LUISS

DIPARTIMENTO   CATTEDRA

Impresa e Management   Research Methodology for Marketing

"The effects of price promotions on brand loyalty among different price tiers."

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Management Summary

The aim of this study is to understand the effect of price promotions on loyalty of brands that lie among different price tiers empirically. The contribution of this thesis to marketing literature is the main instrument used for the analysis, which is the Dirichlet model and the measure of polarization index. The advantage of using those are:

- that these models are purchase data based, so data are easy to be collected

- from them it is possible to obtain highly reliable results

- finally they result to be less costly for marketing managers.

Several steps are followed to analyze data. First of all, I focused on the detergent market. The data used in this research are from a large US national wide traditional grocery retailer that sells online. The data integrates three types of information from 279 Scan Key Household panels data collected during the years 1996 and 1999: price/promotion of stock keeping units(SKUs), consumers orders and SKU information. I segmented the market in three price tiers: low, medium, high as did in Jarvis's paper. All tiers are listed based on loyalty measure of polarization index calculated using the Dirichlet model. In this way, I know which is the price tier that guarantees the highest value in terms of loyalty. Using the same methodology, I listed all brands in the detergent category based on loyalty given by polarization index. So, after that, I know which most loyalty tier is and even which most loyal brand is. Matching these information, I can understand if there are any relationships between the loyalty of the tier and the one linked to single brands. This is the problem statement to which my thesis is based on:

"How can price promotions affect the brand loyalty among different price tiers?"

Limitations for this research are a far from perfect dataset, considering only one product categories and the fact that we should also to conduct a survey in order to analyze the consumer perception of price attribute to see how important it is and how it is perceived. Some directions for further research are selecting more product alternatives with more brands in each product category, matching a questionnaire (survey data) next to this research and conducting this research again with a better and more recent dataset.

Chapter 1

1.1. Introduction

Maintaining loyalty is major goal of many companies and brands. The reason is that keeping customers loyal may be less costly than gaining new ones. So, nowadays most of the marketing firms' strategies are focused on maintaining current customers happy. Developing these strategies is becoming quite hard because brand loyalty comes not only from objective actions, but also from emotional and individual preferences. Measuring brand loyalty has constantly represented a key issue for marketing researchers. It requires either long-term actual purchases data or attitudinal data. We can measure loyalty at consumer level, i.e. whether a consumer purchases (or prefers) repeatedly the same product/brand, or brand level i.e., whether the brand was purchased (or preferred) by consumers repeatedly among remaining brands. Another issue is to measure loyalty in terms of attitude (like/prefer/ purchase intention) or behaviour (repeat actual purchases). This thesis focus is on behavioural loyalty, measuring brand loyalty at brand level utilising actual consumer purchases data. The main two factors that can affect brand loyalty boosting repurchases and sales, are represented by price tiers and price promotions. Each price tier in a product category is represented by a range of prices which delimit the level. This can be figured as a region of price where brands with similar price lie. This division results useful to marketers, since let them to segment the category basing on the price attribute of brands, understanding the importance of each tier to the customer. Hence, marketers are increasingly focusing on pricing and price promotions in order to influence the consumer purchasing decision. In fact, in some markets the price attribute of a brands covers a key role. The markets where price covers a crucial role in maintaining the customer loyal are those called frequently purchased goods. An example of this type of market is the grocery one, where products have low involvement goods with high frequency buying. Consumers buy habitually grocery products. That is why, measuring loyalty is easier using scanner panel data in this type of markets. These markets are characterized by a quite stable demand in the category and by low involvement goods. The products are called experience or convenience goods. They have a low level of

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engagement and a high purchase frequency. The costumer's habit is to make purchases among a low number of different brands. Brands are not too much segmented, having prices that lie among some price tiers and the typical consumer exhibits a polygamous buying behaviour (Ehrenberg, Uncles, Goodhardt,2003). In these types of market price promotion strategies are one of the main tool used by marketers. Price promotions are represented by decreasing of brand prices among the category. They can make the customer relationship with the brand stronger, motivating fast sales response, as documented by some researches (e.g., Guadagni and Little 1983; Gupta 1988; Neslin, Henderson, and Quelch 1985). Even if in the short run the price promotion could be effective, there are some concerns about the long-run effects of such activity. The main doubts are about the possibility that frequent price discounting can blur the difference between the discount price and the baseline price of a product (Marketing News 1985). Using panel data, collected for a specific period, it is possible to detect some common patterns, thanks to which would be possible to understand the effectiveness of these price promotions in the long run. This is done by detecting the changes in behavioural loyalty to a brand due to price promotion, among price tiers. The patterns revealed are important to develop marketing strategy to justify investments on loyalty programs as Dowling and Uncles (1997) state. To reveal these patterns, it is important to consider that the baseline of a product falls into a specific price tier. In fact, in a category, there are different price tiers where a brand lies. It can happen that a consumer shows a more loyalty behaviour to a price tier than to a single brand. Hence, the price tier cover a key role since the effect of price promotion can be boosted by lying in a specific price tier or even limited. Marketers need to identify which grade of loyalty each price tier guarantees, as done by Jarvis (2006), in order to choose the right price discount. It is crucial, since brand loyalty can be increased due to the double loyalty effects coming from promotions and price tier belonging, limiting also brand switching among tiers. In fact, as it is reported by Scriven and Ehrenberg (1995), "consumers do not stick to buying only from one price tier, they buy from a repertory of price tiers and they do switch". The role of different price tiers in a category was for the first time analysed by Jarvis et al. (2006) using polarization index, calculated by Dirichlet model, as a measure to identify the degree of loyalty to each price tier. Polarization index was first suggested by Sabavala and Morrison (1977) and developed by (Kalwani and Morrison, 1980; Fader and Schmittlein, 1993) in measuring loyalty and it has advantages of being easy

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to be calculated running the Dirichlet model on the specific excel macro. It is based on actual purchase data that are easy to be collected, so less costly for the company. The index results more reliable in detecting behavioural loyalty since it is based on actual aggregated data. While, as it will be discussed later, the index does not detect attitudinal loyalty, so the preferences of the customers are not justified by this measure. Jarvis's paper represents a different approach in using the Dirichlet model and the polarization index to detect variation in loyalty. Usually the index was applied to brands, while in his research, the index was applied to price tiers to reveal the loyalty to tiers in a category. Moreover, graphing the index with the market share he could reveal whenever excess loyalty of brands among tiers existed. Excess loyalty is revealed whenever the index of each brand is greater than the baseline index of the category. Hence, when the brand index is greater than the baseline index, it means that that brand performs better than expected. Contrary, if the brand loyalty is lower than expected and even the market share is lower than the average of the category, we can define these brands as change-of-pace brands. These brands have really low purchase frequencies relative to their penetrations. The Jarvis's paper at the end invites further research to detect how the tiers are affected by price promotions.

My thesis wants to analyse this aspect and to do so, firstly, following the analysis already conducted by Jarvis, I use the Dirichlet model and polarization index to price tiers. The model will be useful since it is a natural baseline for revealing the variations of a repeat purchasing for high-share brands (Fader and Schmittlein 1993). I calculate how the customer loyalty to different price tiers varies based on market shares. The analysis is based on this benchmark. The non-brand attribute price tier is compared using the polarisation index.

The second analysis investigates deeply how the brand loyalty changes, among tiers, when price promotions are applied on brands, running a logistic regression on Stata software.

1.2. Problem statement

This research will be built on the results presented by Jarvis et al. (2006) and will go further, analysing the role of price promotions on brand loyalty among price tiers. The

aim of the study is to analyse the effect of price promotions on loyalty to brands that lie in different price tiers in a category.

Hence the problem statement is as follow:

"How can price promotions affect the brand loyalty among different price tiers?"

The problem statement will be answered with several sub-questions. These are:

1. Which is the price tier that guarantees the highest loyalty to the tier?

2. How does lying in a price tier affect the brand loyalty?

3. How can price promotion affect loyalty of a brand that lies in a price tier?

1.2.1. Managerial relevance

Many marketers view loyalty as covering a key role in create profitability for the company. This study can guide a firm's decisions on whether to take customers from competitors designing price promotion strategies, or to keep the base of the customers loyal creating some loyalty programme based on promotions. Moreover, launching a new brand they can understand which is the best price tier where the brand should lie and, considering the price tier, which price discounts would be more effective.

1.2.2. Scientific relevance

Jarvis et.all (2006) suggested at the end of their paper to analyse the dynamics of the promotional effects, because they might influence the structure of the price tiers in categories. My research goes further the analysis described by Jarvis et.all (2006) detecting the price tier loyalty, giving insights when excess or lower loyalty exists and analysing how brand loyalty changes when brands are under price promotions. After measuring which price tier gets a highest loyalty, a deep study among tiers is conducted. This further analysis is conducted by analysing a panel of purchases data in a product category. Hence, my paper will give a deeply insight on the relation

between price tier and behavioural loyalty to a brand, underling the role of price promotions.

1.2.3. Delimitations

The research conducted is mainly based on actual purchase, detecting the behaviour of consumers. The role of price promotions is measured among price tiers only under an objective and statistical point of view, basing the analysis on actual purchases data. Hence, there is a lack in revealing the perception of the price attribute among consumers and the attitudinal behaviour of them. From my study, I can reveal how price promotions affect brand loyalty among tiers but I cannot explain the results under an attitudinal point of view of the consumer. This point of view can be revealed only using data collected by survey. So, since how price is perceived is important, a further research may lead to match my type of analysis data purchases based, with another on data surveys based. In this way, a complete and more reliable results can be found.

1.3. Structure of the Thesis

In the next chapter a theoretical framework will give a better understanding about the construct of brand loyalty and its different ways to be measured. Moreover, insights on which stage during purchase price covers a key role to motivate the consumer to purchase is described. Next, the importance of loyalty to price tiers is explained underling, further, how belonging to a price tier can affect brand loyalty.

In last part of the chapter an explanation on the role of price promotions in boosting sales and increasing brand loyalty is given. To help build towards the conceptual model, hypotheses are stated between the sub-questions. In the latter part of the chapter a conceptual model will be constructed based on the stated hypotheses.

While in the third chapter the methodology and characteristics of the data are explained. The fourth chapter will discuss the results obtained from the data analysis. The final chapter is focused on conclusions of this study.

Chapter 2

In this section, a deeper explanation of the theory behind the research is provided. The first part is focused on the definition of customer loyalty, giving insights on the importance of his role in developing marketing strategies. Thereafter types of measures used in analysing the performance of customer loyalty are described briefly, underling which measures are more suitable for the purpose of the study. Moreover, the last part of the chapter is focused on the sub-questions of the problem statement. For each sub-question the role of price tier and the role of price promotions are explained, giving the hypotheses developed for the study.

2.1. Which type of measures are used to reveal customer loyalty?

In this paragraph, the measures of loyalty are discussed. Customer loyalty can be explained using two main types of measures, behavioural and attitudinal. The focus in this paper is on behavioural measures, and how these measures are related to price tiers. Here, the main methods used for the researches purpose are listed and explained.

2.1.1. Measures

The measures used to reveal the customer loyalty were divided by Mellens, Dekimpe, Steenkamp (1996), into groups based on two dimensions:

1. attitudinal versus behavioural measures.
2. brand-oriented versus individual-oriented measures.

1) Attitudinal versus behavioural measures:
    Behavioural and attitudinal loyalty depend on what the measures wanted to underline and on what they are based on: purchasing or cognitive component.
    The attitudinal measures, even if they can reveal differences in brand loyalty from repeat buying, result less reliable, because they are not based on purchasing but on the possible preferences of the consumer. They may not be so accurate in representing the actual situation and in detecting common patterns. This is due to the fact that attitudinal measures are based on data collected by surveys. On surveys a consumer could be

rationale in answering to the questions and the responses may not be correlated to the actual purchases. Hence, in studying the behavioural loyalty performance of a brand based on price promotions, is more appropriate to use behavioural measures.

Behavioural measures, in fact, are based on the actual purchases observed in a certain time of period. These measures have some advantages like: they are directly related to the performance of the brand, are more reliable and easier to collect. Differently from the attitudinal measures there is a lack in detecting difference between brand loyalty and repeat buying. Since it is not possible to reveal the real relationship that the consumer has with that brand and hence, if he really feels loyal to that one under an attitudinal point of view.

2) In Brand-oriented versus individual-oriented measures:

The other dimension of measures are Brand-oriented ones. They are useful to measure the value of behavioural loyalty derived from each brand. The data used are often aggregated across individuals. With these measures, it is possible to compare brands and price tiers, and to study the effect of price promotions on the resulting behavioural loyalty to brands.

Individual-oriented measures contrary are not suitable to the purpose of the study. They are more customer focused, estimating the loyalty of specific customers and giving less importance to the loyalty to specific brands and in my case tiers. For my analysis, the type of measures that results more appropriate for the research purpose, falls into the behavioural brand-oriented dimension. These measures are more suitable because they are brand focused fitting to the analysis conducted among price tiers, and to aggregated data derived from purchases made.

2.1.2. The Dirichlet model and useful measures for customer loyalty.

The measures more suitable to reveal the loyalty to a brand depends on which type of data we have and if they are more attitudinal or behavioural focused. In this case since the data are aggregated, coming from a panel of actual purchases, the best measure suitable for this research is the Dirichlet model.

The Dirichlet model was used by, Ehrenberg, Goodhardt and Barwise (1990) and others to reveal the double jeopardy effect in a market. According to Fader and

Schmittlein (93) the model goes beyond the double jeopardy phenomenon explaining behavioural purchase patterns made by heterogeneous consumers. It offers a robust method to summarize and predict repeated choice.

In my research the model is useful since allows investigation into loyalty variation. For my study, it is used to calculate how, in a product category, repeat purchase loyalty should change within the price tier's market share. Moreover, it is used also to detect when excess brand loyalty exists among tiers.

2.1.3. Direchlet Distribution

It is a probability distribution where it is sampling over a probability simplex. Probability simplex is bunch of numbers between 0 and 1 that add up to 1. For example, a) (0.6, 0.4) for K=2, b) (0.1, 0.1, 0.8) for K=3 , c) (0.05, 0.2, 0.15, 0.1, 0.3, 0.2) for K=6 categories.

These numbers represent probabilities over K distinct categories. t is a categorical distribution similar to multinominal distribution.

- The Direchlet model

Here I give some functional description of what the Dirichlet model is.

Firstly, the probability that a random consumer will choose brand i, on a category at time t is:

$$P(i) = \frac{\alpha_i + n_{it}}{\Sigma_j(\alpha_j + n_{jt})}$$

Denominator: represents the sum over all brands available in the market to the consumer.

α: represents the brand-specific Dirichlet parameter for brand i.

If there are j brands (or j price tiers), then the DMD has j parameters α1, α2, . . . , αj and S = α1+ α2 +αj (that will be explained later). Once the parameters α1, α2, . . . , αj are estimated for the DMD, the S parameter is used to indicate the sum of the n-th values of α (Corsi, Rungie and Casini 2011).

n: number of purchases that the consumer has made of brand i not including the purchase at time t.

In default, not having information regarding the purchase history of the consumer, n is 0 for all brands. So, as suggested, our best guessing is to assume that choice probabilities are proportional to market shares.

$$P(i) = \frac{\alpha_i}{\Sigma_j \alpha_j} = \text{Market share for brand } i. \qquad (1)$$

The "S" is the sum of:

$$S = \sum_j \alpha_j \qquad \text{where } 0 \le S \le +\infty. \qquad (2)$$

S: can range between 0 and infinity and gives indication of the overall loyalty in the category as previously described by (Goodhardt et al., 1984; Ehrenberg, 1988; Uncles et al.,1995).

"Low values of S indicate consumers always choosing the same alternative and large values indicate considerable switching amongst alternatives in the market" Jarvis et al. (2006). Alternatives that in the first part of my study are represented not by brands but by price tiers.

Equation (4) shows the link between the Dirichlet "S" statistic and the polarization index φ (further description is given in the following paragraph).

The repeat rate (p): "is the probability of choosing alternative i conditional on a previous purchase of the same alternative. It is used to measure the switching and is linked to both φ and market share (m)" Jarvis et al. (2006).

Rungie and Laurent (2003a), showed this in the 3 and 4 equations:

$$p = m + \varphi - m\varphi \quad \text{where } 0 \le p \ge 1. \qquad (3)$$

where:

$$\varphi = \frac{1}{1 + \sum_j \alpha_j} \qquad \text{where } 0 \le \varphi \ge 1. \qquad (4)$$

2.1.4. The polarization index φ

$$\varphi = \frac{1}{1 + \sum_j \alpha_j} \qquad \text{where } 0 \leq \varphi \geq 1. \qquad\qquad (4)$$

The polarization index, φ, was for the first time presented by Sabavala and Morrison (1977) and developed by (Kalwani and Morrison, 1980; Fader and Schmittlein, 1993), it is useful to reveal variations in loyalty. The index value varies from zero to one. A φ of one would mean consumers are always choosing the same alternative and 100% loyal to it (which is very unusual). Low values for φ indicate less loyalty and more switching between a number of alternatives in the category. If φ is close to zero then all buyers will switch regularly. This method is preferred to the others since provides a model for identifying variations revealed comparing the index to a baseline level of loyalty. Graphing the variation against the market share and utilising the Dirichlet multinomial distribution (DMD) baseline, it can describe a robust method for reporting the structure of a market (Jarvis et al. [2006]). Usually the brand is the "unit" used for these types of analyses but, following the Jarvis paper in my study, the unit is represented by price tier.

2.1.5. Other Measures of Loyalty in Practice

Three possible types of measures are described by Stern and Hammond (2004). These measures were listed in two share based measures and non-share based measure where provides an indication to reveal behavioural loyalty to a brand. All of them comes from the Dirichlet model:

1) the share of category requirements.

2) SCRpref the share of category purchases accounted for by the customer's most preferred brand.

3) the polarization index which captures changes in the heterogeneity in consumer choice paths as purchase incidence changes due to changes in price (already discussed).

- The share of category requirements(SCR)

The Dirichlet model parameters can generate a variety of other statistics, such as each brand's SCR. It was used for analysis of behavioural loyalty by some market researchers (e.g., Information Resources, Inc. 1989, Johnson 1984).
SCR is defined as each brand's market share among customers.
The share of category requirements measure (SCR) is calculated as the ratio of total purchases of the brand to total category purchases among those who buy the brand.

$$SCR_{hi}(T) = \frac{\sum_{t \in T} q_{hi}(t)}{\sum_{j} \sum_{t \in T} q_{hj}(t)} \, ,$$

where

$SCR_{hi}(T)$ = household h's share of category requirements for brand i during time period T (which often refers to a month, a quarter, or a year),

$q_{hi}(t)$ = quantity of brand i purchased by household h on purchase occasion t (where t is an index of all purchase occasions during time period T), and

j = index for all brands in the category.

As Stern (2004) notes, a SCR weakness is that (in common with SCRpref and all share-based measures) is confounded by purchase incidence which is based on time incidence without revealing the associated loyalty. In order to avoid this, he used an additional measurement of loyalty as already reported, that is the polarization index φ, which is related to the S statistic of the Dirichlet model.

- The share of most preferred brand of a customer (SCRpref)

It was developed by Deighton et al. (1994) and it is more focused on the most preferred brand of a customer, calculating the share of category purchases accounted for that brand. SCRpref is more individual oriented than the SCR that is most brand oriented in revealing loyalty. Thus, SCR can be regarded as a brand loyalty measure and SCRpref as a customer loyalty measure (Stern and Hammond 2004). This is the reason why their combination can be more accurate in giving more reliable results.

2.2. Which is the price tier that guarantees the highest customer loyalty?

In this paragraph, the construct of customer loyalty in general is discussed. Moreover, each stage to which the customer must go through to become loyal, is given. I focus my attention on the cognitive one since, here, it seems that the consumer is more price sensitive. In this section, it is underlined how price level are listed based on loyalty, using the Dirichlet model. Therefore, in the last part of the paragraph, the hypotheses related to price tiers, on which I focused on, are identified. In a modification of Oliver's paper (1997, p. 392) the loyalty definition is described as: "a deeply held commitment to rebuy or re-patronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behaviour". It can be divided in two different concepts: behavioural and attitudinal.

- "Behavioural loyalty consists of repeated purchases of the brand" (Chaudhuri & Holbrook, 2001).

- "Attitudinal loyalty includes a degree of dispositional commitment in terms of some unique value associated with the brand" (Chaudhuri & Holbrook, 2001).

As described in Oliver's paper (1997) there are different stages that a consumer must go through to achieve the higher level of loyalty to a brand. Oliver's (1997) framework follows this cognition-affect-conation pattern. He argues that consumers can become "loyal" at each attitudinal phase relating to different element. Precisely, in the first stage, the cognitive one, the consumer is affected by those information that can be detected cognitively. In this stage, the behavioural loyalty can be influenced deeply by price variations as promotions. In this stage, the brand attribute information available to the consumer indicates that one brand is preferable to its alternatives. Cognition can be based on prior knowledge or on recent experience-based information.
Here is reported the scheme of the Oliver's paper:

Loyalty Phases with Corresponding Vulnerabilities

Stage	Identifying Marker	Vulnerabilities
Cognitive	Loyalty to information such as price, features, and so forth.	Actual or imagined better competitive features or price through communication (e.g., advertising) and vicarious or personal experience. Deterioration in brand features or price. Variety seeking and voluntary trial.
Affective	Loyalty to a liking: "I buy it because I like it."	Cognitively induced dissatisfaction. Enhanced liking for competitive brands, perhaps conveyed through imagery and association. Variety seeking and voluntary trial. Deteriorating performance.
Conative	Loyalty to an intention: "I'm committed to buying it."	Persuasive counterargumentative competitive messages. Induced trial (e.g., coupons, sampling, point-of-purchase promotions). Deteriorating performance.
Action	Loyalty to action inertia, coupled with the overcoming of obstacles.	Induced unavailability (e.g., stocklifts—purchasing the entire inventory of a competitor's product from a merchant). Increased obstacles generally. Deteriorating performance.

Figure 2.1. Loyalty phases with corresponding vulnerabilities (Oliver 1997)

So, as it is shown in the figure, the cognitive stage is the one where price plays a key role among the brand's attributes to make the customer loyal. Behavioural loyalty to a brand is important for the company to generate profitability. It can be affected deeply by the price since the consumer can be more sensitive to the price than to another brand's attribute. This happens especially in those markets where brands are not too much segmented as the frequently purchased goods market, to which I focused my study on. Hence, in my study price tiers are treated as brands in order to identify the degree of loyalty associated to each tier. Thereafter, to underline the role of promotions in the cognitive stage of purchasing, the focus of the analysis will switch to brands. Price level are divided in three main tiers: low, medium and high. These tiers will be listed based on the loyalty level stated thanks to the polarization index provided by running the Dirichlet model. In this way, the popularity of the price level is revealed. My hypothesis is based on the fact that price is a signal for quality most of the time. Lemon and Nowlis (2002) stated that high quality/ high price or low quality/low price brand is one of the most basic aspects of a brand's strategy. In their paper, they affirmed that a low-tier brand offers lower perceived quality and price, a high-tier brand offers higher perceived quality and price. Moreover, previous research indicated that price promotions have a greater effect on high-tier than on low-tier brands (e.g., Blattberg and Wisniewski 1989; Bronnenberg and Wathieu 1996; Sethuraman, Srinivasan, and Kim 1999; Lemon and Nowlis 2002).

High quality products are associated to higher price. Hence, since quality leads to higher loyalty, the highest price tier (the most expensive one) to which high quality perception is associated, would lead to higher loyalty as well. Contrary lowest price tier is associated to the lowest quality perception; hence this tier should get the lowest value in terms of loyalty. The middle tier would performance better than the lowest and worse than the highest one.

To do so I made this hypothesis:

H1: Middle and high price tier category might have the highest behavioural loyalty in comparison to remaining (low) price tier category.

2.3. How does lying in a price tier affect the brand loyalty?

In this paragraph, focused deeper on price levels, an explanation and an overview of the importance of price tiers, is specified. It will give insight on the reasons which lead a consumer to switch among tiers. This explanation is useful to understand why consumer switches among tiers and so among different brands across price levels. In the specific, this happens for low engagement goods as the detergent one. In the latter part the hypotheses are developed, based on my expectations. In the detergent market, since it is a frequently purchased good, one of the most important product attribute is the price level (in this study level and tier have the same meaning) at which the product is on offer. The reasons why price tiers are important to determine the category structure and the purchase behaviour among various price promotions, are several. These reasons are stated in the Romaniuk and Dawes, (2005) paper. The paper asses that consumers need to exhibit heterogeneity behaviour over the time, and so they seek their satisfaction purchasing different products at different price tiers. Hence, variety seeking covers a crucial role in the switching phenomenon among price levels to satisfy desires (Givon,1984; McAlister and Pessemier, 1982). The switching behaviour can be explained also by occasion-based segmentation (e.g. Dubow, 1992). For example, in the detergent category consumers might buy a cheaper product for everyday washing but a most expensive one for those clothes which are more sensitive during the washing. Finally, the notion of hedonic consumption (e.g. Hirschman and Holbrook, 1982) may also determine the buying

across price tiers. Consumers may desire to occasionally indulge themselves by buying a product or brand outside their normal price range. For a consumer, the prices range to which they might purchase are well defined. Outside of them they would doubt the quality of the product, not buying it, or finding the price level too low or even too high and so not affordable (e.g. Monroe, 1971). This acceptable range is shaped by the range of prices that consumers are exposed to (Cox, 1986). Therefore, for all the reasons mentioned by Romaniuk and Dawes, (2005), it is quite reliable saying that customers buy from a range of prices over time. However, there is little research about the examination of how price promotion affects these switching to different brands among different tiers. Since price is a common attribute that all brands have, it is possible to divide the market up into differing price tiers to be examined. In my case, this division takes into consideration three price levels: low, medium and high. Hence, identifying an expected pattern would provide a way of understanding, predicting and responding to price-promotion strategies useful to compete in the category. Scriven and Ehrenberg (1995) were the first who analysed consumer panel data and found evidence of buying behaviour across price levels. Most classic segmentation approaches allocate consumers to segments to which composition are stable over time, for example, Weinstein (1994). In my study the segmentation of brands is done based on price levels (low, medium high tiers), basing on purchases. So, thanks to the Dirichlet model I can see how people behave during the purchase since they might buy from a repertoire of price tiers, that are listed based on loyalty. I simply hypothesize that consumers will buy from a range of price tiers. On average, the probability that a purchaser of any tier will also buy from another tier will largely depend on the overall popularity of the other price tier in the market. As already explained excess loyalty represents a better performance of brand loyalty than the one expected. It can be referred to those brands which lie in the most loyal price tier, gaining a sort of double effect of loyalty. One might be due to the brand itself, while the second one to the price level belonging. Contrary if a brand lies in the lowest tier, it would not get any benefits, taking even disadvantages from lying in that tier.

I expect that those brands that fall into the highest behavioural loyalty tier presents an excess of loyalty and those that lie in the lowest are pace of mind brands.

H2: *those brands which lie in the highest behavioural loyalty tier might show an excess of loyalty.*

H3: *those brands which lie in the lowest loyalty might be change-of-pace brands.*

For these two first steps, I will use the Dirichlet model and polarization index to detect the variation of behavioural loyalty among tiers. Listing the tiers from the most loyal to the worst. After I will detect whenever excess of loyalty exists or not. This it will be done, graphing the relationship between polarisation and market share for price levels as done in the Jarvis's paper.

2.4. How can price promotion affect loyalty of a brand that lies in a price tier?

In this section, there is an explanation of the importance of price promotions. The first part is focused on the types of promotions used by marketers, then a deep description of price promotions is given. In the latter part of the chapter I focus my attention on what I want to analyse giving the hypotheses suggested.

2.4.1. Types of promotions

In the marketing mix, promotions continue to be a main part to gain new customers and to keep them loyal. In fact, they still represent a large part of the expenditures in marketing for many firms. These promotions are used to improve consumer perceptions of value and can assume several forms. Of particular interest is to assess when the promotional benefit level perceived is an important moderator of promotional effects (cf. Grewal, Marmorstein, & Sharma, 1996). For example, at what promotional benefit level do consumers prefer price discounts to bonus packs and promotions framed in dollars over percentages? To date, there is little empirical evidence guiding the answers. Price discounts results to be quite costly and can have the deleterious effect of reducing consumer reference prices, which may in some

occasion lead to reduce profitability (Blattberg, Briesch, & Fox, 1995 ; Rajendran & Tellis, 1994). Alternatively, bonus packs avoid the effects associated with direct price competition, but the value perceived gained by the consumer can be less. Therefore, an understanding of the conditions under which consumers value each type of promotion associated to the price tier to which a brand belongs, should be of interest to both retailers and manufacturers. Furthermore, establishing when consumers prefer price promotions framed in dollar versus percentage terms would provide important guidance for many retail decisions.

2.4.2. Price promotions

Since price promotion was the main type of advertising adopted by marketers, consumers nowadays are more aware of and they are expecting promotion discounts more often over the time. For this reason, creating promotion strategies based on prices is becoming more difficult. Grewal, Krishnan, Baker, and Borin (1998) suggested that using frequently discount promotions might reduce perceptions of value. Gedenk and Neslin (1999) demonstrated that, although price reductions had positive effects on current purchases, they also may have a negative effect on subsequent brand preferences. In recognition of the problems associated with price discounting, the Marketing Science Institute (1998) has suggested that marketers might best avoid increasing price competition and yet still encourage consumers to choose products based on enhanced perceptions of value. Hence, from a managerial viewpoint it is important to understand how consumers create and use expectations in motivating purchase decision. The failure to incorporate these price expectations in developing marketing strategies has been shown to result in a misestimating of price elasticity, which can lead to non-optimal pricing decisions (Doyle and Saunders 1985).
Kalwani et al.(1992) confirms that consumers form expectations of a brand's price based on its past prices and on the frequency at which the product is promoted. Hence, the past price to which a brand can be referred is represented by price tiers that cover a key role in understanding the effects of price promotions. The price offers perception can be explained by the application of Helson's (1964) adaptation-level theory to price perception by Sawyer and Dickson (1984). They suggest that price promotions may work in the short run. In fact, consumers may use the brand's price level as a reference

and then are induced by the lower deal price to purchase the brand. However, consumer who has been exposed to frequent price discounted may form expectations that lead to purchase only when the brand is under price offer. As stated by Kalwani and Yim (1992), there are some regions where the consumer results insensitive in changing of prices, not producing any price perceptions. Outside this region, that may be represented by price level, they observe that price differences have a significant impact on purchase brand probability. So, based on which price tier a brand belongs, using a panel of data, I can figure out if a price promotion can be effective or not. In particular, in the detergent category among three different price tiers if a brand in the most loyal tier is under promotion, this may lead a consumer to switch to this brand which belongs to a price region considered more convenient. This can make the customer loyal to the brand which is considered better than the previous one.

Sivakumar and Raj (1997) stated that the loyalty associated to high-quality brands is less vulnerable to decrease when prices increased. The paper showed that there is a strict correlation between quality and loyalty affection due to price changes. The perception of quality of a specific product is based also on the price level to which the product and so a brand, belongs. In fact, to higher price level is associated higher quality. The authors demonstrated that high-quality brands are generally less negatively affected by price increasing than low-quality brands. Moreover, since high-quality brands benefit from price decreasing, even when they were adversely affected by price increase, the overall changes in the short-term in the category and in a specific price tier, would benefit more them than low-quality brands. Since my thesis is based on behavioral measures and on actual purchase data, it is impossible to reveal the quality product perception of customers. Hence, knowing the fact that quality is another attribute that may lead to higher brand loyalty and it is associated to price attribute, I want to avoid the quality perception variable focusing on price tier loyalty one. In fact, I suppose that lying in the most loyal price tier would benefit a brand as the quality level would, as stated in the theory of Sivakumar and Raj (1997). So, the brand associated to the highest price tier would not be highly affected by price promotions on brands on others tier. Contrary those which belong to the lowest price tier would be heavily affected. While for the middle tier I expect that it would be affected less than the lowest tier and more than the highest one.

Due to the motivations described before, here my hypotheses on promotions among price tier:

I expect that a brand that lies in the most loyal tier would not be affected by price promotions on other brands.

H4: *those brands which lie in the highest behavioural loyalty tier, their loyalty will not be affected by price promotions.*

I expect that the lowest loyal price tier is less effective so brands in this tier would not get any benefits. Hence, if other brands are under promotion, the brand loyalty may differ decreasing.

H5: *those brands which lie in the lowest behavioural loyalty tier, their loyalty might perform much less when there are price promotions.*

To do so I will divide brands based on the price tier to which they belong. After that I will use the Dirichlet model to measures brand loyalty in the detergent category. I will list brands loyalty based on the polarization index as done previously for the price tiers. After I will run a logistic regression to detect what happens when other brands of other tiers are under promotions. In this way, I can test if there are any positive or negative correlations between the loyalty to each brand and the belonging to a specific tier when price promotions are running.

2.5. Conceptual Model

In this section, the conceptual model is constructed. The model gives an overview of the different variables. The model is based on the hypotheses and is drawn up accordingly.
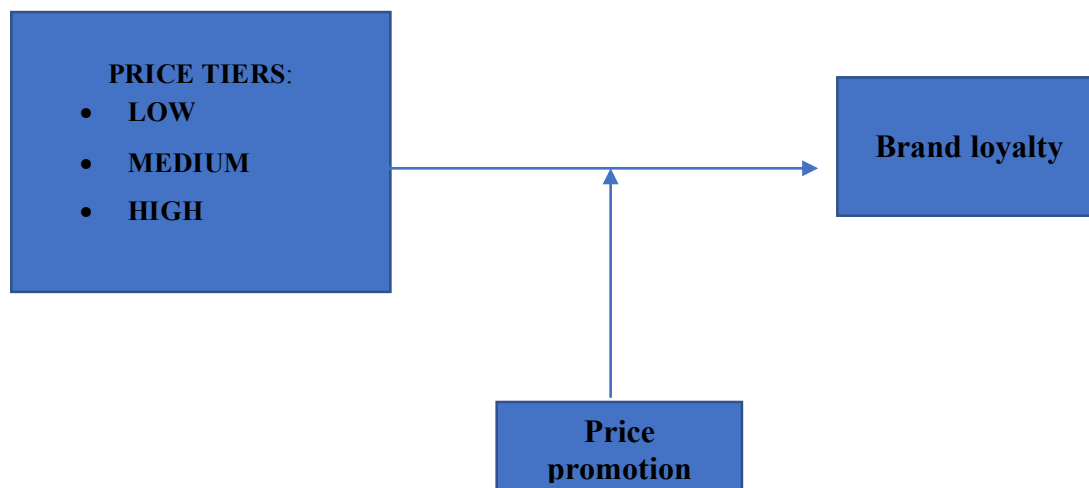
DV= Brand loyalty

X1= Price tier

X2= Price promotion

Chapter 3

3.1. Methodology

In this chapter, firstly the data is described in section 3.2. Then the sample from the dataset is defined and the reader is taken through the data cleaning process. Furthermore, tables are presented and some observations from these tables are given (3.3.). After that in section 3.4., there is a description of the statistical model used in this thesis. Finally, in the analysis part (3.5.) there is an elaboration on the different testing methods for the hypotheses stated.

3.2. Data Description

For this research, a large dataset will be used. I use transactional (purchase data) from households provided by an online US grocery chain. The data collected are covering roughly two years between 1996 and 1998.

Data extracted for the model entails one product category, that is liquid detergent. The reason for choosing this product category is the availability of data, and the fact that It also differs in purchase frequency and promotion sensitivity. Moreover, this category is the one which has the highest number of different brands (16) spreaded among price tiers. These results are useful for the purpose of the study in order to detect changes in brand loyalty. Brands are categorized based on which price tiers they belong. Price tiers are three: low, medium and high. How the category is segmented based on price tiers will be explained later.

3.3. Sample Data

Raw data contains three types of information: stock keeping unit (SKU) data where description of the product, category name and code are given. Price data contains price standardized for the product size, date, size, volume information for each SKUs and whenever the product was on promotion or not. Finally, order that contains SKU purchases of 279 consumers during almost 2 years with order and delivery dates. In order data, we can see what consumer paid for the SKU order, while in price data we can see regular price of a SKU.

To use the polarization index excel macro, these variables should be extracted. Not all of them are useful to run the model. The useful data are: for the SKU data I will use only the SKU code in order to identify the product purchased (that will be called ID product). For price data, I will use price, size, volume information for each product in order to standardize to the same Oz unit. All of these data are extracted among 279 purchases product for the detergent category. The data collected need to be cleaned in order to be analyzed properly for the purpose of this study.

The first step was to select from file were ID product (SKU) and brands were matched, those brands from detergent category. All the other product brands were deleted since I do not focus on their product category. The next step was to filter all the liquid detergent product ID numbers out of the order data file.

I got one unique file with all brands of detergent market. Once the right product categories have been selected, large amounts of information for each product is available. For example the product ID, consumer ID, store ID, delivery date, order date, item quantity, price per unit, size of item, whether the product is on promotion or not and the total volume purchased. Not all of these data were useful, so whenever the variable was not useful, it was deleted.

The remaining product data are: product ID, consumer ID, item quantity, regular price (that refers to the price standardized for OZ unit), whether the product is on promotion or not. Other info in the excel file were derived from the other data. In fact, I had to segment the data in price tiers (High, Medium and Low). I segmented all brands in three categories based on price tier: Low tier from 0 to 0.61$, Medium tier from 0.61$ to 1$, High tier plus 1$. After that, I calculated in which tier a specific brand was. So, I got 16 brands among 3 price tiers. Since some of them were lying in more than one price tier I splitted them in two brands according to which tier they belong: Cheer, Tide, Wisk, Dreft, Surf, Woolwite. After I deleted those which have less than 6 purchases in the market (deleted brands are Ajax, Value Wise, Surf low, Dreft low, Woolwite medium). Hence, after this step the final brands are: All, Arm&Hammer, Cheer Low, Cheer Medium, Dreft, Era, Jewel, Purex, Tide low, Tide medium, Wisk low, Wisk Medium, Woolite, Yes.

Here in the table 1 it is represented all brands among the three price levels.

Brands	All	Arm&Hammer	Dreft	Era	Jewel	Purex	Woolite	Yes	Tide low	Tide medium	Cheer Medium	Cheer LOW	Wisk medium	Wisk low	Tot
HIGH			50				82								132
LOW	96	15		21	19	22		43	227			66		89	598
MEDIUM										442	27		114		583
Tot	96	15	50	21	19	22	82	43	227	442	27	66	114	89	1313

Table1 Descriptive statistics about brands among price tiers

In Table 1 I have all the purchases of the brands already listed among the three price levels. The total number of purchases are 1313. Low tier has the highest number of purchases 598, Medium has 583 and High has the lowest 132. As shown in the table the Low segment is the one with the highest number of brands 9 (All, Arm&Hammer, Cheer Low,Era, Jewel, Purex, Tide low, Wisk low, Yes). While the High and Medium segment have 2 (Dreft, Woolite) and 3 (Tide medium, Cheer Medium, Wisk medium) brands respectively. It seems that the Low segment is more fragmented and there is more competition than the others. It can be important for the further analysis regarding the analysis of loyalty to each tier. Other important data come from whenever price promotions are applied to each brand among different price tiers. This situation is well represented in table 2.

Price tier	Promotion		
	0	1	Tot
HIGH	80	20	100
LOW	277	90	367
MEDIUM	409	152	561
Tot	766	262	1028

Table2 Descriptive statistics about price tiers

In this table is shown how heavily price promotions were used, during the period of analysis considered, based on the purchases made by consumers. So, among all the products purchased without taking into account the quantity, 0 represents whenever price promotion was not present and 1 when it was. Most products purchased were not under promotion 766 while 262 were. Moreover, price tiers to which price promotions

were mainly used, were the Low and Medium ones. To see which brands were under promotions in order to acquire more customers, data are extracted in table 3.

TABLE 3	Promotion ▼		
Brands ⌄T	0	1	Tot
All	78	11	89
Arm&Hammer	9	5	14
Cheer LOW	30	7	37
Cheer Medium	27		27
Dreft	32	1	33
Era	14	4	18
Jewel	9	8	17
Purex	14	5	19
Tide low	69	27	96
Tide medium	309	114	423
Wisk low	25	14	39
Wisk medium	73	38	111
Woolite	48	19	67
Yes	29	9	38
Tot	766	262	1028

Table 3 Descriptive statistics about the brands and promotions associated

This table shows that Tide medium is the brand which was the most under promotion. It is in the Medium price tier. While the lowest is Cheer medium, which was never under promotion. These two brands are both lying in the Medium tier (see brands in green in table3). For the Low tier the rate to which brands were under promotion is almost the same for all of them (brands in black). Regarding the two brands belonging to the high price tier (see brands in red), the one which was the most under-price promotion was the Woolite brand while Dreft was only once.

In the next paragraph the statistical model used for the first part of the analysis is discussed. Moreover, other data are shown like the purchase frequency for each brand, the penetration rate and market share. These data are useful to run the Dirichlet model and calculate the polarization index used to assess the loyalty grade to each price level and to each brand as well.

3.4. Statistical Model, Brand Performance Measures, Panel overview.

The analysis, as already described in the previous chapter, is based on the Dirichlet model. Running this model, it will be possible to calculate the polarization index that will assess the loyalty associated to both brands and price tiers. In this way, I can list them based on the loyalty grade obtained. In order to run the model some more measures from data sample have to be obtained. These are called "Brand Performance Measures". These are a series of measures which relate to the characteristics of individual brands or also price tiers, in the case of this study. It is customary to calculate the brand performance measures from the raw data, these are known as, observed, and then to also estimate the measures from the Dirichlet Model, these are known as, theoretical. (Ehrenberg, Uncles, & Goodhardt 2003). Each theoretical value is a probability statement.

First of all, some definitions of the types of measures used and of the variables to which they are based on, are given. These definitions, which come from Cam Rungie and Gerald Goodhardt, (2004) are:

Shopper (respondent, panel list, household etc): The unit for which the purchase data is recorded. The shoppers are all the potential buyers regardless of whether or not they buy. A shopper can have a purchase rate of zero.

Buyer: A shopper who makes at least one purchase. Their purchase rate is greater than zero. An individual shopper may be a buyer for one brand but and not another.

Purchase Rate: The count of the quantity purchased by the shopper over the specified time period. Each shopper has a separate purchase rate for the category and for each brand. The category purchase rate is the sum of the brand purchase rates.

Average Purchase Rate: The purchase rate averaged over all shoppers. There is a separate average purchase rate for the category and for each brand. The category average purchase rate is the sum of the brand average purchase rates.

Penetration: The proportion of shoppers who are buyers. There is a separate penetration for the category and for each brand.

Purchase Frequency: The purchase rate averaged over buyers. The average purchase rate for those shoppers who buy the brand. There is a separate purchase frequency for the category and for each brand.

 "Brand Performance Measures" formulas are following:

Market Share for brand j

$$\mu_j = \frac{\alpha_j}{S}$$

Penetration for brand j

$$= \sum_{k=1}^{\infty} f_{T,\beta}(k)\left(1 - \frac{\Gamma(S)\Gamma(S - \alpha_j + k)}{\Gamma(S + k)\Gamma(S - \alpha_j)}\right)$$

Purchase Frequency for brand j

$$= \frac{\text{Average Purchase Rate for brand } j}{\text{Penetration for brand } j}$$

Dirichlet S

$$S = \sum_{j=1}^{h} \alpha_j$$

Category Polarization, φ

$$\varphi = 1/(S+1)$$

And, where market share $= \mu$, and repeat rate $= \rho$ for any one brand, then

$$\rho = \mu + \varphi - \mu\varphi$$

"Brand Performance Measures" can be calculated starting from data in the panel. First, it is important to focus the attention on the overall panel data, reported in Table 4.

Total Households in the panel	279
Total buyers of the category	134
Category Penetration	48%
Total Purchases	1313
Category Purchase Frequency	9.8

Table 4 Descriptive statistics about the panel

Starting from data from Table 4 we can assess that total household are 279, to which 134 of them are buyers in the category. The total number of purchases, as already stated, is 1313. Based on that brand performance of the overall category can be easily revealed, using the formula already given above.

In table 5 brands are listed based on the market share.

Brands	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Penetration (O)
Arm&Hamm	15	7	1.14%	2.1	2.5%
Jewel	19	10	1.45%	1.9	3.6%
Era	21	10	1.60%	2.1	3.6%
Purex	22	6	1.68%	3.7	2.2%
Cheer Mediu	27	8	2.06%	3.4	2.9%
Yes	43	9	3.27%	4.8	3.2%
Dreft	50	10	3.81%	5.0	3.6%
Cheer LOW	66	6	5.03%	11.0	2.2%
Woolite	82	26	6.25%	3.2	9.3%
Wisk low	89	6	6.78%	14.8	2.2%
All	96	18	7.31%	5.3	6.5%
Wisk medium	114	26	8.68%	4.4	9.3%
Tide low	227	27	17.29%	8.4	9.7%
Tide medium	442	73	33.66%	6.1	26.2%

Table 5 Descriptive statistics about the brands

All the other brand performance measures, used in this study, are given like: purchase frequency and penetration rate.

The deep analysis on results will be conducted later in the next chapter. Here I focused my attention on how these measures are useful to run the model. Purchase frequency as penetration rate are given in the operative form (O), calculated, using formulas from row data in the panel. After that the operative results are used to run the macro in excel with the Dirichlet model.
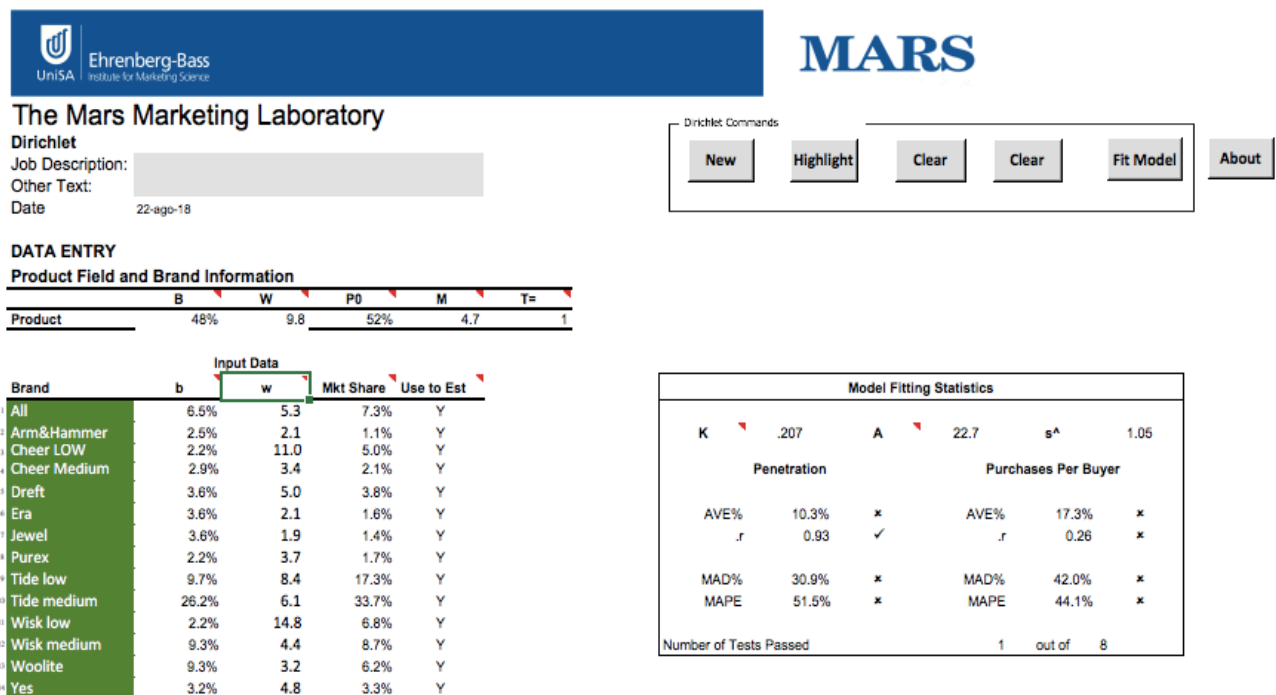
The figure 1 represents the excel macro:

Figure 3.1. Dirchlet output

In this figure in INPUT DATA I must insert in the "b" column the penetration rate, in the "w" column the purchase frequency and in the "Market Share" column the data of the market share. This is done for all brands that are listed in the brand column in alphabetical way. This will be done also for the price tiers, following the same methodology but instead of brands in Brand column, there are price tiers.

In DATA ENTRY, there are also, as before, purchase frequency and penetration rate columns, but instead of insert brand data I must insert the overall purchase frequency and penetration rate of the detergent category. In the "Model fitting statistics", some information are given after running the model. First of all, s^ indicator useful to calculate the final phi for the overall category and for each brand. The final output, obtained by running the model, will be discussed in the result chapter.

3.5. Analysis

In this section, the way the hypotheses will be tested, is explained. The hypotheses are tested comparing the polarization indexes obtained from the s^ indicator coming from the Dirichlet model. Also, multiple linear regression based on dummy variable will be applied on the last 3 hypotheses based on the parameters obtained from the previous model. The parameters that need to be estimated will be described separately for each hypothesis.

The first hypothesis states:

H1: Medium and High price tier category might have the highest behavioural loyalty in comparison to remaining Low price tier category.

Hypothesis *H1* will be tested by calculating "Brand Performance Measures" useful to run the Dirichlet model, for each price tier. Hence, I run the Dirichlet model using price tiers aggregated data instead of brands one. After that the s^ indicator, that comes out from the analysis, is used to calculate the polarization index for each price tier and the overall category. Comparing the phi's, I can list price levels based on the polarization index, from the most loyal to the lowest one.

The second hypothesis and states:

H2: *those brands which lie in the highest behavioural loyalty tier might show an excess of loyalty.*

Hypothesis H2 will be tested in the same way as did before for the hypothesis H1. Instead of taking into consideration price tier I focus my attention on brands. Hence, I calculate "Brand Performance Measures" and I run the Dirichlet model to obtain the final phi for each brand and for the overall detergent category. In this way, I can list brands based on brand loyalty. I compared each phi brand value to the overall phi category value. Once the polarization index results to be higher, it means that the brand performs better than expected and so, there is an excess of loyalty.

The third hypothesis states:

H3: *those brands which lie in the lowest loyalty might be change-of-pace brands.*

The analysis of this hypothesis is following the H2 analysis.

To detect if a brand can be change-of-pace brand, I will graph all brands based on two parameters: polarization index and the market share. The comparing term as already said is the category phi. If the polarization index associated to a brand is less than the category one and if also the market share is a low level respect the overall category market share performance, it means that the brand is a change-of-pace one.

The last two hypothesis states:

H4*: those brands which lie in the highest behavioural loyalty tier, their loyalty might be still higher than other brands under promotions.*

H5*: those brands which lie in the lowest behavioural loyalty tier, their loyalty might perform much less when there is promotion on other brands.*

For these hypotheses, we first need to explain what it is meant with highest, lowest and medium behavioral loyalty tier. From the previous hypothesis, I figured out which type of tier lead to a higher loyalty and which to a lower. Using the polarization phi tiers are listed from the highest to the lowest loyal. Hence, the highest, lowest and medium behavioral loyalty tier are based on this list. In order to test the hypothesis a linear regression on Stata has to be run. Before to do so, new parameters are given. Firstly, dummy variables are generated coming from belonging to a type of price tier. Dummylow refers to a brand which belongs to low price tier, contrary Dummymiddle to a brand which belongs to medium price tier. Once these two variables are both 0, it means that the specific brand belongs to the highest price tier.

The variables of the linear regression are here listed:

Phi is the dependent variable that represent the loyalty linked to brands.

Dummylow is an independent dummy variable.

Dummymidle is an independent dummy variable.

Pro_laundry represent whenever a brand is under price promotion (1) or not (0) and it is a dummy variable as well.

Want I want to test is the moderator effect that price promotion may have on the relationship between price tier belonging and the loyalty associated to brands. It is represented by the polarization index as graphed in the conceptual model.

Here it is the multiple linear regression:

Phi=β0+β1Dummylow+β2Dummymidle+β3Pro_laundry+β4(Dummylow*Pro_laundry) +β5(Dummymidle*Pro_laundry)

To conclude about H5 and H6, I will inspect whether the interaction effects (Type of Tier×PricePromotion) are significant and in the right direction.

Chapter 4

4.1. Results

In this chapter, the results of the analysis are reported. The chapter will be divided in two sections. First, in section 4.1.1. and 4.1.2. the hypotheses from 1 to 3 together with their corresponding Dirichlet model results are listed and possible implications are commented on. In the next sections, the last hypotheses are tested for significance. An overview of the market under studying will be given.

4.2. Testing H1

In this paragraph, the Dirichlet model with the resulting polarization index will be listed and possible implications are commented up on. The hypotheses will be also stated for a clear overview. Firstly, according to the first hypothesis which states:

H1: Medium and high price tier category might have the highest behavioural loyalty in comparison to remaining (low) price tier category.

The first step to do, is to run the Dirichlet model based on price tier. In this way, they can be listed based on it and so based on their loyalty.

The tier in this study are divided in 3 main levels: Low, Medium and High. Among these tiers, all brands of the detergent market lie. To see how these brands are distributed among the price tiers see Table 1 in the methodology chapter. Hence, before running the Dirichlet model all the brand performance measures were calculated. In this case, instead of being referred to brands they are referred to different price tiers, as we can see in Table 6.

Number	PRICE TIER	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Penetration (O)
1	HIGH	132	36	10.05%	3.7	13%
2	LOW	598	79	45.54%	7.6	28%
3	MEDIUM	583	91	44.40%	6.4	33%

Table 6 Summary statistics for price tier segments (aggregate)

Here is given an overview of the data shown in the table. As shown and as already said, the sum of purchases among price levels are: 132 in High tier, 598 in the Low tier and 583 in the Medium. Hence, the one which performs better in terms of purchases is the Low one, also the Medium which performs slightly less. Contrary the High tier is performing less maybe due to the fact that is more expensive. Focusing on the number of buyers on each tier, the situation changes. In fact, the one which has the highest number of buyers is the Medium one. While the Low tier results to have less buyers, even if they seem to purchase apparently more than how other buyers do in other tiers. This is well represented by Purchase Frequency. It results to be slight higher for Low tier than the Medium one and double than the High one. The market share of course follows the trend of purchases and so, the first two places are occupied by Low and Medium tiers respectively. While Penetration since is based on the number of buyers, follows the trend of Buyers of the Tiers. Hence Medium tier results to be higher than the others in terms of Penetration with 33% of rate while Low has 28% and High tier has 13%. These measures will be used to run the Dirichlet model. In order to list price tiers based on loyalty, I need to calculate the polarization index. In the figure 4.1. is represented the results of the Dirichlet model.

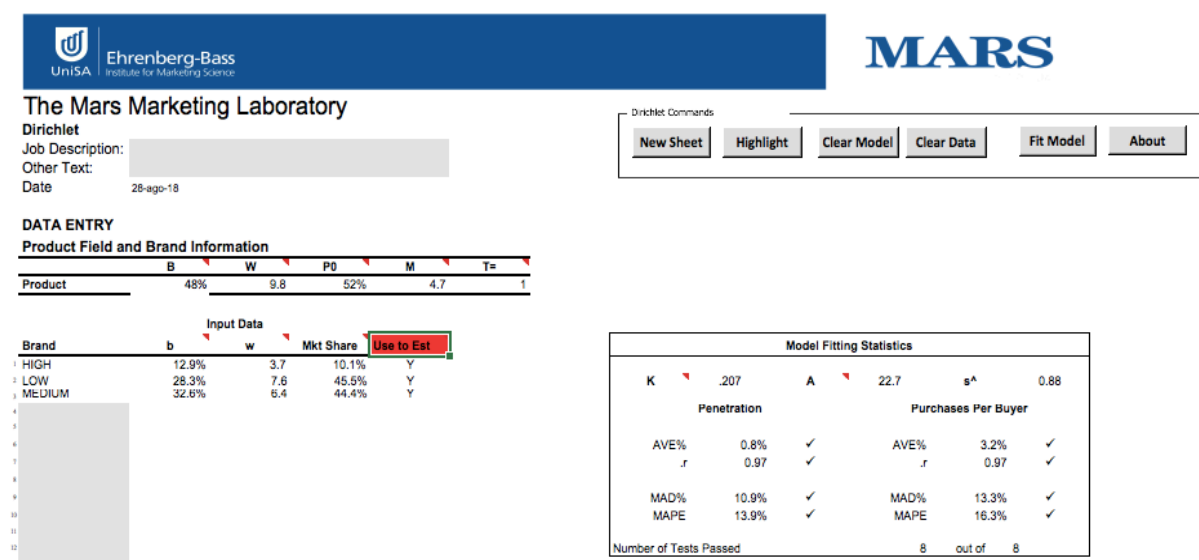

Figure 4.1. Dicthlet price tier analysis output

Here, we can see that the model has a good fit and the s^ indicator of the category is 0.88. From this result, I can calculate the polarization category index that comes from the formula $1/(s+1)$. So, the polarization category index is: 0.53. This result represents the baseline to which I will compare the polarization index of each price tier.

The final results are showed in the table 7:

Number	PRICE TIER	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Purchase Frequency (T)	Penetration (O)	Penetration (T)	S	Phi	DMD(PHI)	Differences
2	LOW	598	79	45.54%	7.6	6.7	28%	32%	0.398	72%	53%	18%
3	MEDIUM	583	91	44.40%	6.4	6.6	33%	32%	1.096	48%	53%	-5%
1	HIGH	132	36	10.05%	3.7	4.9	13%	10%	2.129	32%	53%	-21%

Table 7 Model dirichlet estimates (S, Phi), theoretical values (T) and observed data values (O) for price tier segments

Here are displayed the s^ indicator and polarization index for each tier. After, each phi will be compared to the Dirichlet multinomial distribution (DMD) baseline to see if the tier is performing better or worse than expected. Tiers are listed from the most loyal one to the lowest.

In fact, the most loyal tier is the Low one since phi is 72% (Table 7, column Phi). Contrary the lowest loyal tier is the High one, polarization index phi is 32%. Middle tier results to be the second most loyal with a phi index of 48%. Therefore, hypothesis H1 is rejected.

In the figure 4.2. the polarization index (phi) of each tier and the market share are graphed. Phi index is on the Y axes while the market share is on the X axes. Comparing these values to the DMD represented by the category index 53%, we can see how the tiers perform.
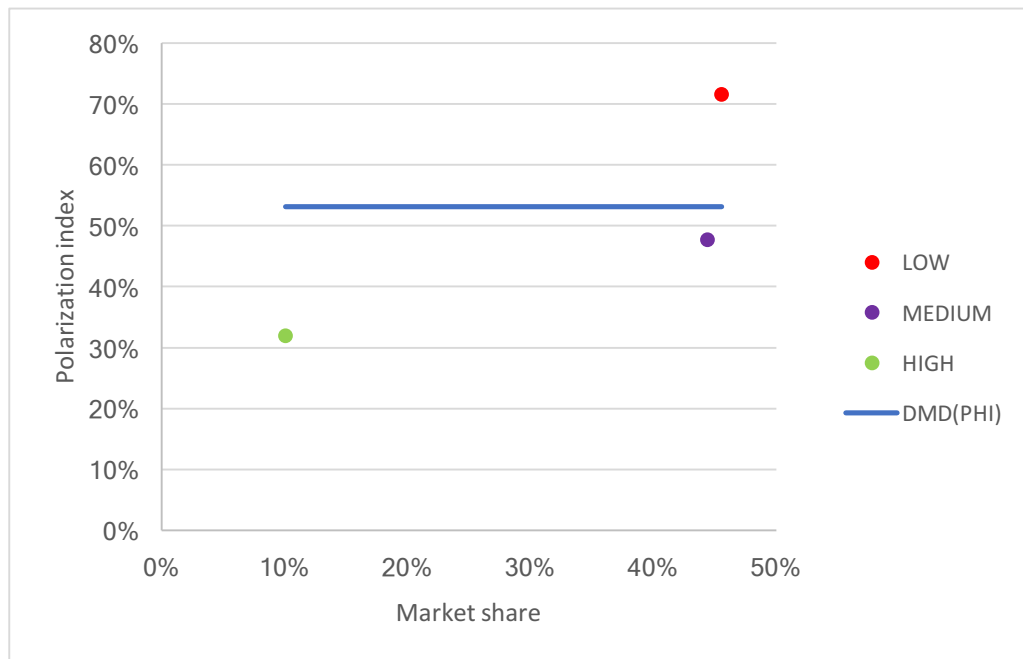

Figure 4.2. Graph of performance of price tier segments

The line in the graph is given by the category phi index 53%. We can easily see that the one which performs worst is High tier. As said before the phi index is 32%, that is 21% less than the category phi. That means that the tier performs worse than category average. Seeing the Table 7 we can also see that data coming from the Dirichlet model show that the high tier theoretical value of purchase frequency (T) and penetration are 4.9 and 10% respectively (Table 7). That it means that High tier is performing worse in the purchase frequency since the operational value is 1 point less and slight better in the penetration rate (see table 7), since the operational value is 13%. In the graph the High tier compared to the others has a lowest market share and the buyers are not too much loyal to this tier since the phi is just 32%. The market share, as said, is 10% the worst of the category.

The one which performs better is the Low tier (above the line, DMD(Phi)). It has the best situation since its phi is much higher than the category one 18% more. Moreover, also the market share has a good rate of 45,5%. It means that, at least in theory and it will be tested later, those brands which lie in this tier perform better in terms of selling and also in loyalty, since buyers are more loyal to this tier than to the others. The Medium one is performing quite well too, since the phi is slightly less than the category one -5% and the market share rate is 44% almost as much as the Low tier one.

4.3. Testing H2, H3

In this paragraph, the results of H2 and H3 hypothesis are given ad commented.

The two hypotheses, as already said, state:

H2: *those brands which lie in the highest behavioural loyalty tier might show an excess of loyalty.*

H3: *those brands which lie in the lowest loyalty might be change-of-pace brands.*

In order to reject or not these two hypothesis the first step, as done before for price tiers, is to run the Dirichlet model. This time the brand performance measures useful for the model will be calculated based on brands and not on tiers.

In the table 8 are shown the brand performance measures for each brand (Low tier brands in red, Medium low tier brands in purple and High tier brands in phosphor):

Brands	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Purchase Frequency (T)	Penetration (O)	Penetration (T)	S	Phi	Type of tier	DMD(PHI)	Differences
Tide medium	442	73	33.66%	6.1	5.9	26.2%	27%	0.883	53%	MEDIUM	46%	7%
Tide low	227	27	17.29%	8.4	5.0	9.7%	16%	0.108	90%	LOW	46%	44%
Wisk medium	114	26	8.68%	4.4	4.6	9.3%	9%	1.159	46%	MEDIUM	46%	1%
All	96	18	7.31%	5.3	4.5	6.5%	8%	0.628	61%	LOW	46%	16%
Wisk low	89	6	6.78%	14.8	4.5	2.2%	7%	0.01	99%	LOW	46%	53%
Woolite	82	26	6.25%	3.2	4.4	9.3%	7%	2.748	27%	HIGH	46%	-19%
Cheer LOW	66	6	5.03%	11.0	4.4	2.2%	5%	0.01	99%	LOW	46%	53%
Dreft	50	10	3.81%	5.0	4.3	3.6%	4%	0.685	59%	HIGH	46%	14%
Yes	43	9	3.27%	4.8	4.3	3.2%	4%	0.763	57%	LOW	46%	11%
Cheer Mediu	27	8	2.06%	3.4	4.2	2.9%	2%	1.789	36%	MEDIUM	46%	-10%
Purex	22	6	1.68%	3.7	4.2	2.2%	2%	1.411	41%	LOW	46%	-4%
Era	21	10	1.60%	2.1	4.2	3.6%	2%	6.561	13%	LOW	46%	-33%
Jewel	19	10	1.45%	1.9	4.2	3.6%	2%	9.028	10%	LOW	46%	-36%
Arm&Hamm	15	7	1.14%	2.1	4.2	2.5%	1%	5.764	15%	LOW	46%	-31%

Table 8 Model Dirichlet estimates (S, Phi), theoretical values (T) and observed data values (O) for detergent brands (red: low tier brand, purple: medium tier, phosphor: high tier brand)

Here are displayed all brands and how they perform. Tide medium is the one which has the highest number of purchases 442 and it is the one with the highest market share 33.66%. The other medium brand Wisk is performing better than the other brands but much less than Tide medium in terms of market share (8.68%). All brand in Low tier have a market share less than 8%, the only one which performs much better is Tide low. This can due also for the brand appealing, since Tide brand is performing very well in both Medium and Low tiers. High tier brands (Woolite, Dreft) perform quite similar having a market share of 6.25% and 3.81% respectively.

Graphing and comparing brands to the baseline represented by the category phi it is possible to reveal which brands performs better than expected. Taking into account the previous results, I can affirm that the highest behavioural loyalty tier is represented by the Low tier one, so I can investigate according to H2 if those brands in this tier show an excess of loyalty or not. In the figure 8 those red points represent the low brands. The X axes is the market share while the Y axes represents the phi. The category phi is 46% (see Table 8). In the Differences column, all the differences among brand's phi and the category one are displayed.
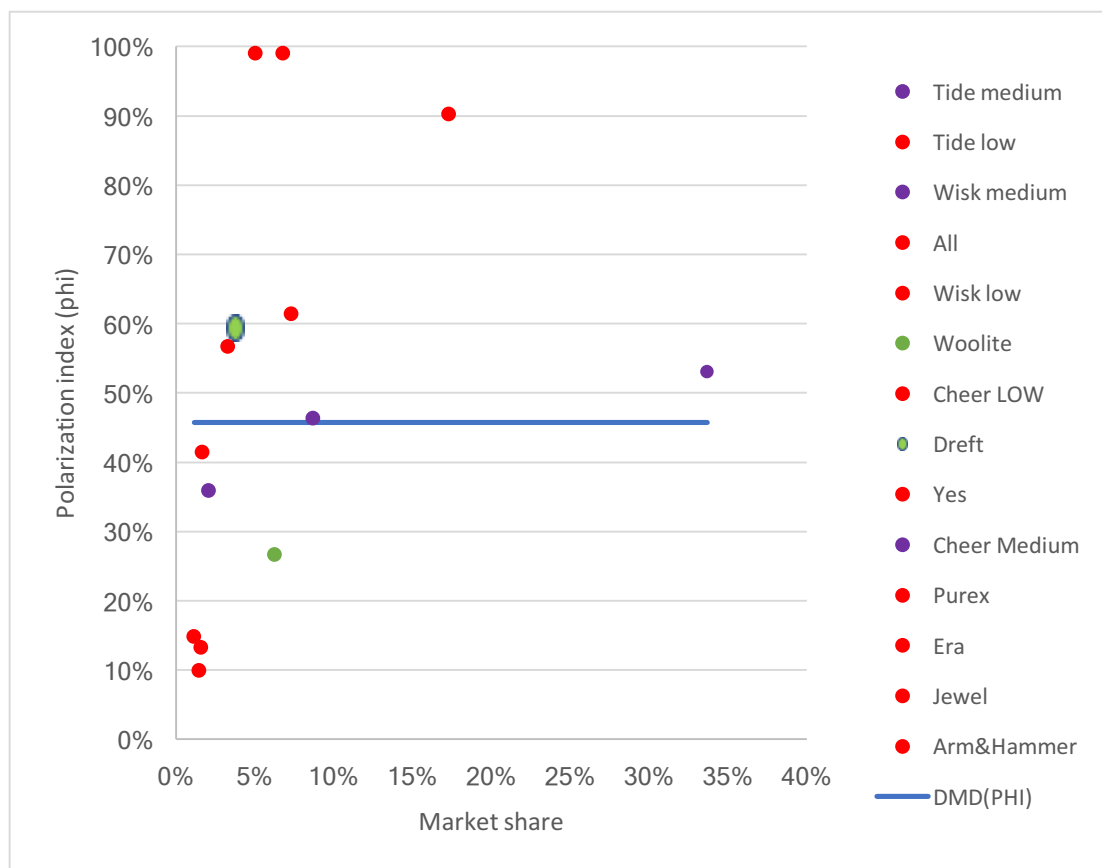
Figure 4.3. Graph of performance of detergent brands (red: low tier brand, purple: medium tier, phosphor: high tier brand)

Hence, looking at the graph I can affirm that 5 out of 9 brands in the low tier perform better than expected in terms of loyalty. These are: Cheer Low, Wisk Low, Yes, All, Tide low. While Purex performs quite less than expected -4%. The other three brands Jewel, Arm&hammer, Era performs much worse than expected -36%, -31%, -33% respectively. Hence, I can affirm that H2 is partially not rejected since most of low brands present excess loyalty. Testing H3 hypothesis, the lowest loyalty tier is the High tier one. In this tier Two brands are present: Woolite and Dreft. From the figure 4.3 I cannot establish if these two brands are change-of pace brands. As said before these kinds of brand are those characterized by low purchase frequency and low market share. Woolwite has a low market share in comparison of the other brands of the category but Dreft is preforming better, since the phi is higher than expected. Graphing the penetration rate with the purchase frequency it is possible to get more information regarding the market under study.
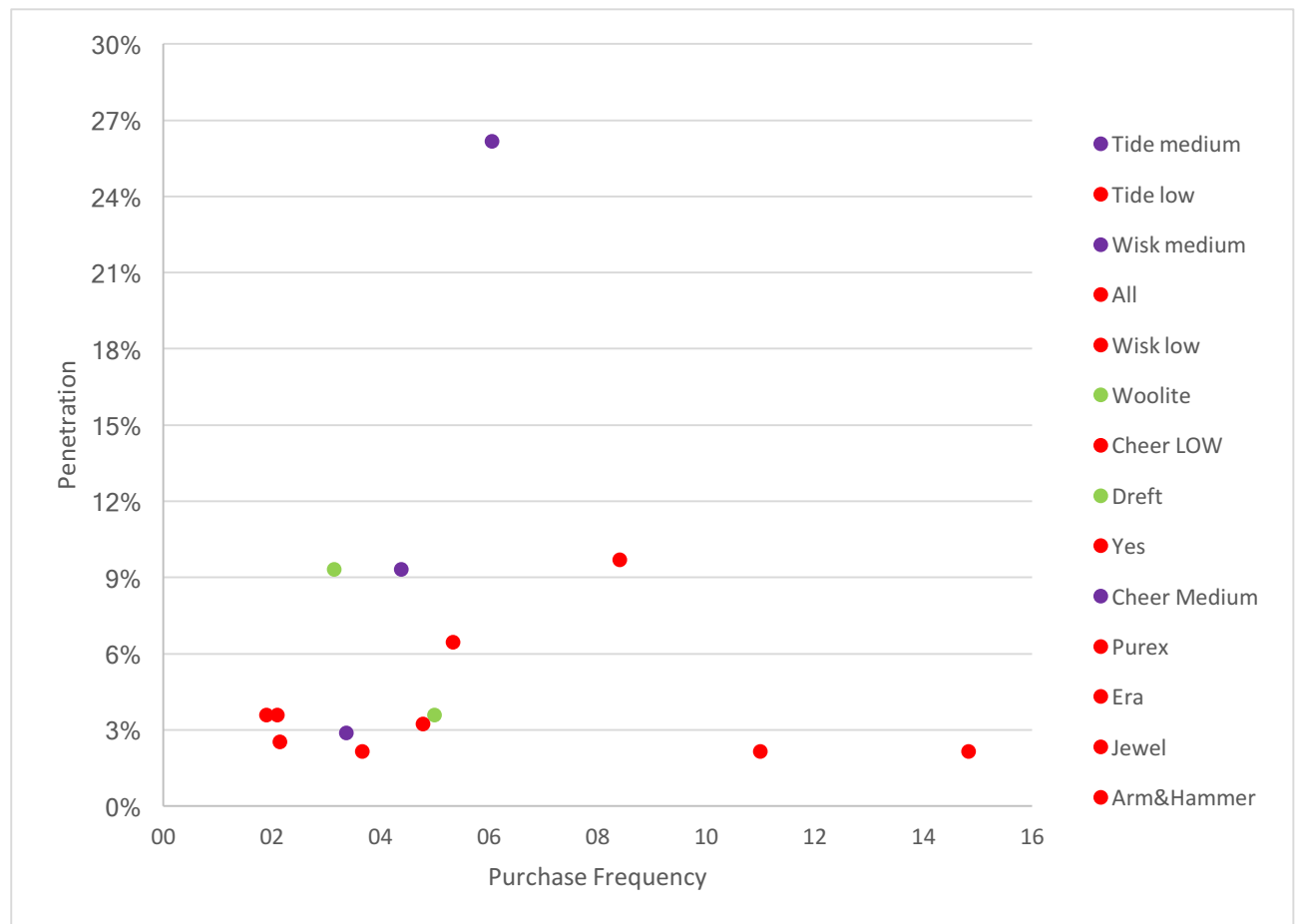
Figure 4.4. Graphing the penetration rate with the purchase frequency (red: low tier brand, purple: medium tier, phosphor: high tier brand)

In particular, the two high brands are not change-of pace brands since Dreft performs quite good in both Penetration and Purchase frequency. It seems that those consumers, who purchase the brand, are quite loyal according to the polarization index of 59%, that is 14% more than the category one. While Woolwite is performing much less in Penetration (3%) but quite good in Purchase frequency 4,4 even if the consumers of this brand are not so loyal (polarization index 27% that is -19% than the category one). In conclusion H3 is rejected since the high brands are performing differently in terms of loyalty, Penetration and purchase frequency and none of them can be defined as change-of-pace brands.

4.4. Testing H4, H5.

In this paragraph, the last hypotheses are discussed. In order to test the hypotheses a multiple linear regression is applied, investigating whether "price promotion" independent variable covers a moderator role. The reference independent variable change based on the hypotheses under study, in this way it is easier to highlight the differences.

H4 states:

those brands which lie in the highest behavioural loyalty tier, their loyalty will not be affected by price promotions.

H5 states:

 those brands which lie in the lowest behavioural loyalty tier, their loyalty might perform much less when there is promotion on other brands.

As already said a multiple linear regression is run on Stata software in order to test the hypothesis where price promotion covers a moderator role.

For hypothesis 4, I am refereeing to those brands which lie in the Low tier (dummylow), since as demonstrated before it is the most loyal one, and their loyalty may not be influenced by price-promotions .

For hypothesis 5, I am refereeing to those brands which lie in the High tier, since as demonstrated before it is the less loyal one, and that their loyalty may be influenced by price-promotions on brands of other tiers (dummyhigh).

Hence, here it is the final regression equation for H4 and H5:

Phi=β0+β1Dummyhigh+β2Dummymidle+β3Pro_laundry+β4(Dummylow*Pro_la undry) +β5(Dummymidle*Pro_laundry).

In the figure 4.5., results from Stata are displayed after running the multiple regression.

```
. regress phi dummyhigh dummymiddle pro_laundry c.dummyhigh#c.pro_laundry c.dummymiddle#c.pro_laundry, beta
```

Source	SS	df	MS		
Model	10.8930779	5	2.17861557		
Residual	32.4220367	1022	.031724106		
Total	43.3151145	1027	.042176353		

Number of obs =   1028
F(5, 1022) =   68.67
Prob > F   = 0.0000
R-squared   = 0.2515
Adj R-squared = 0.2478
Root MSE   = .17811

phi	Coef.	Std. Err.	t	P>|t|	Beta
dummyhigh	-.2896173	.0226071	-12.81	0.000	-.418102
dummymiddle	-.1813337	.0138597	-13.08	0.000	-.4398475
pro_laundry	-.009284	.0216106	-0.43	0.668	-.0197099
c.dummyhigh#c.pro_laundry	-.102716	.0494952	-2.08	0.038	-.0691142
c.dummymiddle#c.pro_laundry	.0155004	.0274462	0.56	0.572	.026804
_cons	.6876173	.0107018	64.25	0.000	.

Figure 4.5. Regression results of Phi (estimated brand level loyalty) on tier segments and price promotions (reference group: low tier).

I regress loyalty (phi) on dummylow, dummymiddle, dummyhigh, that is the reference group, price promotions and interactions effects.

The model is significant (F $(5,1022)$= 68.67, p-value=0.0000 <0.05) and according to the R^2 that is 0.25, 25% variance in brand loyalty are explained by independent variables. When I inspect individual regression coefficients, dummylow as reference group variable (b=0.6876 p=.000< 0.05), dummyhigh (b=-.2896, p=.000< 0.05) and dummymiddle (b=-.1813, p=.000< 0.05) significantly influence phi (loyalty). The highest behavioural loyalty tier (i.e.dummylow) performs significantly higher loyalty than all the other tier segments. The lowest behavioural loyalty tier (i.e.dummyHigh) performs significantly lower loyalty than high behavioural tier segment (low tier) and middle behavioural tier segment(middle tier). Price promotions do not effect on loyalty (b =-.009, p = 0.668). Moreover, regarding the promotion as a moderator effect, when the brand is in middle loyalty tier segment and there is a price promotion (dummymiddle×pro_laundry), loyalty does not change (b =.0155, p =0.572) in comparison to low tier. Moreover, when the brand is in lowest loyalty tier segment (high tier) and there is a price promotion (dummyhigh×pro_laundry), loyalty decreases (b = -

.1027, p <.05), performing significantly lower than the highest behavioural loyalty tier segment (low tier). Thus confirming H4, that when there is promotions on other brands high loyalty tier is not affected, performing better the other tiers. Additionally, when we compare the relative magnitude of effects, being in the lowest loyalty tier segment has the second highest, tough negative effect (beta=-.41). Finally, price promotion and being in a lowest loyalty segment has the third highest effect, tough negative (beta = -0.069). Thus, price promotions have the worst effect for brands in the lowest loyalty segment. Our results proved this empirically.

While testing H5 changing the reference group (high tier) these are the results.

```
. regress phi dummylow dummymiddle pro_laundry c.dummylow#c.pro_laundry c.dummymiddle#c.pro_laundry, beta
```

Source	SS	df	MS				
Model	10.8930779	5	2.17861557				
Residual	32.4220367	1022	.031724106				
Total	43.3151145	1027	.042176353				

Number of obs = 1028
F(5, 1022) = 68.67
Prob > F = 0.0000
R-squared = 0.2515
Adj R-squared = 0.2478
Root MSE = .17811

phi	Coef.	Std. Err.	t	P>|t|	Beta
dummylow	.2896173	.0226071	12.81	0.000	.6759927
dummymiddle	.1082836	.0217742	4.97	0.000	.2626554
pro_laundry	-.112	.0445282	-2.52	0.012	-.2377753
c.dummylow#c.pro_laundry	.102716	.0494952	2.08	0.038	.1414309
c.dummymiddle#c.pro_laundry	.1182164	.0476344	2.48	0.013	.2044255
_cons	.398	.0199136	19.99	0.000	.

Figure 4.6. Regression results of Phi (estimated brand level loyalty) on tier segments and price promotions (reference group: high tier).

Firstly, promotion in this case has a significant effect on phi and this effect is negative since it decreases (b= -.112, p=.012< 0.05).

Regarding the promotion as a moderator effect, when the brand is in middle loyalty tier segment and there is a price promotion (dummymiddle×pro_laundry), loyalty performs better in comparison to the lowest loyalty tier (high tier) (b =.11, p =0.038). Moreover, when the brand is in highest loyalty tier segment (low tier) and there is a price promotion

(dummylow×pro_laundry), loyalty increases (b =.10, p <.05), performing significantly higher loyalty than low behavioural loyalty tier segment (high tier). Thus, confirming H5 that price promotions affect low loyalty tier and in particular negatively since all the other tier brands under promotion perform better.

Chapter 5

5.1. Conclusion

In this chapter, a summary of the research is given in paragraph 5.2. In paragraph 5.3 the results of the hypotheses tested are discussed to answer the sub- and research questions. Next in section 5.4 the limitations of the research are explained and directions for further research are given in the final paragraph 5.5.

5.2. Summary

Several researches have been conducted on the role of customer loyalty but most of them are based on brand loyalty without taking into account different roles that price tiers cover in affecting loyalty. In fact, the Dirichlet model is one of the major method to reveal loyalty, since this method can produce different measures useful to determine loyalty grade. Even if this method is very reliable, since is based on actual purchase data, most of the time it covers just brand point of view. One of the first to apply the Dirichlet model, analysing the role of price in affecting loyalty, was Jarvis. In his paper price tiers take place instead of single brands and an overview of loyalty category is given. For this thesis, customer's purchase behavior from an online environment is analyzing. This is done using the Dirichlet model applied both to price tiers and brands. The choice to use online purchase data was based firstly to the reparability of the data. Moreover for online goods, during the purchasing process, the customer attention is focused more on the price than other attributes since most of the product attributes associated to the perception are not taken into account by the consumer. To do so, transactional data from an online grocery store is used to find consumer behavior brand loyalty patterns. By doing it we are able to see which price tier is the most loyal one, which loyalty grade is associated to brands and how price promotions affect loyalty. The brands chosen are those to belong to one product category, namely liquid detergent.

I followed the Jarvis's method adding a new question research that wants to investigate not only the role of price tiers, but also the role of price promotions among them. Moreover it is investigated if price promotion can have a moderator effect between the relationship of belonging to a price tier and brand loyalty. This conveyes the study to

analyse the market under two points of you. The first one as Jarvis did, defining price tiers in the category and listing them based on the loyalty generated. While the second step was to focus on brands listing them according to their loyalty, measured thanks to the Dirichlet model and the polarization index (phi). These information were merged in order to detect which price tier guarantees the highest level of loyalty in the category and which level of loyalty are associated to each brand. Hence, I could reveal the affection that each price promotion produces to the loyalty of each brand, and how the belonging to a tier can boost or limit it.

Based on the literature review of the sub questions, it was expected that those brands lying in the most expensive tier, would have been the most loyal ones since high price is perceived as high quality and according to the literature can generate higher loyalty. Also, it was expected that once detected the most loyal tier, brands in that tier, would have presented an excess of loyalty due to the effect of belonging to that tier. While those that belong to the lowest loyal tier would have been less loyal and with a low market share. So as described in the literature, these brands can be defined as be change-of-pace brands. Finally, what was expected is that price promotions would affect negatively more low loyalty tier brands than those which belong to the highest loyalty tier.

5.3. Discussion

Here it is discussed the results obtained from the hypotheses tested.

- Starting with the first hypothesis H1, I expected that the low price tier would have been the less loyal one. This it is due to the fact, that higher price is perceived as higher quality, and this lead to a higher loyalty as stated by Sivakumar and Raj (1997). The paper showed that there is a strict correlation between quality and loyalty affection due to price changes. The perception of quality of a specific product is based also on the price level to which the product and so a brand, belongs. In fact, to higher price level is associated higher quality. The hypothesis was rejected once it was tested. Hence, it contradicts what Sivakumar and Raj's paper affirms. In fact, I figure out that the price tier which gets the highest loyalty level is the low tier, the one that was supposed to be the less loyal one. While the one that was supposed to be the most loyal one, according to the paper cited, should have been high price tier;

to which is associated higher quality. The explanation can be found in the fact that we are in a type of market characterized by low engagement goods. As already said, these goods are basically not too much expensive and there is a high level of switching among consumers during the purchasing process. The detergent liquid category on which my thesis is focused, falls in this type of market. So, the perception that higher price means higher quality in terms of product attribute, can be not true or even if it is true it is not a key attribute for the consumer. Moreover, detergent liquid is not a kind of product to which quality attribute assumes a relevant role in boosting purchases and in creating a loyal customer. This can easily explain why, instead, low tier is the most loyal one. In fact, price attribute, in these types of market, is a key attribute to boost sales and to increase loyalty as well. Other attributes may be considered, but the online environment was chosen in order to limit the number of other product attributes perceived, highlighting the price one. Hence, I can affirm that low-price tier is the most loyal one while high tier is the less loyal one.

- Regarding the second hypothesis H2 where I supposed that those brands lying in the most loyal tier would have got excess loyalty, this hypothesis was almost totally satisfied. Since a brand that is in the most loyal tier, its loyalty would have boosted, getting benefits of belonging to that tier. This is shown comparing the polarization index of each brand to the overall category one. 6 out of 9 brands in the most loyal tier, represented by the low price segment, present an excess of loyalty. This loyalty comes out since a consumer is not loyal just to the brand but also to the entire price tier where he got used to buy.

- In H3 I stated that those brands which lie in the worst loyal tier (high price in this case) are supposed to be limited by belonging to that tier. Since if a consumer is not so loyal to that tier, he would easily switch to another brand decreasing the market share of the previous brand. In this case, this hypothesis was rejected. The reason is mainly that, even if these brands can have low level of loyalty and so high switching behaviour, their market share can be quite good instead. So, there is not a direct correlation between low loyalty and being change-of-pace brands. In fact, even if a brand has low level of loyalty maybe the number of sales are justified by the high number of different buyers. In my case, I got just two brands in high price tier and so this result can be not

so reliable in terms of figuring out if high brands are or are not change of pace brands in the liquid detergent category.

- In H4 I supposed that for those brands in the highest behavioural loyalty tier, their loyalty would not be affected by price promotions on other brands. In the literature review is deeply analysed the role of price promotions. One of the main problem of this kind of promotions is that, even if they can boost sales, they may make loyalty decreasing due to the increasing of switching behaviour. So, the hypothesis developed assumes that a brand in a high loyalty tier, low price segment in my case, would not be affected by price promotions on other brands. Hence, if brands on other less loyal tier are under promotions, those lying in the most loyal segment would still have higher loyalty. This hypothesis was accepted. This can be explained in two ways. Firstly, the habit of buying to the same price tier would limit the switching phenomenon cause by prices promotion on other tiers. This explanation is confirmed by Kalwani and Yim (1992) who affirmed that the switching behaviour is limited for those consumer who are used to buy in a certain price region. Second, since price is a key attribute, and low price tier is the most appealing one, even if other brands are under price promotion, this may affect most the brands in the same tier than ones in the most loyal one. In particular, in my case, low price tier is not affected at all by price promotions on other tiers brands. In fact, it performs better than the others whether or not they are under price promotions. It can be explained since low tier represents the region to which consumers results insensitive to price discounts on brands of other regions as stated by Kalwani and Yim (1992). Moreover, in general from Stata output I can affirm that price promotions affects loyalty negatively, making it decrease. This is due, as underlined by Marketing Science Institute (1998), to the fact that too many price promotions may lead to a high switching behaviour creating confusion in the consumer and increasing competition in the market.

- In H5 was supposed that those brands which lie in the lowest behavioural loyalty tier (high price tier), they would perform worse in terms of loyalty when there are price promotions on other brands. Contrary to H4 this hypothesis is based on the increasing of the switching behavior due to price promotions on other tiers. The hypothesis H5 was accepted. Outside the most loyal region Kalwani and Yim (1992) observe that

price differences have a significant impact on purchase brand probability. In fact, in this case of the less loyal tier, high price segment, is not so appealing for the consumer and so the brand does not benefit to belong to this tier. From the Stata output I figured out that high tier brands perform basically much worse than brands of other tiers. Moreover, this situation is even boosted when there are price promotions on the other tiers. So, I can affirm that switching behavior, leaded by price promotions, is not limited by belonging to a tier to which a consumer is not loyal to.

5.4. Managerial implications

The theoretical implication of this research is that evidence is present that brand loyalty can be measured through Dirichlet model and polarization index without biases. The hypotheses have been tested and this research proves that the liquid detergent online market, characterized by low engagement goods, can be segmented in three price tiers. These are defined based on prices and they are: Low, Medium and High. The low-price tier is the most loyal one. Those brands in this tier are characterized by an excess of loyalty. Moreover, price promotions, that in this type of market boost sales but may decrease loyalty, does not affect brands in this tier. Contrary high tier is the less loyal one. Brands in this tier are not change of pace goods since a common pattern did not come out from my research. But contrary to those brands in the most loyal tier, those in the lowest loyal one are heavily affected by price promotions on other brands. In particular, their loyalty performs less.

Managerial implications as such can be directed towards managers of grocery stores both online and offline sales channel operating in the low engagement goods field.

Under a managerial point of view, this thesis can bring important operative information that can be used to take decision for marketers. From my thesis emerges that in the low engagement market high quality is not the major key attribute to which marketers should focus on. Moreover, the correlation between high price, high quality and so high loyalty may not be true. Since these markets are deeply characterized by price promotions competition, my research can bring some good insights regarding strategies that may be adopted. First, for managers is important to segment the market in price tiers in order to understand how the category is divided and define where their

brand lies. Based on it, price discounted strategies can be developed. As showed by my thesis if a brand under study lies in the lowest loyalty tier, that may be the most expensive one, marketers should know that in this tier, brands are really affected by price promotions on other brands of other tiers. Hence managers should work on increasing brand perceived value than engaging a price competition with other brands. Hence, price promotions, in this case, should be used as not a loyalty tool but as a method to gain new customers that for the first time buy in the category. Contrary, if a brand lies in the most loyal tier, as confirmed by my thesis, managers should use price promotions as a marketing tool to increase their loyalty and increase switching behavior among tiers gaining competitor's customers. But also in this tier using this marketing tool for a long period can blur the company profit. In general, price promotions should be used by managers in the short run, as suggested by Marketing Science Institute (1998), without basing the entire marketing strategy just on it. In fact, to improve brands loyalty in the long run they should focus more on the brand value perception.

5.6. Limitations

First, a choice was made for one product category, liquid detergent. Different or more alternatives could have been chosen. Another limitation is that data used are quite old since are regarding the two years of 1996 to 1999 and it would have been better if the panel was greater. A higher level of data would have given a more reliable and deep understanding of the market under study. Moreover, a limitation concerning the data is that the dataset comprised information on a limited number of stores in the US. This diminishes the results generalizability to all grocery stores in the US. The behavioral side of loyalty is covered by this research the other, attitudinal side of loyalty is not measured. In fact, the main limitation of this study is that all the research is based on actual purchase data so I analyze the market just under a behavioral point of view, without considering the attitudinal insights that a survey could have revealed. Purchases data, of course, are more reliable than attitudinal data since they are not affected by the problem of not reliable responses of consumers. But without taking into account these kinds of data, it is impossible to get insights on how price is perceived by consumer and which other product attributes can influence the purchase

decision. Also, the price tiers defined are based just on a segmentation of prices without knowing how these tiers are really perceived by the final customer.

5.7. Directions for further researches

In further research a larger dataset, with more product categories and brands per category, will provide a great opportunity for future research. This would enhance the generalizability greatly. Moreover, based on study limitation I would recommend firstly to match attitudinal and actual purchase data conducting a survey in addition to the transactional data already available. By doing this, the researcher would be able to measure both the behavioral and attitudinal side of loyalty. This is interesting as the researcher could find out some consumer motives of why consumers switch to another brand of a tier or choose to stay loyal to a particular brand of a price segment. In this way, it is possible to dived the market in price tiers based on the consumer perception. It would be possible to understand how important the price attribute is compared to the other product features. Also, I would recommend to identify which type of price promotions are applied, to see which is more affective among price tiers.

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Appendix

Loyalty Phases with Corresponding Vulnerabilities		
Stage	**Identifying Marker**	**Vulnerabilities**
Cognitive	Loyalty to information such as price, features, and so forth.	Actual or imagined better competitive features or price through communication (e.g., advertising) and vicarious or personal experience. Deterioration in brand features or price. Variety seeking and voluntary trial.
Affective	Loyalty to a liking: "I buy it because I like it."	Cognitively induced dissatisfaction. Enhanced liking for competitive brands, perhaps conveyed through imagery and association. Variety seeking and voluntary trial. Deteriorating performance.
Conative	Loyalty to an intention: "I'm committed to buying it."	Persuasive counterargumentative competitive messages. Induced trial (e.g., coupons, sampling, point-of-purchase promotions). Deteriorating performance.
Action	Loyalty to action inertia, coupled with the overcoming of obstacles.	Induced unavailability (e.g., stocklifts—purchasing the entire inventory of a competitor's product from a merchant). Increased obstacles generally. Deteriorating performance.

Figure 2.1. Loyalty phases with corresponding vulnerabilities (Oliver 1997)

Brands (All)	Arm&Hammer	Dreft	Era	Jewel	Purex	Woolite	Yes	Tide low	Tide medium	Cheer Medium	Cheer LOW	Wisk medium	Wisk low	Tot
HIGH			50				82							132
LOW	96	15		21	19	22	43	227			66		89	598
MEDIUM									442	27		114		583
Tot	96	15	50	21	19	22	82 43	227	442	27	66	114	89	1313

Table1 Descriptive statistics about brands among price tiers

Price tier	Promotion 0	1	Tot
HIGH	80	20	100
LOW	277	90	367
MEDIUM	409	152	561
Tot	766	262	1028

Table2 Descriptive statistics about price tiers

TABLE 3 Promotion	0	1	Tot
Brands			
All	78	11	89
Arm&Hammer	9	5	14
Cheer LOW	30	7	37
Cheer Medium	27		27
Dreft	32	1	33
Era	14	4	18
Jewel	9	8	17
Purex	14	5	19
Tide low	69	27	96
Tide medium	309	114	423
Wisk low	25	14	39
Wisk medium	73	38	111
Woolite	48	19	67
Yes	29	9	38
Tot	766	262	1028

Table 3 Descriptive statistics about the brands and promotions associated

Total Households in the panel	279
Total buyers of the category	134
Category Penetration	48%
Total Purchases	1313
Category Purchase Frequency	9.8

Table 4 Descriptive statistics about the panel

Brands	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Penetration (O)
Arm&Hamm	15	7	1.14%	2.1	2.5%
Jewel	19	10	1.45%	1.9	3.6%
Era	21	10	1.60%	2.1	3.6%
Purex	22	6	1.68%	3.7	2.2%
Cheer Mediu	27	8	2.06%	3.4	2.9%
Yes	43	9	3.27%	4.8	3.2%
Dreft	50	10	3.81%	5.0	3.6%
Cheer LOW	66	6	5.03%	11.0	2.2%
Woolite	82	26	6.25%	3.2	9.3%
Wisk low	89	6	6.78%	14.8	2.2%
All	96	18	7.31%	5.3	6.5%
Wisk medium	114	26	8.68%	4.4	9.3%
Tide low	227	27	17.29%	8.4	9.7%
Tide medium	442	73	33.66%	6.1	26.2%

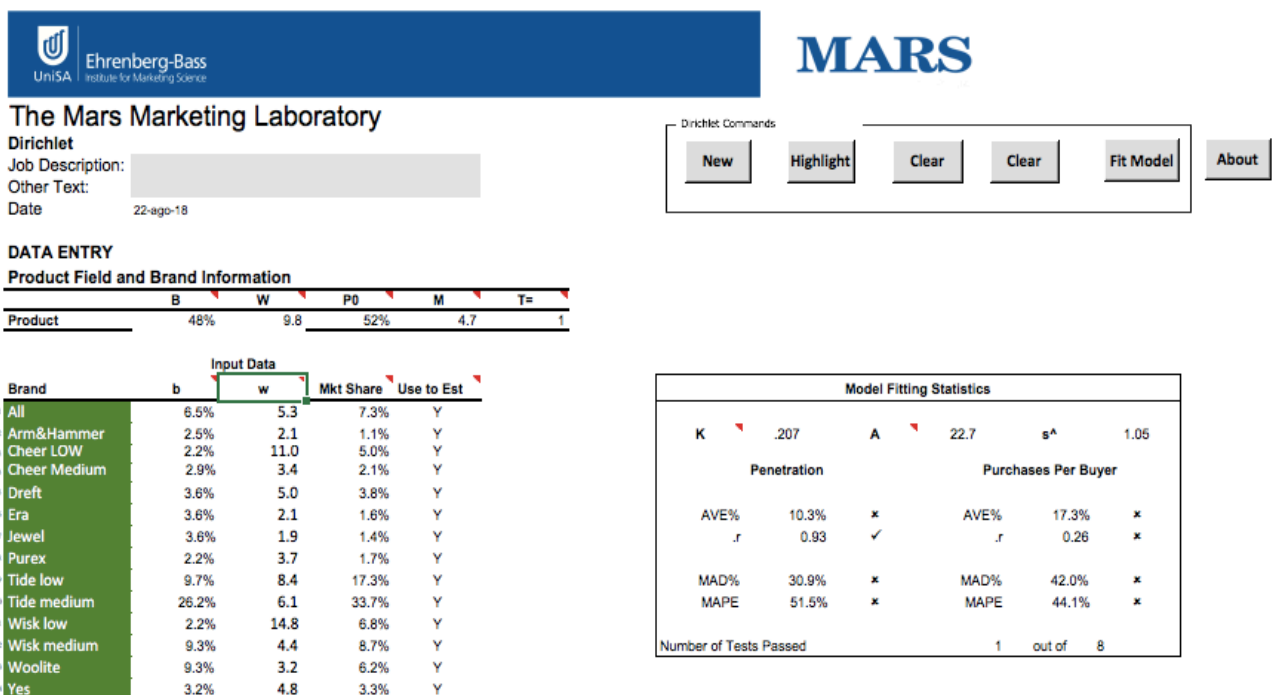Table 5 Descriptive statistics about the brands

Figure 3.1. Dirchlet output

Number	PRICE TIER	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Penetration (O)
1	HIGH	132	36	10.05%	3.7	13%
2	LOW	598	79	45.54%	7.6	28%
3	MEDIUM	583	91	44.40%	6.4	33%

Table 6 Summary statitics for price tier segments (aggregate)
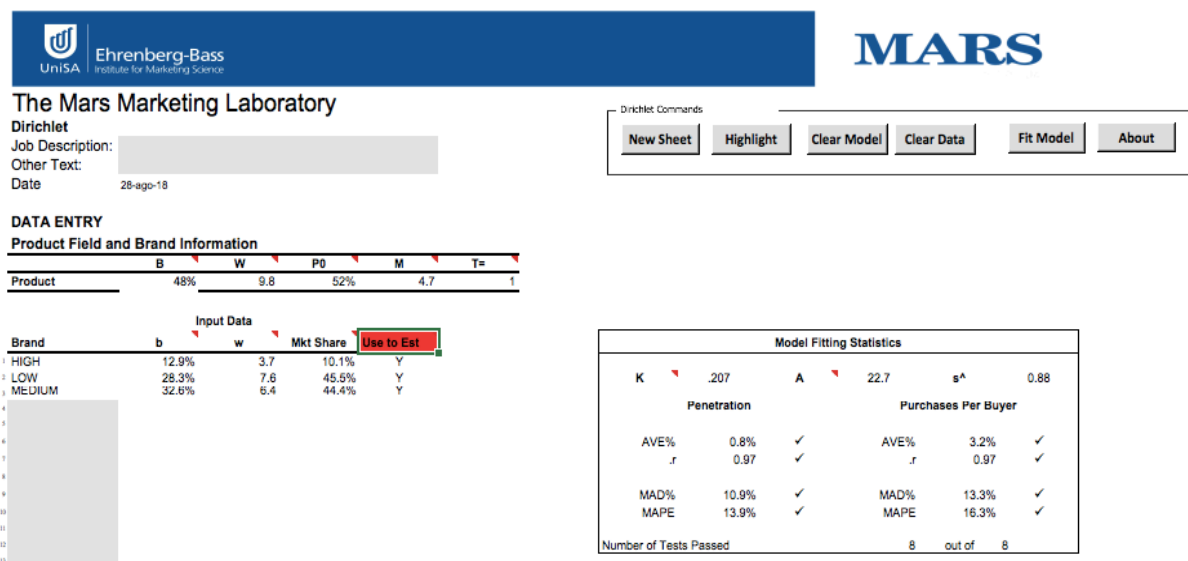

Figure 4.1. Dicthlet price tier analysis output

Number	PRICE TIER	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Purchase Frequency (T)	Penetration (O)	Penetration (T)	S	Phi	DMD(PHI)	Differences
2	LOW	598	79	45.54%	7.6	6.7	28%	32%	0.398	72%	53%	18%
3	MEDIUM	583	91	44.40%	6.4	6.6	33%	32%	1.096	48%	53%	-5%
1	HIGH	132	36	10.05%	3.7	4.9	13%	10%	2.129	32%	53%	-21%

Table 7 Model dirichlet estimates (S, Phi), theoretical values (T) and observed data values (O) for price tier segments
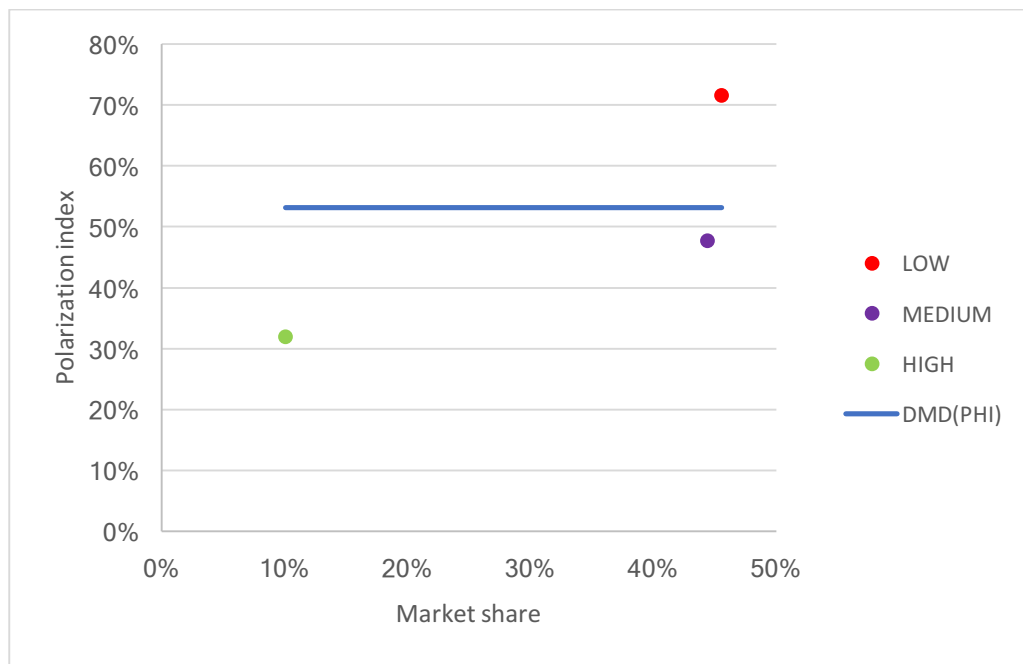
Figure 4.2. Graph of performance of price tier segments

Brands	Sum of purchases	Buyers of the tier	Market share	Purchase Frequency (O)	Purchase Frequency (T)	Penetration (O)	Penetration (T)	S	Phi	Type of tier	DMD(PHI)	Differences
Tide medium	442	73	33.66%	6.1	5.9	26.2%	27%	0.883	53%	MEDIUM	46%	7%
Tide low	227	27	17.29%	8.4	5.0	9.7%	16%	0.108	90%	LOW	46%	44%
Wisk medium	114	26	8.68%	4.4	4.6	9.3%	9%	1.159	46%	MEDIUM	46%	1%
All	96	18	7.31%	5.3	4.5	6.5%	8%	0.628	61%	LOW	46%	16%
Wisk low	89	6	6.78%	14.8	4.5	2.2%	7%	0.01	99%	LOW	46%	53%
Woolite	82	26	6.25%	3.2	4.4	9.3%	7%	2.748	27%	HIGH	46%	-19%
Cheer LOW	66	6	5.03%	11.0	4.4	2.2%	5%	0.01	99%	LOW	46%	53%
Dreft	50	10	3.81%	5.0	4.3	3.6%	4%	0.685	59%	HIGH	46%	14%
Yes	43	9	3.27%	4.8	4.3	3.2%	4%	0.763	57%	LOW	46%	11%
Cheer Medium	27	8	2.06%	3.4	4.2	2.9%	2%	1.789	36%	MEDIUM	46%	-10%
Purex	22	6	1.68%	3.7	4.2	2.2%	2%	1.411	41%	LOW	46%	-4%
Era	21	10	1.60%	2.1	4.2	3.6%	2%	6.561	13%	LOW	46%	-33%
Jewel	19	10	1.45%	1.9	4.2	3.6%	2%	9.028	10%	LOW	46%	-36%
Arm&Hammer	15	7	1.14%	2.1	4.2	2.5%	1%	5.764	15%	LOW	46%	-31%

Table 8 Model Dirichlet estimates (S, Phi), theoretical values (T) and observed data values (O) for detergent brands (red: low tier brand, purple: medium tier, phosphor: high tier brand)
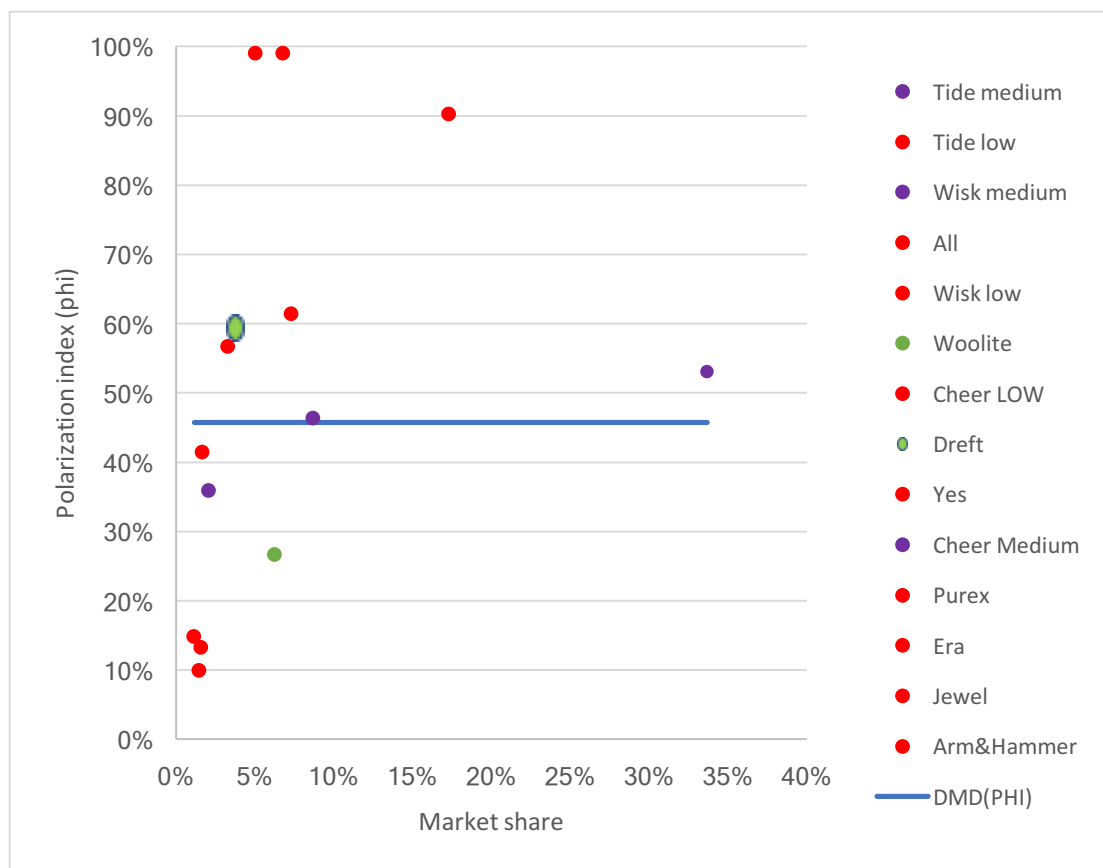
Figure 4.3. Graph of performance of detergent brands (red: low tier brand, purple: medium tier, phosphor: high tier brand)
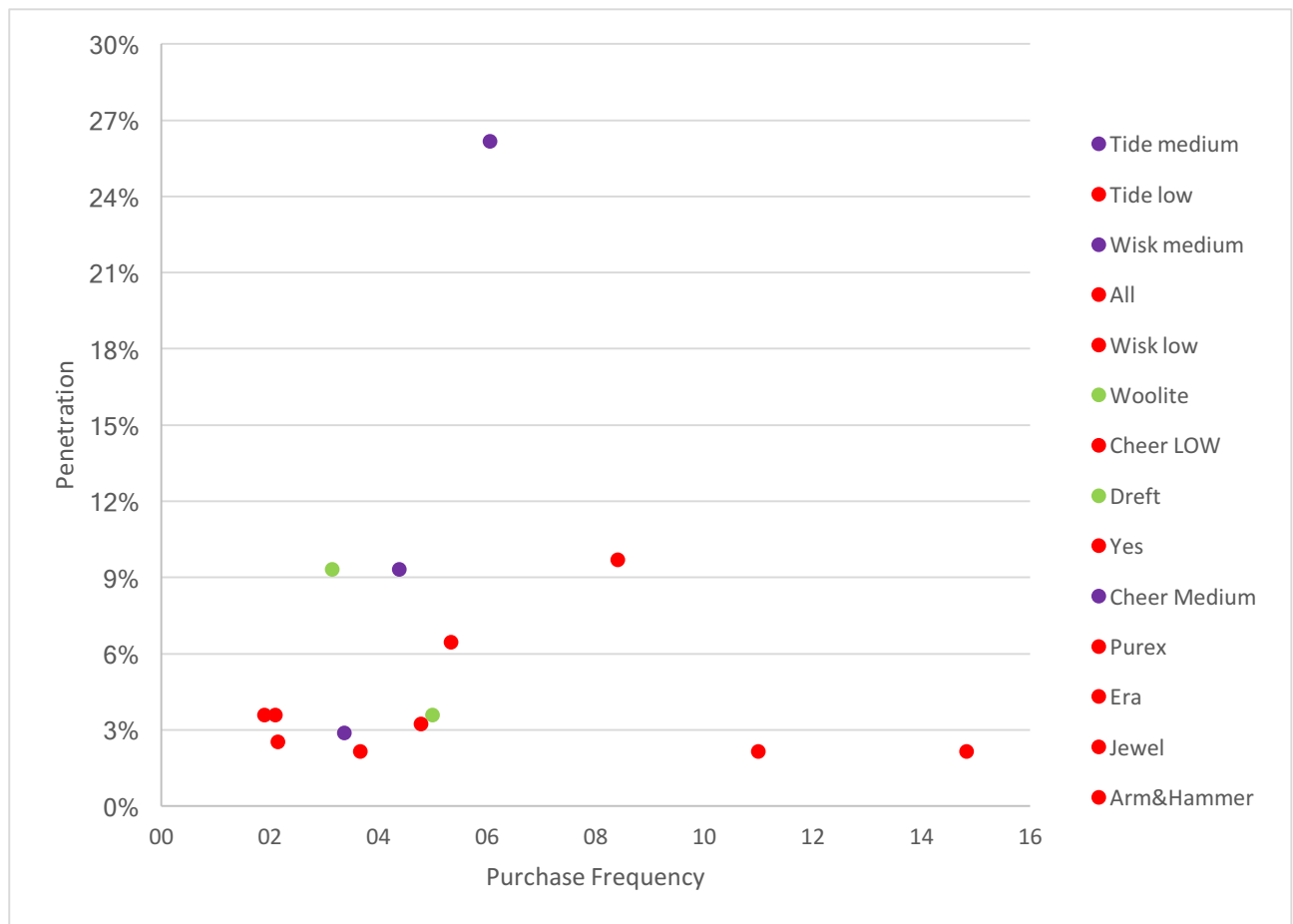
Figure 4.4. Graphing the penetration rate with the purchase frequency (red: low tier brand, purple: medium tier, phosphor: high tier brand)

```
. regress phi dummyhigh dummymiddle pro_laundry c.dummyhigh#c.pro_laundry c.dummymiddle#c.pro_laundry, beta
```

Source	SS	df	MS		
Model	10.8930779	5	2.17861557		
Residual	32.4220367	1022	.031724106		
Total	43.3151145	1027	.042176353		

Number of obs = 1028
F(5, 1022) = 68.67
Prob > F = 0.0000
R-squared = 0.2515
Adj R-squared = 0.2478
Root MSE = .17811

phi	Coef.	Std. Err.	t	P>|t|	Beta
dummyhigh	-.2896173	.0226071	-12.81	0.000	-.418102
dummymiddle	-.1813337	.0138597	-13.08	0.000	-.4398475
pro_laundry	-.009284	.0216106	-0.43	0.668	-.0197099
c.dummyhigh#c.pro_laundry	-.102716	.0494952	-2.08	0.038	-.0691142
c.dummymiddle#c.pro_laundry	.0155004	.0274462	0.56	0.572	.026804
_cons	.6876173	.0107018	64.25	0.000	.

Figure 4.5. Regression results of Phi (estimated brand level loyalty) on tier segments and price promotions (reference group: low tier).

```
. regress phi dummylow dummymiddle pro_laundry c.dummylow#c.pro_laundry c.dummymiddle#c.pro_laundry, beta
```

Source	SS	df	MS		
Model	10.8930779	5	2.17861557		
Residual	32.4220367	1022	.031724106		
Total	43.3151145	1027	.042176353		

Number of obs = 1028
F(5, 1022) = 68.67
Prob > F = 0.0000
R-squared = 0.2515
Adj R-squared = 0.2478
Root MSE = .17811

phi	Coef.	Std. Err.	t	P>|t|	Beta
dummylow	.2896173	.0226071	12.81	0.000	.6759927
dummymiddle	.1082836	.0217742	4.97	0.000	.2626554
pro_laundry	-.112	.0445282	-2.52	0.012	-.2377753
c.dummylow#c.pro_laundry	.102716	.0494952	2.08	0.038	.1414309
c.dummymiddle#c.pro_laundry	.1182164	.0476344	2.48	0.013	.2044255
_cons	.398	.0199136	19.99	0.000	.

Figure 4.6. Regression results of Phi (estimated brand level loyalty) on tier segments and price promotions (reference group: high tier).

Thesis Summary

The aim of this study is to understand the effect of price promotions on loyalty of brands that lie among different price tiers empirically. The contribution of this thesis to marketing literature is the main instrument used for the analysis, which is the Dirichlet model and the measure of polarization index. The advantage of using those are:
that these models are purchase data based, so data are easy to be collected from them it is possible to obtain highly reliable results finally they result to be less costly for marketing managers. Several steps are followed to analyze data. First of all, I focused on the detergent market. The data used in this research are from a large US national wide traditional grocery retailer that sells online. The data integrates three types of information from 279 Scan Key Household panels data collected during the years 1996 and 1999: price/promotion of stock keeping units (SKUs), consumers orders and SKU information. I segmented the market in three price tiers: low, medium, high as did in Jarvis's paper. All tiers are listed based on loyalty measure of polarization index calculated using the Dirichlet model. In this way, I know which is the price tier that guarantees the highest value in terms of loyalty. Using the same methodology, I listed all brands in the detergent category based on loyalty given by polarization index. So, after that, I know which most loyalty tier is and even which most loyal brand is. Matching these information, I can understand if there are any relationships between the loyalty of the tier and the one linked to single brands. This is the problem statement to which my thesis is based on:

"How can price promotions affect the brand loyalty among different price tiers?"

Limitations for this research are a far from perfect dataset, considering only one product categories and the fact that we should also to conduct a survey in order to analyze the consumer perception of price attribute to see how important it is and how it is perceived. Some directions for further research are selecting more product alternatives with more brands in each product category, matching a questionnaire (survey data) next to this research and conducting this research again with a better and more recent dataset.

Introduction

Maintaining loyalty is major goal of many companies and brands. The reason is that keeping customers loyal may be less costly than gaining new ones. So, nowadays most of the marketing firms' strategies are focused on maintaining current customers happy. Developing these strategies is becoming quite hard because brand loyalty comes not only from objective actions, but also from emotional and individual preferences. Measuring brand loyalty has constantly represented a key issue for marketing researchers. It requires either long-term actual purchases data or attitudinal data. We can measure loyalty at consumer level, i.e. whether a consumer purchases (or prefers) repeatedly the same product/brand, or brand level i.e., whether the brand was purchased (or preferred) by consumers repeatedly among remaining brands. Another issue is to measure loyalty in terms of attitude (like/prefer/ purchase intention) or behaviour (repeat actual purchases). This thesis focus is on behavioural loyalty, measuring brand loyalty at brand level utilising actual consumer purchases data. The main two factors that can affect brand loyalty boosting repurchases and sales, are represented by price tiers and price promotions. Each price tier in a product category is represented by a range of prices which delimit the level. This can be figured as a region of price where brands with similar price lie. This division results useful to marketers, since let them to segment the category basing on the price attribute of brands, understanding the importance of each tier to the customer. Hence, marketers are increasingly focusing on pricing and price promotions in order to influence the consumer purchasing decision. In fact, in some markets the price attribute of a brands covers a key role. The markets where price covers a crucial role in maintaining the customer loyal are those called frequently purchased goods. An example of this type of market is the grocery one, where products have low involvement goods with high frequency buying. Consumers buy habitually grocery products. That is why, measuring loyalty is easier using scanner panel data in this type of markets. These markets are characterized by a quite stable demand in the category and by low involvement goods. The products are called experience or convenience goods. They have a low level of engagement and a high purchase frequency. The costumer's habit is to make purchases among a low number of different brands. Brands are not too much segmented, having prices that lie among some price tiers and the typical consumer exhibits a polygamous

buying behaviour (Ehrenberg, Uncles, Goodhardt,2003). In these types of market price promotion strategies are one of the main tool used by marketers. Price promotions are represented by decreasing of brand prices among the category. They can make the customer relationship with the brand stronger, motivating fast sales response, as documented by some researches (e.g., Guadagni and Little 1983; Gupta 1988; Neslin, Henderson, and Quelch 1985). Even if in the short run the price promotion could be effective, there are some concerns about the long-run effects of such activity. The main doubts are about the possibility that frequent price discounting can blur the difference between the discount price and the baseline price of a product (Marketing News 1985). Using panel data, collected for a specific period, it is possible to detect some common patterns, thanks to which would be possible to understand the effectiveness of these price promotions in the long run. This is done by detecting the changes in behavioural loyalty to a brand due to price promotion, among price tiers. The patterns revealed are important to develop marketing strategy to justify investments on loyalty programs as Dowling and Uncles (1997) state. To reveal these patterns, it is important to consider that the baseline of a product falls into a specific price tier. In fact, in a category, there are different price tiers where a brand lies. It can happen that a consumer shows a more loyalty behaviour to a price tier than to a single brand. Hence, the price tier cover a key role since the effect of price promotion can be boosted by lying in a specific price tier or even limited. Marketers need to identify which grade of loyalty each price tier guarantees, as done by Jarvis (2006), in order to choose the right price discount. It is crucial, since brand loyalty can be increased due to the double loyalty effects coming from promotions and price tier belonging, limiting also brand switching among tiers. In fact, as it is reported by Scriven and Ehrenberg (1995), "consumers do not stick to buying only from one price tier, they buy from a repertory of price tiers and they do switch". The role of different price tiers in a category was for the first time analysed by Jarvis et al. (2006) using polarization index, calculated by Dirichlet model, as a measure to identify the degree of loyalty to each price tier. Polarization index was first suggested by Sabavala and Morrison (1977) and developed by (Kalwani and Morrison, 1980; Fader and Schmittlein, 1993) in measuring loyalty and it has advantages of being easy to be calculated running the Dirichlet model on the specific excel macro. It is based on actual purchase data that are easy to be collected, so less costly for the company. The index results more reliable in detecting behavioural loyalty since it is based on actual

aggregated data. While, as it will be discussed later, the index does not detect attitudinal loyalty, so the preferences of the customers are not justified by this measure. Jarvis's paper represents a different approach in using the Dirichlet model and the polarization index to detect variation in loyalty. Usually the index was applied to brands, while in his research, the index was applied to price tiers to reveal the loyalty to tiers in a category. Moreover, graphing the index with the market share he could reveal whenever excess loyalty of brands among tiers existed. Excess loyalty is revealed whenever the index of each brand is greater than the baseline index of the category. Hence, when the brand index is greater than the baseline index, it means that that brand performs better than expected. Contrary, if the brand loyalty is lower than expected and even the market share is lower than the average of the category, we can define these brands as change-of-pace brands. These brands have really low purchase frequencies relative to their penetrations. The Jarvis's paper at the end invites further research to detect how the tiers are affected by price promotions.

My thesis wants to analyse this aspect and to do so, firstly, following the analysis already conducted by Jarvis, I use the Dirichlet model and polarization index to price tiers. The model will be useful since it is a natural baseline for revealing the variations of a repeat purchasing for high-share brands (Fader and Schmittlein 1993). I calculate how the customer loyalty to different price tiers varies based on market shares. The analysis is based on this benchmark. The non-brand attribute price tier is compared using the polarisation index.

The second analysis investigates deeply how the brand loyalty changes, among tiers, when price promotions are applied on brands, running a logistic regression on Stata software.

Problem statement

This research will be built on the results presented by Jarvis et al. (2006) and will go further, analysing the role of price promotions on brand loyalty among price tiers. The aim of the study is to analyse the effect of price promotions on loyalty to brands that lie in different price tiers in a category.

Hence the problem statement is as follow:

"How can price promotions affect the brand loyalty among different price tiers?"

The problem statement will be answered with several sub-questions. These are:

Which is the price tier that guarantees the highest loyalty to the tier?

How does lying in a price tier affect the brand loyalty?

How can price promotion affect loyalty of a brand that lies in a price tier?

Structure of the Thesis

In the next chapter a theoretical framework will give a better understanding about the construct of brand loyalty and its different ways to be measured. Moreover, insights on which stage during purchase price covers a key role to motivate the consumer to purchase is described. Next, the importance of loyalty to price tiers is explained underling, further, how belonging to a price tier can affect brand loyalty.

In last part of the chapter an explanation on the role of price promotions in boosting sales and increasing brand loyalty is given. To help build towards the conceptual model, hypotheses are stated between the sub-questions. In the latter part of the chapter a conceptual model will be constructed based on the stated hypotheses. While in the third chapter the methodology and characteristics of the data are explained. The fourth chapter will discuss the results obtained from the data analysis. The final chapter is focused on conclusions of this study.

Which type of measures are used to reveal customer loyalty?

The measures more suitable to reveal the loyalty to a brand depends on which type of data we have and if they are more attitudinal or behavioural focused. In this case since the data are aggregated, coming from a panel of actual purchases, the best measure suitable for this research is the Dirichlet model.

The Dirichlet model was used by, Ehrenberg, Goodhardt and Barwise (1990) and others to reveal the double jeopardy effect in a market. According to Fader and Schmittlein

(93) the model goes beyond the double jeopardy phenomenon explaining behavioural purchase patterns made by heterogeneous consumers. It offers a robust method to summarize and predict repeated choice.

In my research the model is useful since allows investigation into loyalty variation. For my study, it is used to calculate how, in a product category, repeat purchase loyalty should change within the price tier's market share. Moreover, it is used also to detect when excess brand loyalty exists among tiers.

Direchlet Distribution

It is a probability distribution where it is sampling over a probability simplex. Probability simplex is bunch of numbers between 0 and 1 that add up to 1. For example, a) (0.6, 0.4) for K=2, b) (0.1, 0.1, 0.8) for K=3 , c) (0.05, 0.2, 0.15, 0.1, 0.3, 0.2) for K=6 categories.

These numbers represent probabilities over K distinct categories. t is a categorical distribution similar to multinominal distribution.

The Direchlet model

Here I give some functional description of what the Dirichlet model is.

Firstly, the probability that a random consumer will choose brand i, on a category at time t is:

$$P(i) = \frac{\alpha_i + n_{it}}{\Sigma_j(\alpha_j + n_{jt})}$$

Denominator: represents the sum over all brands available in the market to the consumer.

α: represents the brand-specific Dirichlet parameter for brand i.

If there are j brands (or j price tiers), then the DMD has j parameters $\alpha 1, \alpha 2, \ldots, \alpha j$ and $S = \alpha 1 + \alpha 2 + \alpha j$ (that will be explained later). Once the parameters $\alpha 1, \alpha 2, \ldots, \alpha j$ are estimated for the DMD, the S parameter is used to indicate the sum of the n-th values of α (Corsi, Rungie and Casini 2011).

n: number of purchases that the consumer has made of brand i not including the purchase at time t.

In default, not having information regarding the purchase history of the consumer, n is 0 for all brands. So, as suggested, our best guessing is to assume that choice probabilities are proportional to market shares.

$$P(i) = \frac{\alpha_i}{\Sigma_j \alpha_j} = \text{Market share for brand } i. \qquad (1)$$

The "S" is the sum of:

$$S = \sum_j \alpha_j \qquad \text{where } 0 \leq S \leq +\infty. \qquad (2)$$

S: can range between 0 and infinity and gives indication of the overall loyalty in the category as previously described by (Goodhardt et al., 1984; Ehrenberg, 1988; Uncles et al.,1995).

"Low values of S indicate consumers always choosing the same alternative and large values indicate considerable switching amongst alternatives in the market" Jarvis et al. (2006). Alternatives that in the first part of my study are represented not by brands but by price tiers.

Equation (4) shows the link between the Dirichlet "S" statistic and the polarization index φ (further description is given in the following paragraph).

The repeat rate (p): "is the probability of choosing alternative i conditional on a previous purchase of the same alternative. It is used to measure the switching and is linked to both φ and market share (m)" Jarvis et al. (2006).

Rungie and Laurent (2003a), showed this in the 3 and 4 equations:

$$p = m + \varphi - m\varphi \quad \text{where } 0 \leq p \geq 1. \qquad (3)$$

where:

$$\varphi = \frac{1}{1 + \sum_j \alpha_j} \qquad \text{where } 0 \leq \varphi \geq 1. \qquad (4)$$

The polarization index φ

$$\varphi = \frac{1}{1 + \sum_j \alpha_j} \qquad \text{where } 0 \leq \varphi \geq 1. \qquad (4)$$

The polarization index, φ, was for the first time presented by Sabavala and Morrison (1977) and developed by (Kalwani and Morrison, 1980; Fader and Schmittlein, 1993), it is useful to reveal variations in loyalty. The index value varies from zero to one. A φ of one would mean consumers are always choosing the same alternative and 100% loyal to it (which is very unusual). Low values for φ indicate less loyalty and more switching between several alternatives in the category. If φ is close to zero then all buyers will switch regularly. This method is preferred to the others since provides a model for identifying variations revealed comparing the index to a baseline level of loyalty. Graphing the variation against the market share and utilising the Dirichlet multinomial distribution (DMD) baseline, it can describe a robust method for reporting the structure of a market (Jarvis et al. [2006]). Usually the brand is the "unit" used for these types of analyses but, following the Jarvis paper in my study, the unit is represented by price tier.

Data Description

For this research, a large dataset will be used. I use transactional (purchase data) from households provided by an online US grocery chain. The data collected are covering roughly two years between 1996 and 1998.

Data extracted for the model entails one product category, that is liquid detergent. The reason for choosing this product category is the availability of data, and the fact that It also differs in purchase frequency and promotion sensitivity. Moreover, this category is the one which has the highest number of different brands (16) spreaded among price tiers. These results are useful for the purpose of the study in order to detect changes in brand loyalty. Brands are categorized based on which price tiers they belong. Price tiers are three: low, medium and high. How the category is segmented based on price tiers will be explained later.

Conclusion summary

Several researches have been conducted on the role of customer loyalty but most of them are based on brand loyalty without taking into account different roles that price tiers cover in affecting loyalty. Infact the Dirichlet model is one of the major method to reveal loyalty, since this method can produce different measures useful to determine loyalty grade. Even if this method is very reliable, since is based on actual purchase data, most of the time it covers just brand point of view. One of the first to apply the Dirichlet model, analysing the role of price in affecting loyalty, was Jarvis. In his paper price tiers take place instead of single brands and an overview of loyalty category is given. For this thesis, customer's purchase behavior from an online environment is analyzing. This is done using the Dirichlet model applied both to price tiers and brands. The choice to use online purchase data was based firstly to the reparability of the data. Moreover for online goods, during the purchasing process, the customer attention is focused more on the price than other attributes since most of the product attributes associated to the perception are not taken into account by the consumer. To do so, transactional data from an online grocery store is used to find consumer behavior brand loyalty patterns. By doing it we are able to see which price tier is the most loyal one, which loyalty grade is associated to brands and how price promotions affect loyalty. The brands chosen are those to belong to one product category, namely liquid detergent. I followed the Jarvis's method adding a new question research that wants to investigate not only the role of price tiers, but also the role of price promotions among them. Moreover it is investigated if price promotion can have a moderator effect between the relationship of belonging to a price tier and brand loyalty. This conveys the study to analyse the market under two points of you. The first one as Jarvis did, defining price tiers in the category and listing them based on the loyalty generated. While the second step was to focus on brands listing them according to their loyalty, measured thanks to the Dirichlet model and the polarization index (phi). These information were merged in order to detect which price tier guarantees the highest level of loyalty in the category and which level of loyalty are associated to each brand. Hence, I could reveal the affection that each price promotion produces to the loyalty of each brand, and how the belonging to a tier can boost or limit it.

Based on the literature review of the sub questions, it was expected that those brands lying in the most expensive tier, would have been the most loyal ones since high price is perceived as high quality and according to the literature can generate higher loyalty. Also, it was expected that once detected the most loyal tier, brands in that tier, would have presented an excess of loyalty due to the effect of belonging to that tier. While those that belong to the lowest loyal tier would have been less loyal and with a low market share. So as described in the literature, these brands could be defined as be change-of-pace brands. Finally, what was expected is that price promotions would affect negatively more low loyalty tier brands than those which belong to the highest loyalty tier.

Discussion of results

Here it is discussed the results obtained from the hypotheses tested.

- • Starting with the first hypothesis H1, I expected that the low price tier would have been the less loyal one. This it is due to the fact, that higher price is perceived as higher quality, and this lead to a higher loyalty as stated by Sivakumar and Raj (1997). The paper showed that there is a strict correlation between quality and loyalty affection due to price changes. The perception of quality of a specific product is based also on the price level to which the product and so a brand, belongs. In fact, to higher price level is associated higher quality. The hypothesis was rejected once it was tested. Hence, it contradicts what Sivakumar and Raj's paper affirms. In fact, I figure out that the price tier which gets the highest loyalty level is the low tier, the one that was supposed to be the less loyal one. While the one that was supposed to be the most loyal one, according to the paper cited, should have been high price tier; to which is associated higher quality. The explanation can be found in the fact that we are in a type of market characterized by low engagement goods. As already said, these goods are basically not too much expensive and there is a high level of switching among consumers during the purchasing process. The detergent liquid category on which my thesis is focused, falls in this type of market. So, the perception that higher price means higher quality in terms of product attribute, can be not true or even if it is true it is not a key attribute for the consumer. Moreover, detergent liquid is not a kind of product to which quality attribute assumes a relevant role in

boosting purchases and in creating a loyal customer. This can easily explain why, instead, low tier is the most loyal one. In fact, price attribute, in these types of market, is a key attribute to boost sales and to increase loyalty as well. Other attributes may be considered, but the online environment was chosen in order to limit the number of other product attributes perceived, highlighting the price one. Hence, I can affirm that low-price tier is the most loyal one while high tier is the less loyal one.

- Regarding the second hypothesis H2 where I supposed that those brands lying in the most loyal tier would have got excess loyalty, this hypothesis was almost totally satisfied. Since a brand that is in the most loyal tier, its loyalty would have boosted, getting benefits of belonging to that tier. This is shown comparing the polarization index of each brand to the overall category one. 6 out of 9 brands in the most loyal tier, represented by the low price segment, present an excess of loyalty. This loyalty comes out since a consumer is not loyal just to the brand but also to the entire price tier where he got used to buy.

- In H3 I stated that those brands which lie in the worst loyal tier (high price in this case) are supposed to be limited by belonging to that tier. Since if a consumer is not so loyal to that tier, he would easily switch to another brand decreasing the market share of the previous brand. In this case, this hypothesis was rejected. The reason is mainly that, even if these brands can have low level of loyalty and so high switching behaviour, their market share can be quite good instead. So, there is not a direct correlation between low loyalty and being change-of-pace brands. In fact, even if a brand has low level of loyalty maybe the number of sales are justified by the high number of different buyers. In my case, I got just two brands in high price tier and so this result can be not so reliable in terms of figuring out if high brands are or are not change of pace brands in the liquid detergent category.

- In H4 I supposed that for those brands in the highest behavioural loyalty tier, their loyalty would not be affected by price promotions on other brands. In the literature review is deeply analysed the role of price promotions. One of the main problem of this kind of promotions is that, even if they can boost sales, they may make loyalty decreasing due to the increasing of switching behaviour. So, the hypothesis

developed assumes that a brand in a high loyalty tier, low price segment in my case, would not be affected by price promotions on other brands. Hence, if brands on other less loyal tier are under promotions, those lying in the most loyal segment would still have higher loyalty. This hypothesis was accepted. This can be explained in two ways. Firstly, the habit of buying to the same price tier would limit the switching phenomenon cause by prices promotion on other tiers. This explanation is confirmed by Kalwani and Yim (1992) who affirmed that the switching behaviour is limited for those consumer who are used to buy in a certain price region. Second, since price is a key attribute, and low price tier is the most appealing one, even if other brands are under price promotion, this may affect most the brands in the same tier than ones in the most loyal one. In particular, in my case, low price tier is not affected at all by price promotions on other tiers brands. In fact, it performs better than the others whether or not they are under price promotions. It can be explained since low tier represents the region to which consumers results insensitive to price discounts on brands of other regions as stated by Kalwani and Yim (1992). Moreover, in general from Stata output I can affirm that price promotions affects loyalty negatively, making it decrease. This is due, as underlined by Marketing Science Institute (1998), to the fact that too many price promotions may lead to a high switching behaviour creating confusion in the consumer and increasing competition in the market.

- In H5 was supposed that those brands which lie in the lowest behavioural loyalty tier (high price tier), they would perform worse in terms of loyalty when there are price promotions on other brands. Contrary to H4 this hypothesis is based on the increasing of the switching behavior due to price promotions on other tiers. The hypothesis H5 was accepted. Outside the most loyal region Kalwani and Yim (1992) observe that price differences have a significant impact on purchase brand probability. In fact, in this case of the less loyal tier, high price segment, is not so appealing for the consumer and so the brand does not benefit to belong to this tier. From the Stata output I figured out that high tier brands perform basically much worse than brands of other tiers. Moreover, this situation is even boosted when there are price promotions on the other tiers. So, I can affirm that switching behavior, leaded by price promotions, is not limited by belonging to a tier to which a consumer is not loyal to.

Managerial implications

The theoretical implication of this research is that evidence is present that brand loyalty can be measured through Dirichlet model and polarization index without biases. The hypotheses have been tested and this research proves that the liquid detergent online market, characterized by low engagement goods, can be segmented in three price tiers. These are defined based on prices and they are: Low, Medium and High. The low-price tier is the most loyal one. Those brands in this tier are characterized by an excess of loyalty. Moreover, price promotions, that in this type of market boost sales but may decrease loyalty, does not affect brands in this tier. Contrary high tier is the less loyal one. Brands in this tier are not change of pace goods since a common pattern did not come out from my research. But contrary to those brands in the most loyal tier, those in the lowest loyal one are heavily affected by price promotions on other brands. In particular, their loyalty performs less.

Managerial implications as such can be directed towards managers of grocery stores both online and offline sales channel operating in the low engagement goods field.

Under a managerial point of view, this thesis can bring important operative information that can be used to take decision for marketers. From my thesis emerges that in the low engagement market high quality is not the major key attribute to which marketers should focus on. Moreover, the correlation between high price, high quality and so high loyalty may not be true. Since these markets are deeply characterized by price promotions competition, my research can bring some good insights regarding strategies that may be adopted. First, for managers is important to segment the market in price tiers in order to understand how the category is divided and define where their brand lies. Based on it, price discounted strategies can be developed. As showed by my thesis if a brand under study lies in the lowest loyalty tier, that may be the most expensive one, marketers should know that in this tier, brands are really affected by price promotions on other brands of other tiers. Hence managers should work on increasing brand perceived value than engaging a price competition with other brands. Hence, price promotions, in this case, should be used as not a loyalty tool but as a method to gain new customers that for the first time buy in the category. Contrary, if a brand lies in the most loyal tier, as confirmed by my thesis, managers should use

price promotions as a marketing tool to increase their loyalty and increase switching behavior among tiers gaining competitor's customers. But also in this tier using this marketing tool for a long period can blur the company profit. In general, price promotions should be used by managers in the short run, as suggested by Marketing Science Institute (1998), without basing the entire marketing strategy just on it. In fact, to improve brands loyalty in the long run they should focus more on the brand value perception.

Limitations

First, a choice was made for one product category, liquid detergent. Different or more alternatives could have been chosen. Another limitation is that data used are quite old since are regarding the two years of 1996 to 1999 and it would have been better if the panel was greater. A higher level of data would have given a more reliable and deep understanding of the market under study. Moreover, a limitation concerning the data is that the dataset comprised information on a limited number of stores in the US. This diminishes the results generalizability to all grocery stores in the US. The behavioral side of loyalty is covered by this research the other, attitudinal side of loyalty is not measured. In fact, the main limitation of this study is that all the research is based on actual purchase data so I analyze the market just under a behavioral point of view, without considering the attitudinal insights that a survey could have revealed. Purchases data, of course, are more reliable than attitudinal data since they are not affected by the problem of not reliable responses of consumers. But without taking into account these kinds of data, it is impossible to get insights on how price is perceived by consumer and which other product attributes can influence the purchase decision. Also, the price tiers defined are based just on a segmentation of prices without knowing how these tiers are really perceived by the final customer.

Directions for further researches

In further research a larger dataset, with more product categories and brands per category, will provide a great opportunity for future research. This would enhance the generalizability greatly. Moreover, based on study limitation I would recommend firstly to match attitudinal and actual purchase data conducting a survey in addition to

the transactional data already available. By doing this, the researcher would be able to measure both the behavioral and attitudinal side of loyalty. This is interesting as the researcher could find out some consumer motives of why consumers switch to another brand of a tier or choose to stay loyal to a particular brand of a price segment. In this way, it is possible to dived the market in price tiers based on the consumer perception. It would be possible to understand how important the price attribute is compared to the other product features. Also, I would recommend to identify which type of price promotions are applied, to see which is more affective among price tiers.