separately, consequently we determine the main competitors of each brand based on the share of sales nationwide. Competitors belong to the same shampoo category and are chosen with an upward tendency (if the given brand is not the leader, then its main competitor is considered to be the one with a higher sales share). Sales figures of a competing brand are not available, consequently determining weighted price of a competing brand we use the same weights as for the corresponding brand of interest assuming that identical weights reflect similar shopping behavior for competitive brands or, alternatively, we assume equal shares of sales for small and large bottle sizes if the given product is sold in one bottle size only or is not listed in a store. Competitor's lower price is assumed to negatively influence the sales of the product; thus, the expected sign is positive.
- **Shelf vision (SV)**: the variable comprises two factors: the level of placement on a shelf and presence of brand block shelving. If a brand is situated on an eye-level and in a brand block, it is given 1, if shelving

corresponds to only one of the requirements, it is given 0,5, otherwise - 0. The expected sign is positive due to the theory of flattened cone of peripheral vision of consumers, brand saliency and easy-shopping theories, discussed in the first chapter.

- **Shelf share % (SS)**: computed as a share of the primary shelf space occupied by a brand as compared to other shampoos. The expected sign is positive.
- **Display share % (DS)**: computed as a share of secondary, out-of-the-primary-shelf product placement out of all the displays occupied by shampoos. The expected sign is positive due to the psychological perception of a display as a special bargain.
- **Out-of-stocks % (OOS)**: computed as the percentage of SKUs absent on a shelf out of all brand SKUs listed in a store. The sign cannot be defined a priori based on the theory: if the negative effect of the absence of previously available item dominates – expected sign is negative, if, on the contrary, the effect of efficient assortment (listing only the most popular items) and availability of a favorite item dominates – the expected sign is positive.
- **Promotion (promo)**: a dummy variable that measures whether a promotion was held in a given period of time. The dummy variable reflects several types of promotions without differentiating between them: bundling, buy-and-get promotions, and persuasive advertising within a store conducted by a promoter (price promotion is implicitly reflected by the weighted price variable).

The descriptive statistics of the dependent and explanatory variables below are provided for the total sample and different stores separately for each variable used in the estimation. The tables are presented for one of the four brands; the

summary statistics of the data on the rest of the brands reflect similar patterns and are presented in appendix 1.

- **Brand 1:**

Table 4.1

Summary statistics for the entire sample for Brand 1

Variable	Obs	Mean	Std. Dev	Min	Max
Sales (ml)	96	9979.167	5455.387	1800	23800
Shelf vision	96	.875	.2176429	.5	1
Shelf share	96	.0536458	.0220583	.02	.1
Display share	96	.1421875	.2305015	0	1
Promotion	96	.25	.4352858	0	1
Out of stocks	96	.0479167	.1100901	0	.57
Own price	96	4.537193	.2853462	4.14	5.179444
Competitor price	80	4.230072	.0845066	4.01225	4.41875

As one can see from table 4.1, the data exhibits significant variation.

One can assess the variation is sales means looking at the difference between the minimal and maximal means which is 1850ml, about 10 bottles of the product per weak (table 4.2). The brand was visually well presented in all the stores, especially stores 4 and 5, where the brand consistently got the maximum possible point (1) for shelf vision. The worst visual presentation occurred in store 1 and 6, where the standard deviations are also close. Shelf share and display share means as well as standard deviations vary to a greater degree across the stores. One can see the difference in the distribution of promotions (in quantity) across the stores. The stores managed their assortment problem with different degrees of efficiency which is reflected by considerable distinction in the means of the variable. The prices show some variation in

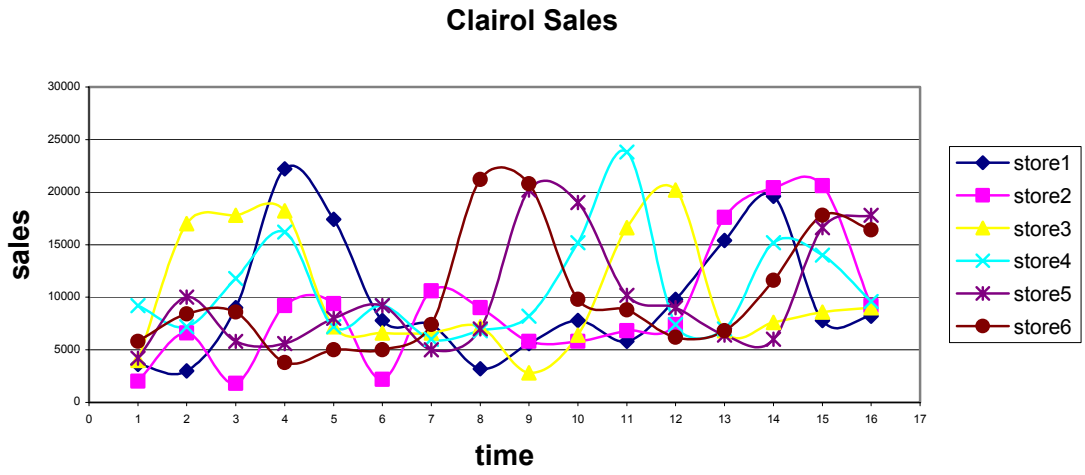
means and higher variation in standard deviations; however, the own price is more variable than the competitor's price

Table 4.2

Summary statistics for Brand 1 across the stores (means and standard deviations)

Variable	**Mean/St. dev**	**Store 1**	**Store 2**	**Store 3**	**Store 4**	**Store 5**	**Store 6**
Sales (ml)	Mean	9600	9025	10162.5	10875	10000	10212.5
	Std. dev	5894.178	5899.096	5673.432	4846.373	5346.151	5711.027
Shelf vision	Mean	.6875	.90625	.90625	1	1	.75
	Std. dev	.25	.2015564	.2015564	0	0	.2581989
Shelf share	Mean	.045625	.080625	.04875	.05	.026875	.07
	Std. dev	.0089209	.023796	.010247	.0063246	.0060208	.0178885
Display share	Mean	.079375	.165625	.03375	.2025	.1275	.244375
	Std. dev	.1186855	.2252989	.0728354	.400125	.1643371	.2159929
Promotion	Mean	.25	.1875	.3125	.25	.25	.25
	Std. dev	.4472136	.4031129	.4787136	.4472136	.4472136	.4472136
Out of stocks	Mean	.09625	.089375	.018125	.04	.0275	.016875
	Std. dev	.1484573	.1741443	.039195	.0950088	.0759386	.0362802
Own price	Mean	4.302341	4.852083	4.504479	4.284722	4.42045	4.859085
	Std. dev	.1736514	.1304799	.2503332	.0548567	.1252413	.1683562
Competitor price	Mean	2.189797		2.1975	2.331406	2.22	2.211656
	Std. dev	.0942477		.0669948	.0770753	.0387105	.0501609

Graph 4.1

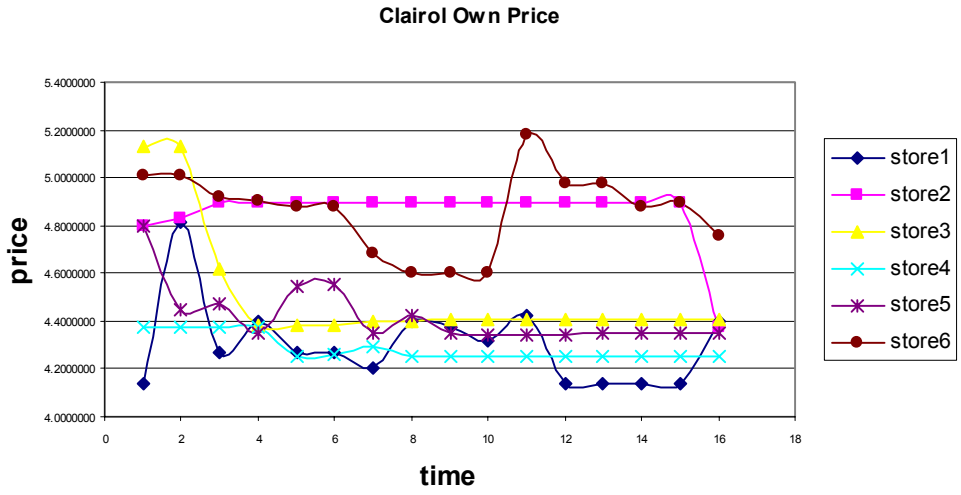


Graph 4.1 illustrates the evolution of sales across time for each of the stores. As can be seen there is no distinct pattern in sales common for all the stores. Nevertheless, each sales curve experiences several major humps during the observation period. The peaks coincide with the periods of promotion, which suggests promotions do not have lasting effect. This observation is proved by the insignificance of the coefficients of lagged promotion in the corresponding regressions.

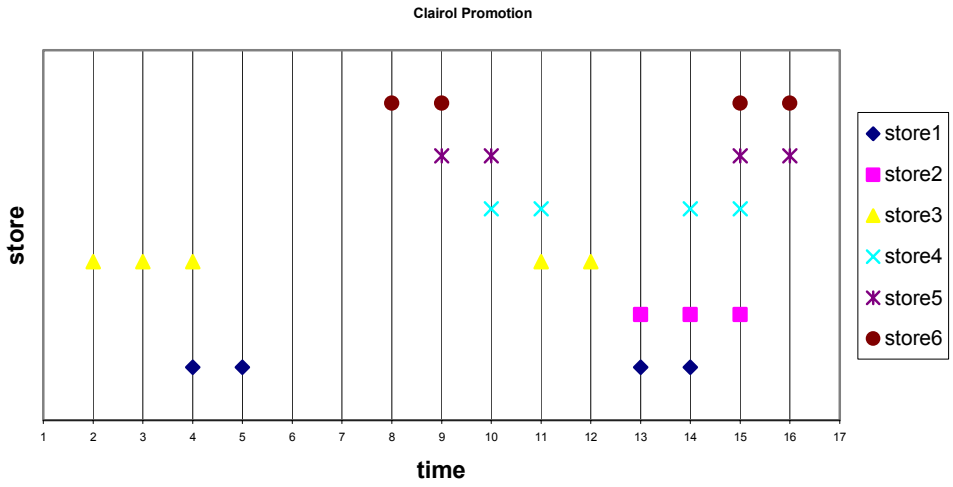
Graph 4.2 illustrates changes in own price in six of the stores. As can be seen, the level of prices at a point in time is almost always different in all the stores.

As was argued above, the promotion dates are assumed to be chosen randomly by the account managers. As can be seen from graph 4.3, dates of promotion for are clearly not uniform across the stores. They rarely coincide and only once overlap for three of the stores.

Graph 4.2



Graph 4.3



Possible problems with the data include endogeneity and collinearity. Endogeneity may arise due to the promotion variable. Since promotion is agreed upon in the process of negotiations between a store manager and a producer's

account manager, the store manager may be more inclined to agree on the promotion for a product that already sells well. However, since all the costs of the promotion are born by the producer and store does not incur any direct costs agreeing to have a promotion, we may assume this effect to be negligible. Also, since different account managers are responsible for the stores and they have other stores to deal with besides the ones under study, we may assume that the date of the promotion is chosen randomly and is based on an account's individual schedule and considerations. On the other hand, the promotion date should be tentatively (deviations of several weeks are permitted) within the longer time period defined by the producer's marketing department nationally (usually a month). The period allotted for the promotion for the whole country is usually accompanied by increased advertising on the national TV channels. Thus, this side of endogeneity problem may be solved by including time dummy. Also, endogeneity may occur with respect to the price variable, stores with large sales (turnover) can afford lower profit margin and put lower price.

The problem of multicollinearity may occur due to the negotiation process. When agreeing to organize a promotion, a producer's account manager positions a promotion as investments to the store from the side of the producer; thus, "in return" and to make the promotion more efficient he/she may ask for some steps from the side of the store, for example, increase shelf share occupied by the brand, improve shelving, place additional displays or to lower the price (price is the most sensitive issue and thus presents least problems). As a result of negotiations, only one or several of the determinants may change for the period of the promotion or for a longer period.

Chapter 5

RESULTS AND THEIR INTERPRETATIONS

In order to perform the regression with the variables described above, we need to determine the suitable method of estimation. Since the data set is panel, we choose between fixed effects, random effects and pooled OLS regression. To determine statistically which of the three is applicable for the given data set, we perform F-test to choose between pooled OLS and fixed effects specification, Breusch and Pagan Lagrangian Multiplier test to choose between pooled OLS and random effects specification, and Hausman test to decide on random effect or fixed effects specification. In table 5.1, the results of the tests with the correspondent p-values and decisions are presented.

Since the p-value for the Breusch and Pagan Lagrangian Multiplier test for Brand 4 is reasonably small, the decision on specification is not straightforward. However, since the results of the estimation under both specifications (random effects and OLS) do not differ significantly (see appendix 3), for the purpose of consistency, we will use pooled OLS specification for all the brands. The absence of fixed effects is unexpected but can be explained by the choice of the monitored stores by the manufacturer. Evidently, the chosen stores were of strategic importance and thus possessed similar characteristics, for example, they were all reasonably big. However, this finding is not negative for our purpose: the effect of promotion and other variables of interest is more salient and important in big stores.

Table 5.1

The results of the specification tests

Brand	Test	P> | statistics |	Decision
Brand 1	Pooled OLS vs. Fixed	0.3603	pooled
	Pooled OLS vs. Random	0.3800	pooled
	Fixed vs. Random	--	--
Brand 2	Pooled OLS vs. Fixed	0.8801	pooled
	Pooled OLS vs. Random	0.1515	pooled
	Fixed vs. Random	--	--
Brand 3	Pooled OLS vs. Fixed	0.2258	pooled
	Pooled OLS vs. Random	0.2892	pooled
	Fixed vs. Random	--	--
Brand 4	Pooled OLS vs. Fixed	0.9925	pooled
	Pooled OLS vs. Random	0.0881	pooled
	Fixed vs. Random	0.9998	random

In order to refute or admit and correct for our theoretically possible problems with the data, we have to perform tests to check for heteroskedasticity, endogeneity and collinearity. Since we suspect possible endogeneity between sales and promotion and sales and price (see discussion in chapter 4), we will perform Hausman test using lagged values of the variables as instrumental variables. To test for suspected collinearity, we will look at the correlation coefficients between the explanatory variables. Presence of heteroskedasticity will be detected using the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity.

Heteroskedasticity test:

Table 5.2

The results of the heteroskedasticity test

Brand	P>|statistics|	heteroskedasticity
Brand 1	0.5540	no
Head& Shoulders	0.8375	no
Brand 3	0.4172	no
Brand 4	0.2345	no

As can be seen from table 5.2, there was no heteroskedasticity detected.

Endogeneity test:

Table 5.3

The results of the Hausman test for endogeneity

Brand	Variable	Instrumental variable	P>|statistics|	Endogeneity
Brand 1	Own price	Lagged price	0.7771	no
	Promo	Lagged promo	0.8559	no
Brand 2	Own price	Lagged price	0.0786	no
	Promo	Lagged promo	0.1137	no
Brand 3	Own price	Lagged price	--	--
	Promo	Lagged promo	0.9752	no
Brand 4	Own price	Lagged price	0.9156	no
	Promo	Lagged promo	0.0348	yes

Using lagged variables as instruments (correlation coefficients are presented in appendix 2), we performed endogeneity test. We detected endogeneity between promotion and sales for Brand 4. The estimation results using instrumental variables differ somewhat from those using OLS: coefficients of promotion and out-of-stock became significantly smaller in absolute values (estimation results can be found in appendix 3). Consequently, we will use pooled OLS regression for three of the brands and instrumental variables regression for Brand 4.

In order to control for seasonality, inflation and other time-specific effects, we introduce time dummies into our regressions. The tables with the estimation results can be found in appendix 3. As can be seen, time dummies are mostly insignificant. However, in Brand 1 regression one of the time dummies is significant and the estimation results are different from OLS regression: shelf vision coefficient became significant and some other coefficients changed in values. For Brand 2 one time dummy is weakly significant but there are no significant changes in comparison with the OLS regression results. For Brand 3 again only one time dummy is significant but the results differ somewhat from the OLS regression results: shelf share coefficient became significant and some of the coefficients changed in absolute values. Using instrumental variables regression with time dummies, we see that none of the time dummy coefficients are significant; thus, we will analyze the result of the instrumental variables regression without time dummies.

The final specification, the estimation results of the corresponding regressions and p-values for the coefficients for each of the four brands are presented in table 5.4.

Table 5.4

The estimation results

Dep.var.: Sales (ml)	Results	Brand			
		Brand1 OLS	Brand2 OLS	Brand3 OLS	Brand4 IV
	Time dummy	yes	no	yes	no
Promotion	Coefficient	**10877.13*****	**9430.58*****	**7257.23*****	**5079.71*****
	P-value	0.000	0.000	0.000	0.000
Out of stocks	Coefficient	**-8106.25*****	-2443.708	**-2422.58****	**-5823.87****
	P-value	0.007	0.149	0.043	0.021
Own price	Coefficient	**-2043.83***	**-5277.1*****	NA[1]	739.593
	P-value	0.084	0.000	NA[1]	0.707
Competitor price	Coefficient	153.4262	NA[2]	-117.3458	-337.9947
	P-value	0.967	NA[2]	0.884	0.907
Display share	Coefficient	**5057.9*****	**4979.3*****	**1885.9*****	**4397.2*****
	P-value	0.000	0.000	0.000	0.000
Shelf vision	Coefficient	**1974.624***	207.0999	**1978.24****	790.1352
	P-value	0.093	0.794	0.015	0.325
Shelf share	Coefficient	-5354.32	3084.549	**6200.98****	5300.045
	P-value	0.742	0.563	0.045	0.540
Constant	Coefficient	16719.63	**31455.2*****	**18071.6*****	3672.143
	P-value	0.361	0.000	0.000	0.474

Note: * significant at 10%, **significant at 5%, * significant at1%

[1] own price is constant for Brand 3

[2] competitor's price is not defined for Brand 2

Promotion (with the focus on bundling and buy-and-get promotions) is highly significant for all the brands. Positive sign of the coefficients confirm the theory of risk reduction and increase in overall evaluation of the product due to promotion (Harris, 1997) and refute the theory of additional restrictions and decrease in utility due to promotion (Wilson et al., 1990). According to the regression analysis, if promotion is carried out in a store, the sales grow by 10877 ml for Brand 1 (around 54 bottles of 200ml), 9430 ml for Brand 2 (around 47 bottles of 200ml), 7257 ml for Brand 3 (around 36 bottles of 200ml), and 5079 ml for Brand 4 (around 25 bottles of 200ml). The lowest impact of promotion is reached with Brand 4. This can be partially explained by the perceived value of a gift in case of bundling and buy-and-get promotion. A gift is usually chosen so that its perceived value constitutes about 40% of the product price. Since Brand 4 belongs to a low-price tier, the free promotional gift can have a low perceived value in absolute terms and thus fail to make an attractive bargain.

Out-of-stocks, defined as a percentage of SKUs missing on the shelf out of all SKUs within the brand, are significant for all the brands except for Brand 2. Out-of-stocks might have a less dramatic effect on sales of Brand 2 due to high substitutability of SKUs inside the brand itself. Since all Brand 2 SKUs are positioned primarily as antidandruff shampoos, a consumer can easily find a substitute of the preferred SKU among other Brand 2 SKUs. The negative impact of out-of-stock confirms the finding of Bell and Fitzsimons (1999). As can be seen from the regression coefficients, an increase in stock-out of 1% will decrease the sales of Brand 1 by about 8106ml (around 40 bottles of 200ml), of Brand 3 by 2422ml (about 12 bottles of 200ml), of Brand 4 by 5823ml (around 29 bottles of 200ml). The considerable effect of out-of-stock on Brand 1 can be explained by the relative novelty of the brand and limited number of SKUs within the brand which contributes to low substitutability of SKUs within the brand.

The price of the product is significant for two brands only: Brand 1 and Brand 2. This can be explained in little variability in data for the other two brands (for Brand 3 the price was constant). According to the regression results, an increase in price per ml by 1kop will decrease sales by about 2043ml for Brand 1 and by about 5277ml for Brand 2. That is, if a 200ml bottle costs 2UAH more, the sales will decrease by 10 and 26 bottles correspondently.

Competitor's price is insignificant for all the brands. Low cross-price elasticity may be explained by strong loyalty of consumers to the brands. This can also be explained but the bad proxy chosen for the competitor's price.

Display share is highly significant for all the brands. The positive sign of the coefficient verifies the theoretical analysis of additional product placements, i.e. displays. The theory, however, does not explain a relatively small coefficient for Brand 3 as compared to other brands. A smaller degree of efficiency of displays could be explained by "non-maturity" of the brand (Chevalier, 1975), which is not the case with Brand 3, well known among consumers. One could find an explanation in the market structure theory: according to Chevalier (1975) displays are more effective when there is no clearly defined leader in the market. Brand 3 is a leader by far occupying 11.4% and with its closest competitor occupying only 3.9% of the market share. Brand 2 is a well-defined leader with 11.7% of the market share while its closest competitor possesses only 0.2%. If we assume equal maturity of Brand 3 and Brand 2, then the theory of market structure fails to explain why the effect is so different for two leading brands with equal popularity among consumers. On the other hand, the relatively big coefficient of Brand 1 supports this theory: The competition in the natural shampoos category is quite strong (the closest competitor is only 2.9% ahead). The most competitive brand is Brand 4. It surpasses its competitor by 0.1% only (9.0% and 8.9% respectively).

However, if we compare two brands from highly competitive environments (Brand 1 and Brand 4) and again assume equal familiarity among consumers, we find a contradiction to the theory of market structure. Displays exercise relatively smaller influence on a brand from a more competitive category (Brand 4). Different effectiveness of display may be attributed to different price levels of the brand. Judging from the coefficients, we see that a brand from a lower price-tier is less sensitive to additional displays. Thus, we can conclude that displays effect different income groups differently. We may assume that consumers who shop for low-price products keep prices in the main focus of their attention. They well remember the actual market price of the product and do not perceive displays as a special bargain. According to the regression coefficients, however, an increase in display share by 0.01 increases the sales of Brand 4 by about 44ml (almost 0.21 bottles of 200ml), the sales of Brand 2 by about 50ml (around 0.25 bottles of 200ml), the sales of Brand 1 by about 50ml (nearly 0.25 bottles of 200ml), and the sales of Brand 3 by about 19ml (about 0.09 bottles of 200ml).

Shelf vision variable is significant for Brand 1 (at 10% significance level) and for Brand 3 (at 5% significance level). For the other two brands this variable is insignificant. This might be explained by the category to which the brands belong. Since both brands belong to high price tier products, Brand 1 belongs to natural category which is highly competitive and Brand 3 belongs to cosmetic category which is even more saturated with brands, exposing consumers to visual image through positioning on the shelf can play a decisive role in purchasing decision. The signs of the coefficients are in accord with the theory of easy-shopping and specifics of human perception, mainly scanning products through "a flattened cone of peripheral vision". According to the regression results, if the sales vision evaluation increases from minimal of 0 to maximal of 1, the sales increase by nearly 10 bottles of 200 ml for Brand 1 and Brand 3. Shelf vision might not be significant for Brand 2 because the brand does not have a directly competitive

brand in the same price tier. Products of low-price tier, where Brand 4 belongs, are traditionally worse represented on the shelf. Targeted consumers are accustomed to this and initially search for the product at a worse location (for example, on a lower shelf). This conventional "location discrimination on the basis of price" could attribute the variable's insignificance.

Shelf share is significant for Brand 3 only. This can be explained by the fact that Brand 3 consistently occupied more shelf space than other brands (mean value of the shelf share is significantly larger). The results lead to a possible explanation that shelf space is a variable of scale which becomes significant only after a brand is allotted a considerable share of shelf space. As can be seen from the coefficient, an increase by 0.01 will bring an increase in sales of about 62ml, which constitutes 0.31 bottles of 200ml.

Chapter 5

CONCLUSIONS

The goal of the research was to determine the most effective in-store marketing techniques for the case of hair care products in modern trade retailers. Based on the existing research and practical observations, seven major in-store determinants were singled out. The empirical model was based on the specification standard to empirical research in the existing literature. Testing the expected influence and significance of the determinants on product sales, we used panel data on four hair care brands, collected in six Kiev stores over a period of 16 weeks.

Based on the results of the specification tests, pooled OLS regression versus fixed effects and random effects regressions was chosen for all four brands. After performing the tests for heteroskedasticity and endogeneity and controlling for time-specific effects, a suitable specification was chosen for each brand. We ran pooled OLS regression for Brand 2, pooled OLS regression with time dummies for Brand 1 and Brand 3, and instrumental variables regression for Brand 4.

The most effective among the regressors are promotions and displays. Their effect on sales was consistently significant for all the brands. Out-of-stocks are negatively significant for three out of four brands. Own price and shelf vision are significant in two cases. Surprisingly, shelf share was significant for one brand only. Competitor's price was insignificant for all the brands.

Thus, we may conclude that the companies that invest in such BTL activities (below the line – advertising media that is considered more as promotional channels, including direct mail, displays, leaflets, and sales promotions) as additional displays and promotions, will get a payoff of increased sales. However, in our discussion we focused on benefits only. Since store managers often demand payments for permission to place a display or organize a promotion, costs of these activities may be higher than actual profits from increased sales in the short run. However, in the long run there may be additional gains, if by means of promotions or displays inexperienced consumers are attracted. They may become returning consumers if the product satisfied their needs. The insignificance of the lagged promotion when included may be explained by the relatively short time span; the long run effects may take place in the longer run. Out-of-stocks may be caused either by ineffective logistics management from the side of the producer or inadequate inventories management from the side of the store. In the latter case, the significance of out-of-stocks in our regressions underlies the importance of collaboration of store managers and manufacturers when supplying products on the shelves. Relative insignificance of qualitative and quantitative presentation on the shelf (shelf vision and shelf share) gives evidence that Ukrainian consumers are more sensitive to stimuli that arouse smart-shopper feelings, like monetary gain from lower price, gifts from promotions and possible gain from display products that are perceived as special bargain, than to visual stimulation. From the insignificance of competitor's price we may conclude that manufacturers do not need to intensely dispute a lower price level as compared to the competitors' with store managers for whom price policy remains a very sensitive issue. However, one should keep in mind that this statement cannot be generalized to the cases when the product loyalty is not so strong and competitor's price matters.

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APPENDIX 1

- **Brand 2:**

Table 1.1

Summary statistics for the whole sample for Brand 2

Variable	Obs	Mean	Std. Dev	Min	Max
Sales (ml)	96	9975	4693.13	200	20400
Shelf vision	96	.875	.2176429	.5	1
Shelf share	96	.07375	.045682	.03	.2
Display share	96	.1871875	.2918821	0	1
Promotion	96	.28125	.4519694	0	1
Out of stocks	96	.0519792	.1028501	0	.44
Own price	96	4.803141	.2873681	4.323	5.545

For this brand the variables exhibit substantial variation as well. There are no observations for the competitor's price because for this brand the competitor in the category of anti-dandruff shampoos is not defined. Although there are anti-dandruff shampoos belonging to some of the existing brands, none of the brands positioned as anti-dandruff are sold in supermarkets.

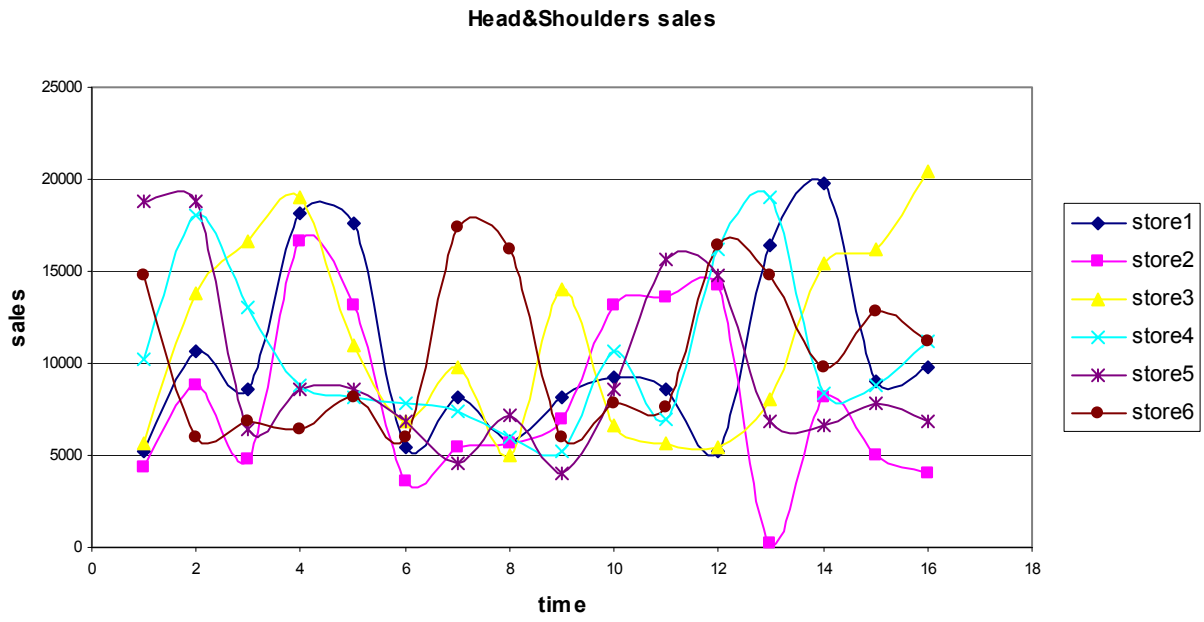
Table 1.2

Summary statistics for Brand 2 across the stores (means and standard deviations)

Variable	Mean/St.dev	Store 1	Store 2	Store 3	Store 4	Store 5	Store 6
Sales (ml)	Mean	10362.5	7987.5	11200	10362.5	9425	10512.5
	Std. dev	4880.01	4764.014	5287.974	4167.313	4781.562	4245.763
Shelf vision	Mean	.9375	.9375	.875	1	.6875	.8125
	Std. dev	.1707825	.1707825	.2236068	0	.25	.25
Shelf share	Mean	.045	.136875	.12	.0425	.031875	.06625
	Std. dev	.0096609	.0431615	.0163299	.007746	.0040311	.0230579
Display share	Mean	.103125	.201875	.4025	.118125	.0375	.26
	Std. dev	.0979605	.2994043	.3229551	.2803383	.0806226	.3988483
Promotion	Mean	.25	.3125	.375	.25	.25	.25
	Std. dev	.4472136	.4787136	.5	.4472136	.4472136	.4472136
Out of stocks	Mean	.134375	.035	.009375	.078125	.043125	.011875
	Std. dev	.1547027	.0780598	.0256824	.1196784	.0935748	.0348748
Own price	Mean	4.560774	5.323931	4.917485	4.590031	4.693812	4.732812
	Std. dev	.0902391	.209416	.1137627	.0822567	.1207246	.0659729

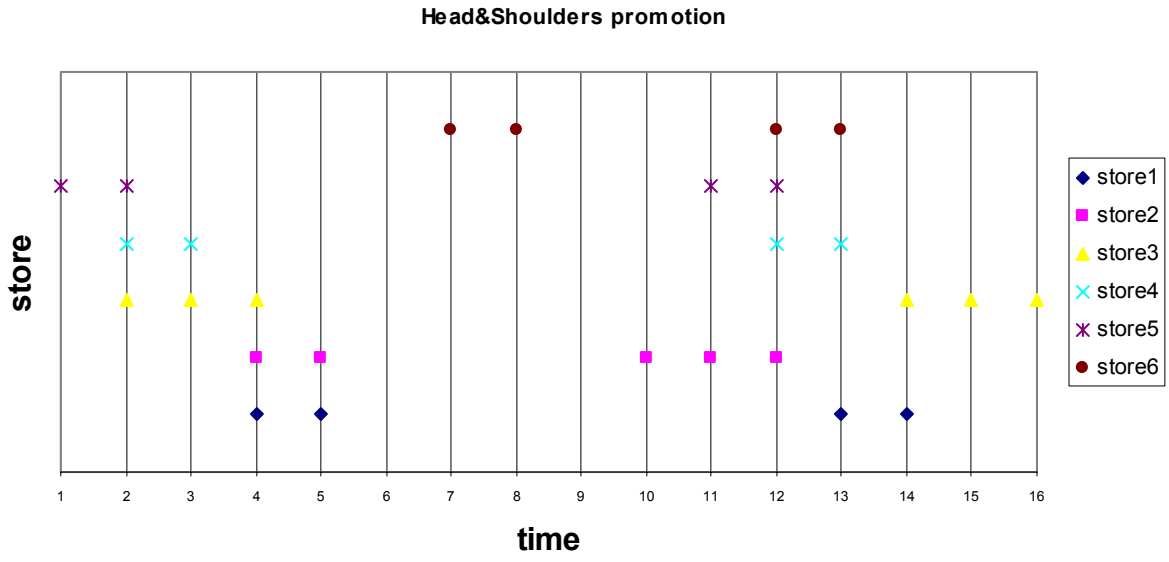
The means of sales in different stores vary considerably; the difference between the maximal and the minimal value is 3212.5 ml which constitutes about 16 bottles of the product. The visual presentation in all of the stores was reasonable high, with the lowest observation still above 0.5 and the other four observations above 0.8. The presentation on the shelf is not so consistently good but varies across the stores. The share of displays devoted to this brand, out of all additional displays in this category, also vary across the stores. The difference between the maximal and the minimal value of the means is more than 36%. The promotional activity was evenly spread between the representative stores: in four of the stores the average number of promotions held during the given period was four while for the other two stores the average is a little higher. The attention paid to the steady assortment of the brand differs significantly from store to store. The difference between the maximal and the minimal values of the means of out-of-stocks is around 13%. The price remains the least variable of the regressors.

Graph 1.1



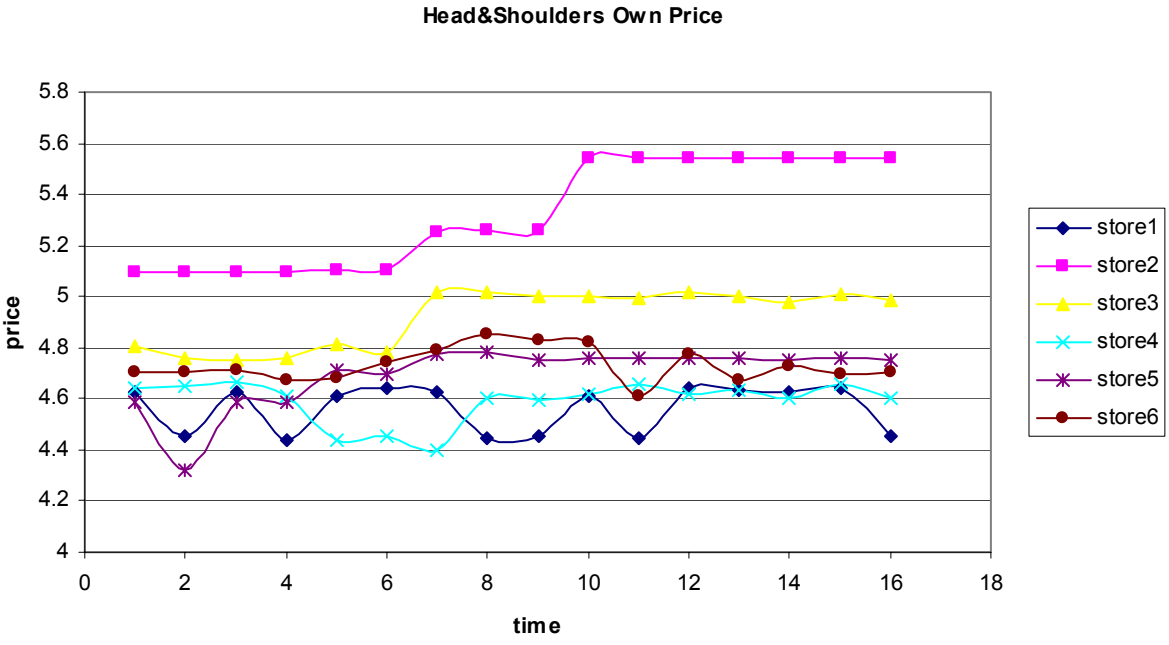
As can be seen from graph 1.1, the peaks and troughs of sales occur at different points of time for different stores. This peaks coincide with the periods of promotion.There is also no distinct pattern common to all the stores according to which the sales develop in time.

Graph 1.2



The dates of promotion for this brand are clearly not uniform across the stores. There are six occurrences of the promotions simultaneously in two of the stores and one occurrence in three of the stores.

Graph 1.3



As can be seen from graph 1.3, the patterns of price development of some of the stores are similar although the prices are different in their absolute values. Overall, there is no uniform pattern for all the stores.

- **Brand 3:**

Table 1.3

Summary statistics for the whole sample for Brand 3

Variable	Obs	Mean	Std. Dev	Min	Max
Sales (ml)	96	22639.58	3559.375	16800	30000
Shelf vision	96	.9427083	.1757659	0	1
Shelf share	96	.1109375	.0439157	.05	.25
Display share	96	.1870833	.2823992	0	1
Promotion	96	.2916667	.4569157	0	1
Out of stocks	96	.0496875	.1207124	0	.67
Own price	96	4.512155	0	4.512155	4.512155
Competitor price	96	4.233095	.1663029	4.004	4.68

As can be seen from table 1.3, there is substantial variation in the data.

Table 1.4

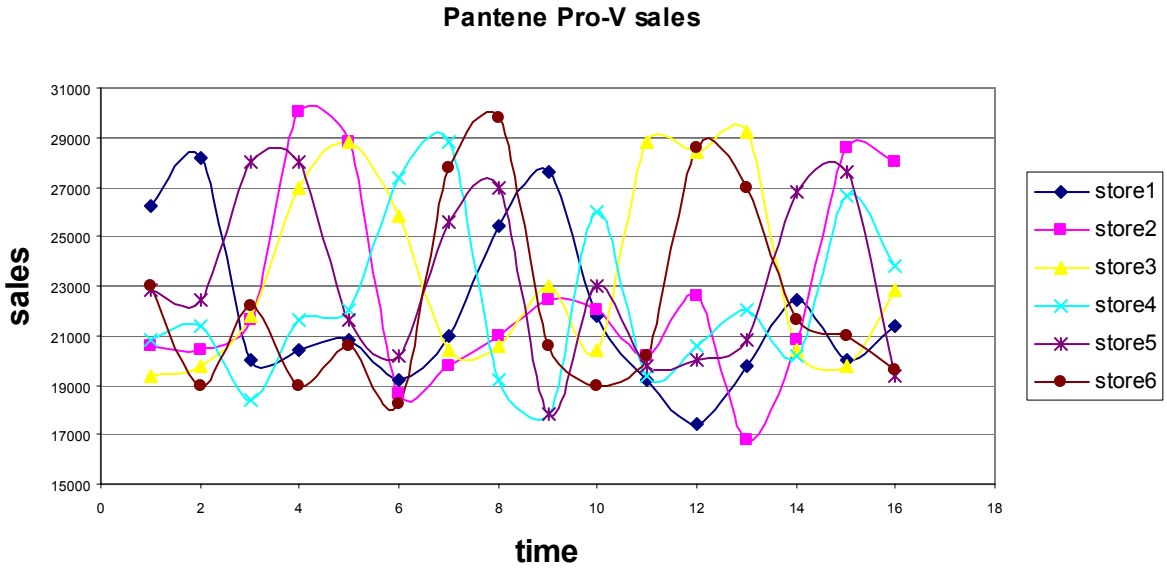
Summary statistics for Brand 3 across the stores (means and standard deviations)

Variable	Mean/St.dev	Store 1	Store 2	Store 3	Store 4	Store 5	Store 6
Sales (ml)	Mean	21925	23026.67	23525	22250	23175	22325
	Std. dev	3205.724	3791.62	3788.315	3338.263	3484.729	3811.474
Shelf vision	Mean	.9375	.8333333	.90625	1	1	1
	Std. dev	.1707825	.243975	.2719528	0	0	0
Shelf share	Mean	.08125	.182	.125	.121875	.06375	.09375
	Std. dev	.0108781	.0521262	.0126491	.0054391	.0080623	.0136015
Display share	Mean	.095	.236	.294375	.161875	.19375	.15625
	Std. dev	.1168475	.3248472	.3208316	.350128	.2394403	.2868652
Promotion	Mean	.25	.2666667	.375	.25	.375	.25
	Std. dev	.4472136	.4577377	.5	.4472136	.5	.4472136
Out of stocks	Mean	.151875	.0766667	.018125	.015625	.00125	.039375
	Std. dev	.1934673	.1769046	.0416683	.0625	.0034157	.0551928
Own price	Mean	4.512155	4.512155	4.512155	4.512155	4.512155	4.512155
	Std. dev	0	0	0	0	0	0
Competitor price	Mean	4.127	4.216	4.11625	4.36275	4.12125	4.45075
	Std. dev	.073343	.1392287	.0332896	.069	.069	.1782027

As can be seen from table 1.4, the means of the following variables do not differ from store to store significantly: sales, shelf vision, promotion, own price, and competitor's price. The rest of the variables

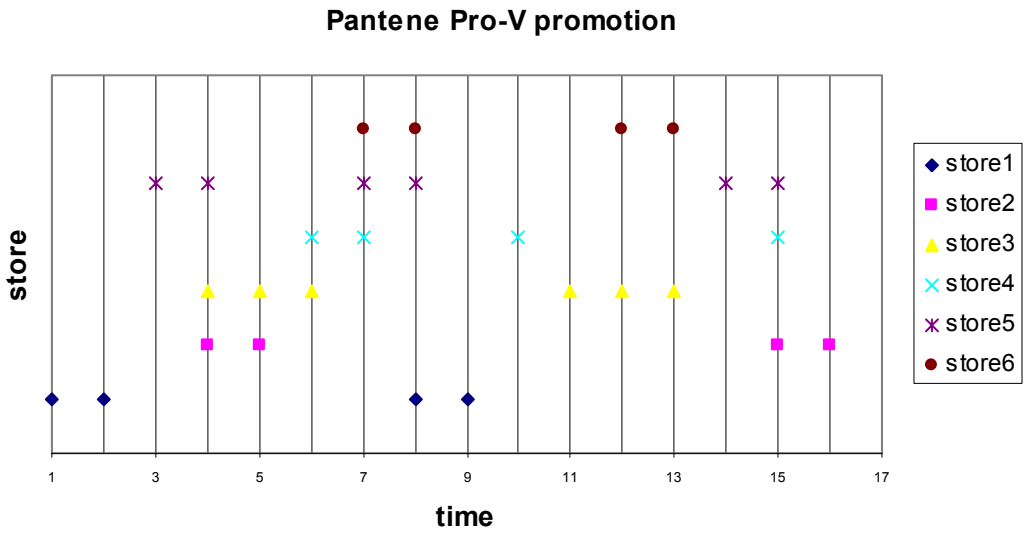
show greater variability. The difference between the maximal and the minimal value of the means is 20% for display share, 15% for out-of-stocks, and 12% for shelf share.

Graph 1.4.



Graph 1.4 illustrates development of sales across time for each of the stores. As can be seen, the pattern of sales is specific for each of the stores. What is peculiar for this brand is that the range where the majority of observations lie is much narrower and the range of sales is higher (20000 - 30000) that for the rest of the brands (5000 - 20000). This pattern proves that the brand is most popular and best sold.

Graph 1.5



The dates of promotion for this brand are clearly not uniform across the stores. There are seven simultaneous occurrences of the promotions in two of the stores and one simultaneous occurrence in three of the stores.

The graph of the price over time for this brand is not provided because the price is constant.

- **Brand 4:**

Table 1.5

Summary statistics for the whole sample for Brand 4

Variable	Obs	Mean	Std. Dev	Min	Max
Sales (ml)	96	7227.083	3459.312	2000	16600
Shelf vision	96	.78125	.259681	0	1
Shelf share	96	.045	.0261574	.02	.2
Display share	96	.1168421	.2029058	0	1
Promotion	96	.28125	.4519694	0	1
Out of stocks	96	.0419792	.0932639	0	.33
Own price	96	2.417407	.1538578	2.247	2.845
Competitor price	94	2.172721	.0953343	1.929741	2.34

Table 1.5 illustrates the variability in the data for all the variables. As can be seen, the data on all the variables show considerable variability.

As cane be seen from table 1.6, promotion is the least variable regressor across the stores: in four of the stores the values of means and standard deviations are identical. Also, there are little deviations in competitor's price across the stores. All other variables exhibit greater variability across the stores

Table 1.6

Summary statistics for Brand 4 across the stores (means and standard deviations)

Variable	Mean/St.dev	Store 1	Store 2	Store 3	Store 4	Store 5	Store 6
Sales (ml)	Mean	6950	7400	8200	6637.5	7462.5	6712.5
	Std. dev	2766.948	2840.657	4763.192	3337.239	3600.532	3382.282

Shelf vision	Mean	.625	.90625	.875	.5	1	.78125
	Std. dev	.2886751	.2015564	.2236068	0	0	.2561738
Shelf share	Mean	.035	.083125	.035625	.04625	.026875	.043125
	Std. dev	.007303	.0430068	.0109354	.0061914	.0060208	.0113835
Display share	Mean	.1325	.06125	.168125	.090625	.2073333	.046875
	Std. dev	.1038268	.1129528	.2324426	.1951228	.3459452	.1007782
Promotion	Mean	.25	.25	.375	.3125	.25	.25
	Std. dev	.4472136	.4472136	.5	.4787136	.4472136	.4472136
Out of stocks	Mean	.048125	.025	.0175	.103125	.015625	.0425
	Std. dev	.0863496	.068313	.0478191	.1579755	.0625	.0781025
Own price	Mean	2.275234	2.676464	2.35425	2.39825	2.381298	2.418948
	Std. dev	.0095103	.2067566	.0548604	.0644676	.0185621	.0197591
Competitor price	Mean	2.094608	2.124511	2.207099	2.15646	2.07532	2.10674
	Std. dev	.0890219	.5739466	.0169667	.0422016	.0134787	.5664758

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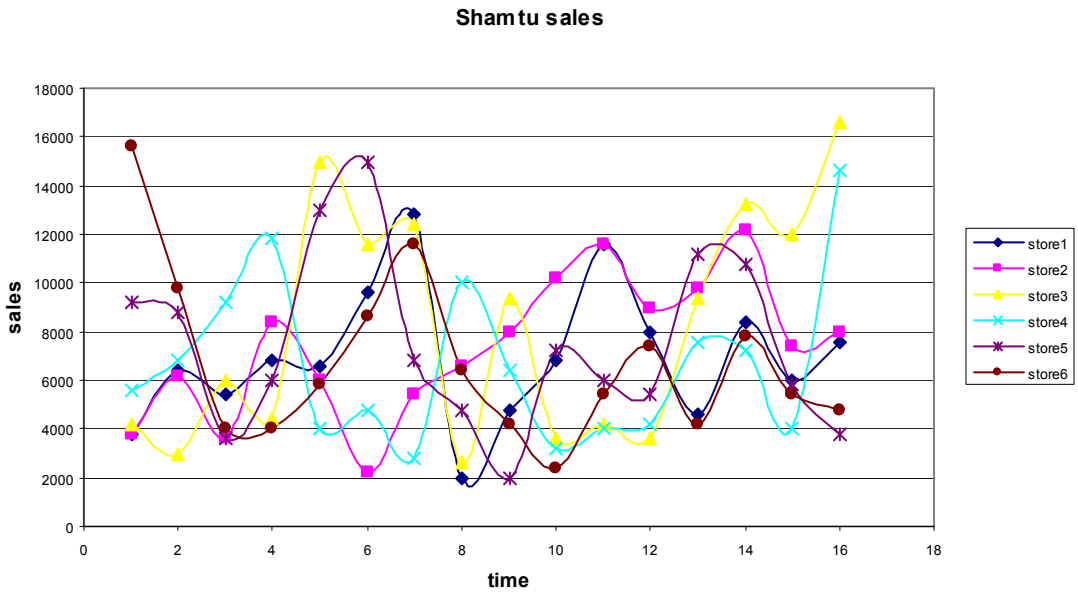
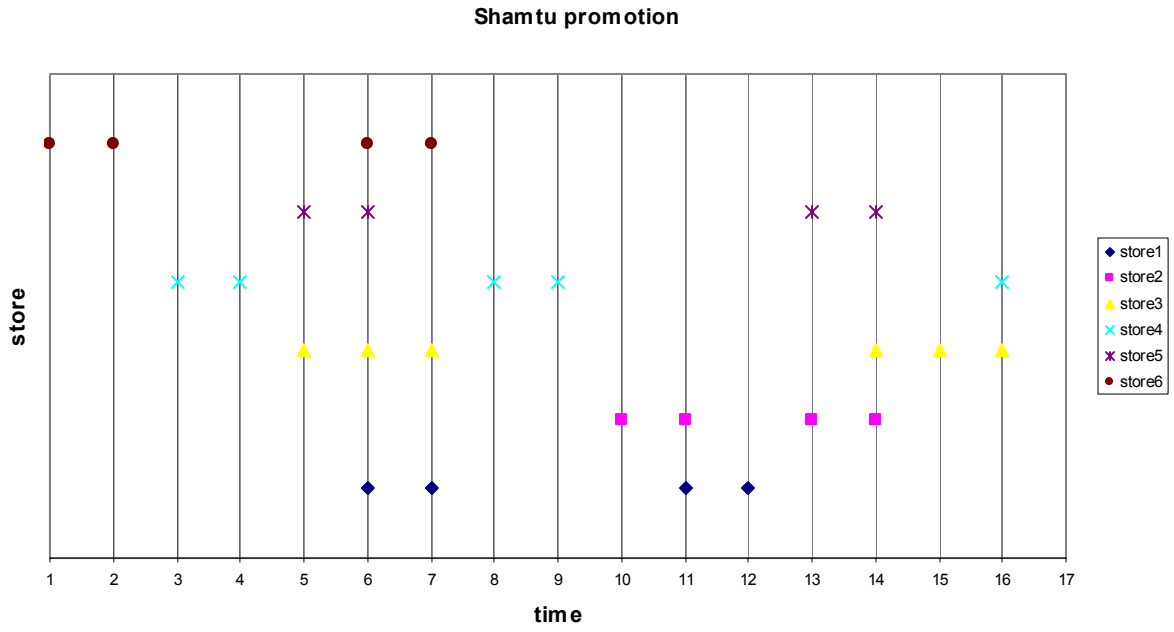
Graph 1.7



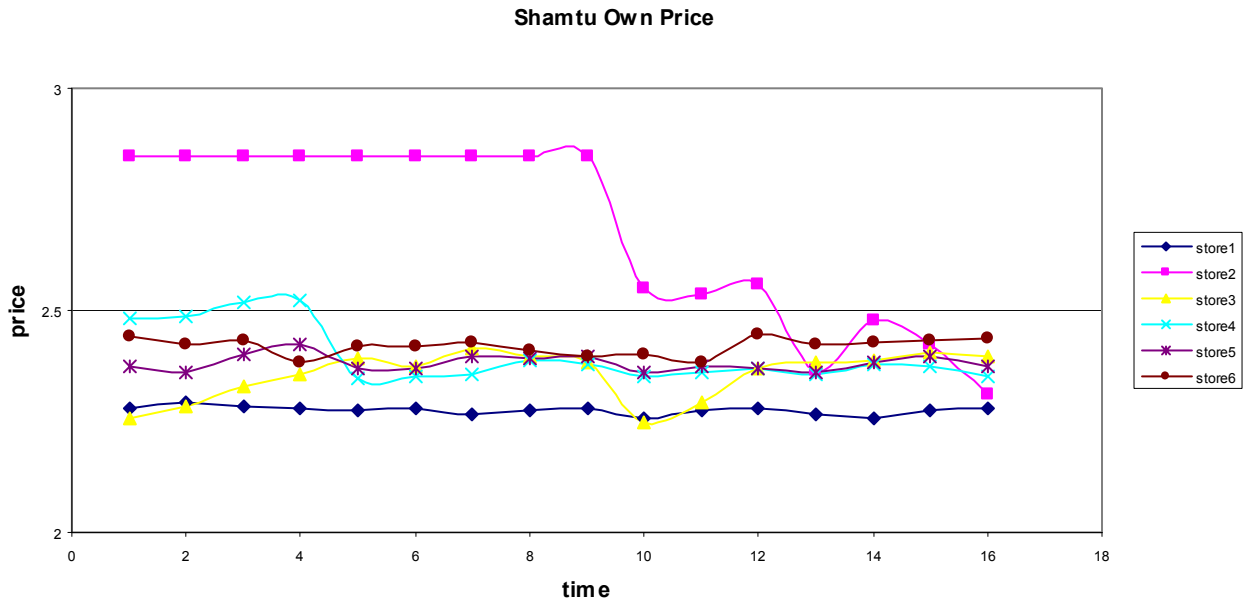
As can be seen from graph 1.7 there is no distinct pattern common to all the stores according to which the sales develop in time. The range where most observations lie consists of lower sales values than the previous three brands (2000 – 12000).

Graph 1.8



As can be seen from graph 1.8, the dates of promotions were chosen individually for each of the stores. Five times the promotions were held simultaneously in two shops and twice simultaneously in three shops.

Graph 1.9



As can be seen from graph 1.9, the price curves are shaped differently for each of the stores and no common trend can be seen.

Appendix 2

Table 2.1

The correlation coefficients between the instrumented and instrumental variables

Brand	**Variable**	**Instrumental variable**	**Correlation coefficient**
Brand 1	Own price	Lagged price	0.8433
	Promo	Lagged promo	0.4171
Head& Shoulders	Own price	Lagged price	0.9467
	Promo	Lagged promo	0.4050
Brand 3	Own price	Lagged price	--
	Promo	Lagged promo	-0.1697
Brand 4	Own price	Lagged price	0.9433
	Promo	Lagged promo	0.3710

Appendix 3

Table 3.1

Estimation results of pooled OLS regression for Brand 1

Pooled OLS regression		No. of obs =	80
R-sq = 0.8723		F(7, 72) =	70.24
Adj R-squared = 0.8599		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**z**	**P>z**
Shelf vision	-1066.872	-1.03	0.309
Shelf share	1312.118	0.09	0.930
Display share	**4843.168**	4.82	0.000
Promotion	**11107.64**	20.74	0.000
Out of stocks	**-7969.462**	-3.04	0.003
Own price	**-1962.566**	-1.90	0.062
Competitor price	-2914.067	-0.92	0.359
Constant	**28875.29**	1.83	0.071

Table 3.2

Estimation results of OLS regression for Brand 1 with time dummies

Pooled OLS regression		No. of obs =	80
R-sq = 0.8983		F(7, 79) =	32.40
Adj R-squared = 0.8591		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**t**	**P>t**
Shelf vision	**1974.624**	1.71	0.093
Shelf share	-5354.323	-0.33	0.742
Display share	**5057.883**	4.58	0.000
Promotion	**10877.13**	18.61	0.000
Out of stocks	**-8106.254**	-2.80	0.007
Own price	**-2043.831**	-1.76	0.084
Competitor price	153.4262	0.04	0.967
Iperiod2	1486.052	1.15	0.257
Iperiod3	**2834.493**	2.16	0.035
Iperiod4	1784.041	1.29	0.201
Iperiod5	906.3488	0.69	0.495
Iperiod6	1375.588	1.04	0.302
Iperiod7	-621.6614	-0.46	0.647
Iperiod8	-277.5443	-0.20	0.840
Iperiod9	460.371	0.34	0.734
Iperiod10	213.9982	0.15	0.879
Iperiod11	1496.003	1.11	0.272
Iperiod12	156.5725	0.11	0.913
Iperiod13	-507.5362	-0.37	0.711
Iperiod14	282.1178	0.20	0.843
Iperiod15	71.08871	0.05	0.961
Iperiod16	1383.527	1.01	0.319

Table 3.3

Estimation results of pooled OLS regression for Brand 2

Pooled OLS regression		No. of obs =	96
R-sq = 0.8908		F(6, 89) =	120.98
Adj R-squared = 0.8834		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**z**	**P>z**
Shelf vision	207.0999	0.26	0.794
Shelf share	3084.549	0.58	0.563
Display share	**4979.305**	8.31	0.000
Promotion	**9430.584**	24.72	0.000
Out of stocks	-2443.708	-1.46	0.149
Own price	**-5277.022**	-6.33	0.000
Constant	**31455.19**	8.36	0.000

Table 3.4

Estimation results of OLS regression for Brand 2 with time dummies

Pooled OLS regression		No. of obs =	96
R-sq = 0.9086		F(7, 79) =	35.04
Adj R-squared = 0.8827		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**t**	**P>t**
Shelf vision	-220.03	-0.25	0.800
Shelf share	6569.58	1.06	0.291
Display share	**4510.285**	6.79	0.000
Promotion	**9337.616**	22.52	0.000
Out of stocks	-1816.898	-1.00	0.322
Own price	**-5568.547**	-5.84	0.000
Iperiod2	-256.9655	-0.27	0.788
Iperiod3	-944.1045	-0.98	0.332
Iperiod4	201.1186	0.21	0.831
Iperiod5	259.0001	0.27	0.786
Iperiod6	**-1578.855**	-1.69	0.096
Iperiod7	-667.3188	-0.71	0.481
Iperiod8	-979.9849	-1.05	0.299
Iperiod9	-33.29759	-0.03	0.972
Iperiod10	-261.916	-0.28	0.784
Iperiod11	-827.1637	-0.87	0.386
Iperiod12	-518.858	-0.52	0.603
Iperiod13	-338.2592	-0.34	0.734
Iperiod14	794.1906	0.79	0.431
Iperiod15	194.0542	0.19	0.849
Iperiod16	1038.789	1.09	0.278
constant	**33298.48**	7.75	0.000

Table 3.5

Estimation results of pooled OLS regression for Brand 3

Pooled OLS regression		No. of obs =	94
R-sq = 0.8887		F(6, 87) =	115.78
Adj R-squared = 0.8810		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**Z**	**P>z**
Shelf vision	**1701.943**	2.25	0.027
Shelf share	4395.036	1.48	0.143
Display share	**1886.82**	4.16	0.000
Promotion	**7064.679**	25.31	0.000
Out of stocks	**-2467.259**	-2.35	0.021
Own price	-	-	-
Competitor price	-607.6189	-0.79	0.433
Constant	**20855.78**	6.47	0.000

Table 3.6

Estimation results of OLS regression for Brand 3 with time dummies

Pooled OLS regression		No. of obs =	94
R-sq = 0.9102		F(7, 79) =	37.74
Adj R-squared = 0.8840		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**T**	**P>t**
Shelf vision	**1978.293**	2.48	0.015
Shelf share	**6200.977**	2.04	0.045
Display share	**1885.983**	4.03	0.000
Promotion	**7257.228**	24.91	0.000
Out of stocks	**-2422.581**	-2.06	0.043
Own price	-	-	-
Competitor price	-117.3458	-0.15	0.884
Iperiod2	129.197	0.18	0.854
Iperiod3	360.4447	0.50	0.618
Iperiod4	867.2897	1.22	0.226
Iperiod5	-570.0711	-0.79	0.431
Iperiod6	-752.6471	-1.05	0.295
Iperiod7	22.55453	0.03	0.975
Iperiod8	-424.2127	-0.60	0.548
Iperiod9	187.3232	0.27	0.791
Iperiod10	48.33356	0.07	0.946
Iperiod11	48.7568	0.07	0.945
Iperiod12	310.2036	0.43	0.665
Iperiod13	77.01337	0.10	0.919
Iperiod14	507.8606	0.70	0.484
Iperiod15	879.5482	1.23	0.221
Iperiod16	**1522.342**	2.01	0.048

Table 3.7

Estimation results of pooled OLS regression for Brand 4

Pooled OLS regression		No. of obs =	87
R-sq = 0.7185		F(7, 85) =	7.88
Adj R-squared = 0.6935		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**z**	**P>z**
Shelf vision	631.7398	0.82	0.417
Shelf share	2122.114	0.26	0.793
Display share	**4204.657**	4.19	0.000
Promotion	**6226.803**	13.76	0.000
Out of stocks	**-7084.769**	-3.27	0.002
Own price	961.3154	0.54	0.592
Competitor price	81.4629	0.03	0.977
Constant	2263.03	0.49	0.628

Table 3.8

Estimation results of random effects regression for Brand 4

Random Effects GLS regression		No. of obs =	93
R-sq: within = 0.7216		No.of groups =	6
R-sq: between = 0.9709		Wald chi2(7) =	226.79
R-sq: overall = 0.7274		Prob > chi2 =	0.0000
Dependent variable: sales	**Coef.**	**z**	**P>z**
Shelf vision	631.7398	0.82	0.415
Shelf share	2122.114	0.26	0.26
Display share	4204.657	4.19	4.19
Promotion	**6226.803**	13.76	0.000
Out of stocks	**-7084.769**	-3.27	0.001
Own price	961.3154	0.54	0.591
Competitor price	81.4629	0.03	0.977

Constant	2263.03	0.49	0.627

Table 3.9

Estimation results of instrumental variables regression for Brand 4

Pooled OLS regression		No. of obs =	80
R-sq = 0.7274		F(7, 79) =	22.90
Adj R-squared = 0.7049		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**t**	**P>t**
Shelf vision	790.1352	0.99	0.325
Shelf share	5300.045	0.99	0.540
Display share	**4397.197**	4.19	0.000
Promotion	**5079.715**	3.94	0.000
Out of stocks	**-5823.87**	-2.35	0.021
Own price	739.593	0.38	0.707
Competitor price	-337.9947	-0.12	0.907
Constant	3672.143	0.72	0.474

Table 3.10

Estimation results of OLS regression for Brand 4 with time dummies

Pooled OLS regression		No. of obs =	93
R-sq = 0.7854		F(22, 70) =	11.65
Adj R-squared = 0.7180		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**t**	**P>t**
Shelf vision	779.4341	0.97	0.335
Shelf share	-6096.93	-0.72	0.473
Display share	**4243.482**	3.96	0.000
Promotion	**6359.012**	13.27	0.000
Out of stocks	**-6149.168**	-2.63	0.011
Own price	2074.368	1.15	0.254
Competitor price	356.5119	0.12	0.902
Iperiod2	-124.0268	-0.12	0.907
Iperiod3	-1353.669	-1.27	0.210
Iperiod4	440.3062	0.41	0.684
Iperiod5	183.6224	0.17	0.863
Iperiod6	**-1872.43**	-1.68	0.097
Iperiod7	-887.7801	-0.83	0.412
Iperiod8	-1219.069	-1.14	0.256
Iperiod9	-421.0845	-0.38	0.702
Iperiod10	197.5631	0.16	0.872
Iperiod11	-906.3286	-0.84	0.405
Iperiod12	-314.9271	-0.29	0.773
Iperiod13	-114.5554	-0.10	0.917
Iperiod14	716.6171	0.65	0.518
Iperiod15	.6983377	0.00	1.000
Iperiod16	**1939.049**	1.71	0.091

Table 3.11

Estimation results of IV regression for Brand 4 with time dummies

Pooled OLS regression		No. of obs =	87
R-sq = 0.7925		F(21, 65) =	5.15
Adj R-squared = 0.7255		Prob > F	0.0000
Dependent variable: sales	**Coef.**	**t**	**P>t**
Shelf vision	945.928	1.18	0.244
Shelf share	-4484.225	-0.52	0.606
Display share	**4118.948**	3.93	0.000
Promotion	**5581.87**	4.56	0.000
Out of stocks	**-5061.455**	-1.87	0.066
Own price	2135.682	1.10	0.275
Competitor price	-6.732752	-0.00	0.998
Iperiod2	-104.4564	-0.08	0.933
Iperiod3	-1384.756	-1.13	0.262
Iperiod4	385.2797	0.32	0.752
Iperiod5	294.3436	0.23	0.820
Iperiod6	-1560.576	-1.06	0.292
Iperiod7	-655.4443	-0.47	0.640
Iperiod8	-1248.508	-1.03	0.308
Iperiod9	-557.9994	-0.47	0.639
Iperiod10	-	-	-
Iperiod11	-813.2342	-0.64	0.525
Iperiod12	-414.0659	-0.35	0.727
Iperiod13	-66.16511	-0.05	0.958
Iperiod14	898.4426	0.67	0.507
Iperiod15	-132.0052	-0.11	0.912
Iperiod16	2112.172	1.57	0.121