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Three essays on brand equity

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THREE ESSAYS ON BRAND EQUITY

by

JianJun Zhu

An Abstract

Of a thesis submitted in partial fulfillment
of the requirements for the Doctor of
Philosophy degree in Business Administration
in the Graduate College of
The University of Iowa

July 2009

Thesis Supervisors: Professor Thomas S. Gruca
　　　　　　　　　　Assistant Professor Lopo L. Rego

ABSTRACT

This three-essay thesis focuses on how value of the brand, i.e. brand equity is created, with each study investigating different parts of the relationships within the brand value chain.

My first essay identifies and tests a new set of brand equity drivers such as brand structure and positioning, brand strategy, and customer characteristics. I use revenue premium as the retail level measure of brand equity and decompose it into price and volume premiums. Then, I explore the effects of different brand equity drivers on these premiums. The study on the universe of grocery industry in the U.S. shows compelling evidences that volume premium prevails over price premium in driving revenue premium. Brand structure and positioning, brand strategy and customer characteristics contribute significantly to the changes of the brand market performance measured with price, volume and revenue premiums.

My second essay examines the association between consumer-based brand equity (IBBE) and brand market performance, and the moderators of this association. I explore a comprehensive set of market performance measures (penetration, loyalty, market share, price and revenue) of 216 major brands sold in the grocery channel in the U.S., in conjunction with EquiTrend© brand equity measure. The results show that customer based brand equity provides incremental explanatory power for brand market performance beyond the explanation by a wide array of performance determinants identified in the first essay. Furthermore, the equity-performance association is moderated by a set of product and category features, as well as the firm brand strategy.

My third essay studies whether firms benefit from having multiple brands across different areas. I model brand market performance as a function of different elements of the firm brand portfolio, including the size and performance of sibling brands and the inter-brand distance. The dataset includes 1,700 brands from over 350 firms in the grocery channel within the U.S. The results show that the brand portfolio information provides incremental explanatory power for brand market performance. Moreover, the size and the performance of sibling brands have significant impact on a focal brand's market performance, and these impacts are moderated by the inter-brand distance.

Abstract Approved by : _____
Thesis Supervisor

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Title and Department

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Thesis Supervisor

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Graduate College
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CERTIFICATE OF APPROVAL

PH.D. THESIS

This is to certify that the Ph.D. thesis of

Jianjun Zhu

has been approved by the Examining Committee for the thesis requirement
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To my wife, Qing Cao and my parents, LiangHua Zhu and HuiFang Jin

ACKNOWLEDGMENTS

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CHAPTER 1

INTRODUCTION

This thesis focuses on brand equity related topics. The first essay studies brand equity drivers and their impact on revenue premium-the retail level measure of brand equity. The second essay investigates the relationship between consumer-based brand equity (CBBE) and brand market performance. The third essay examines the brand portfolio management and its impact on brand market performance.

1.1 Brand Equity

Brand equity has been one of the main marketing research topics since late 1980s. While there are numerous conceptualizations of brand equity (e. g. Aaker 1991; Farquhar 1989,1990; Feldwick 1996; Keller 1993, 2003), brand equity is usually defined as the marketing effects or outcomes that accrue to a product given its brand name compared with those that would accrue if the same product does not have the brand name (e.g. Aaker 1991; Dubin 1998; Farquhar 1989; Keller 2003). Brands with high levels of equity are associated with outstanding performance including sustained price premiums, inelastic price sensitivity, high market shares, successful expansion into new categories, competitive cost structures and high profitability (Keller and Lehmann 2003). Since brand equity has financial benefits for the firm, researchers have been looking for ways to measure this valuable asset (e.g. Aaker 1991, 1996; Chaudhuri and Holbrook 2001; Keller 1993, 2003; Sethuraman and Cole 1999; Simon and Sullivan 1993).

1.2 Brand Value Creation

To explain the phenomena of brand equity, Keller and Lehmann (2003) developed the brand value chain (BVC) model. It theoretically explains how brand related

investments affect firm financial value by changing customer mindsets and subsequent market performance. Brand value creation begins with the firm's investment in marketing programs such as product research, development, trade support, marketing communication, advertising, promotion, etc. These marketing activities affect the consumer mindset with regard to the evaluation of the brand. The consumer mindset consists of multi-dimensional attributes, including brand awareness, associations, attitudes, attachment, activities and experiences. The consumer mindset determines how consumers act in the marketplace. The outcome of these actions are reflected in market performance indicators such as price premiums, reduced price elasticities, increased market share, brand expansion into other categories, etc. Based on the brand's market performance, the financial market makes assessments and adjustments to reflect the value of the brand. Some important financial metrics are the stock price, price-earning ratio, the overall market capitalization of the firm that owns the brand, etc. (Ambler et. al. 2002).

1.3 Three Levels of Brand Equity Measures

The extant literature has proposed brand equity measures at three levels: individual, product and firm. One approach is to measure consumer's state of mind with regard to a brand, i.e. consumer-based brand equity (CBBE). This family of mindset measures includes awareness, attitude, attachments, associations, loyalty toward a brand, etc. (e.g., Aaker 1991, 1996; Ambler and Barwise 1998; Keller 1993; Keller and Lehmann 2001). These measures demonstrate the basic underlying dimensions of brand equity. They have good diagnostic power by signaling the change of a brand's value and providing the reasons for the change (Ailawadi, Lehmann, and Neslin 2003).

Another approach involves measuring product level outcomes. These measures of brand equity include loyalty, price premium, market share, revenue, net profit, etc. (e.g., Ailawadi, Lehmann, and Neslin 2003; Agarwal and Rao 1996; Chaudhuri and Holbrook 2001; Dubin 1998). Since these metrics can be obtained and computed through sales information, they maintain the desirable features of being accessible and objective. Moreover, because these measures are closely related to financial returns, they provide a valuable reference for brand valuation.

Finally, some researchers focus on firm financial returns associated with a brand. These measures involve the consideration of discounted future cash flows or projected future earnings associated with a brand (e.g., Birkin 1994; Mahajan, Rao, Srivastava 1994; Simon and Sullivan 1993). Because this approach puts a brand's future potential into the formula, it treats brand as a long-term intangible financial asset.

1.4 Research Opportunities

Despite the efforts that researchers and practitioners have put into investigating the association between brand equity and its antecedents, our understanding for the relationships among different elements within the brand value chain (Keller and Lahmann 2003) is not complete.

First, there are a limited number of empirical studies investigating the brand equity drivers. The existing research has shown that brand equity is influenced by marketing mix, product attributes, product line structure, customer characteristics, etc. Among them, some studies are based on opinion surveys instead of real purchase behavior data (e.g., Sethuraman and Cole 1999; Yoo, Donthu and Lee 2000). Some others focus on only a limited number of categories or drivers (e.g., Cataluna, Garcia and

Phau 2006; Simon and Sullivan 1993; Randall, Ulrich, and Reibstein 1998). Moreover, few of them if any have addressed the differences across categories of products. More important, no study has empirically explored the important drivers such as within category brand structure, brand positioning and firm brand strategy. All these limit our ability to generalize and apply the results of extant works in academic research and business practice.

Second, in understanding the conversion of customer based brand equity (CBBE) into brand market performance, the field has well documented and widely accepted the conceptualization that improved consumer mindsets (e.g. awareness, association, attitude, attachment, activity, etc.) have positive impact on brand market performance (e.g. price premium, market share, loyalty, penetration, etc.) (Keller and Lehmann 2003). However, there is no empirical evidence to demonstrate that it is true. The extant empirical works on the contribution of customer based brand equity (CBBE) focus on the value relevance of the measure, i.e. linking it to firm financial performance. Because the impact of customer based brand equity (CBBE) is largely, if not completely mediated by brand market performance. The exploration of the link between customer based brand equity and brand market performance may add more knowledge to our understanding of the brand value chain.

Lastly, from a firm's perspective, there is an emerging need to understand the effectiveness of brand portfolio management on brand market performance. Current literature has mainly focused on the determinants of the brand strategy, i.e. why firms choose specific brand portfolio strategy (e.g. Doyle 1989; Ind 1990; Kotler 1972; Murphy 1987; Olins 1989). The reasons for firm specific brand portfolio strategy are generally

believed to be, among other issues, market occupation, segment targeting, product line expansion, firm history, company strategy, managerial philosophy, etc. (LaForet and Saunders 1999). However, there are limited understanding on how these brand portfolio strategies works in terms of performance lifting. There are few researches linking the elements of brand portfolio strategy and brand market level performance. Almost all extant studies on brand performance developed models based on individual brand or a few brands, neglecting the fact that brands within a firm are closely associated with a set of sibling products offered by the parent firm (e.g. Aaker and Keller 1990; Park, Milberg, and Lawson 1991).

1.5 Three Essay Study

My thesis is aiming to fill the above gaps in the literature. My thesis focuses on brand value chain with each study examining different parts of the relationship within this rich framework.

In the first essay, I identify a set of drivers of brand equity and develop a conceptual framework to show how brand equity is created and strengthened by determinants such as brand structure and positioning, brand strategy, customer characteristics, category characteristics, and marketing mix. Using a unique data set covering the whole grocery industry of the United States, I empirically examine the links between brand equity and its determinants. Among all the brand equity drivers, brand structure and positioning, brand strategy and customer characteristics haven't been empirically tested in existing literature. In this study, I use revenue premium, a fairly new marketing metric, as the retail level measure of brand equity (Ailawadi, Lehmann, and Neslin 2003). Besides being accessible and objective, revenue premium is a complete

measure that considers both price premium and quantity increase due to the presence of brand. In operationalizing the study, I decompose revenue premium into price premium and volume premium. Then, I study the effects of different brand equity drivers on price, volume and revenue premium. I also take into account the variation of the effects of brand equity drivers on price, volume and revenue premiums across different types of products. The results show convincing empirical evidence that volume premium prevails over price premium in driving revenue premium. The three sets of new brand equity drivers I brought to the study, i.e. brand structure and positioning, brand strategy and customer characteristics contribute significantly to the changes of the brand market performance measured with price, volume and revenue premiums. Low tier brands achieve higher volume and revenue premium than top tier brands. Brand cross-offering across different areas helps brands create synergy and realize higher revenue premium. Young customers and affluent families contribute to higher revenue premium of branded products.

My second essay examines the association between consumer-based brand equity (IBBE) and brand market performance, and the moderators of this association. It covers a comprehensive set of market performance (penetration, loyalty, market share, price and revenue) of 216 major brands sold in the grocery channel in the U.S. The consumer-based brand equity (IBBE) measure is from the EquiTrend$^{©}$ database. The results show that consumer-based brand equity provides incremental explanatory power for brand market performance beyond the explanation by a wide-reaching performance determinants of brand strategy, marketing mix, customer demographics, and category characteristics. In addition, the equity-performance association is moderated by a set of

product and category features (purchase frequency, stockpileability, and category assortment), as well as brand strategy (portfolio size and brand cross-offering).

In my third essay, I empirically study whether firms benefit from having multiple brands across different areas. Using measures such as penetration, loyalty, market share, price and revenue premium, I model brand market performance as a function of different elements of the firm brand portfolio, the size and performance of sibling brands, the inter-brand distance, and quality variation (surrogated by price positioning). The dataset includes some 1,700 brands from over 350 firms sold in the grocery stores in the U.S. All measures are aggregated to brand level in case of different branded products (extensions) share the same brand name. The results show that firm level brand portfolio information provides incremental explanatory power for brand market performance beyond the explanation by a set of performance determinants of brand strategy, marketing mix, customer demographics, and category characteristics. This study provides generalizable insights into the effectiveness of firms managing products across different areas. The results show that the size and the performance of sibling brands from the same firm have significant impact on a focal brand's market performance. These impacts are moderated by the inter-brand distance. Finally, different patterns were found for these effects across different performance measures.

1.6 Overall Contribution

My thesis studies extend the existing brand equity theory in the following ways.

First, my three pieces of study focus on different parts of the relationships in the brand value chain (BVC). They focus on brand equity drivers, consumer-based brand equity (IBBE), and brand portfolio management respectively. The examination of these

elements and their association with brand market performance enriches our understanding on how brand value is created and strengthened. These empirical works fill the gaps of the existing literature, and contribute to the completing the theoretical framework of brand value creation.

Second, a fundamental challenge for managers is to identify the best strategy inputs to increase brand value. My thesis summarizes and empirically tests the effectiveness of different marketing management decisions in generating brand equity. In the spirit of the proposed framework, marketing professionals can understand how the value of their brand is affected at the retail level. Thus, efficient allocation of resources can be made to maximize the return on investment (ROI).

Third, my thesis demonstrates how firm decisions on product marketing and consumer-based brand equity (CBBE) jointly contribute to the change of brand market performance. This reemphasizes the importance of understanding both the product and consumer perspectives. It also proves the validity and necessity of using both objective (e.g. demographics, marketing mix) and subjective (e.g. consumer perception) measures in demonstrating the relationship between brand market performance and its antecedents.

Fourth, my thesis fills the gaps of current research by focusing on the under-researched variables and unexplored relationships within the brand value chain (BVC). In specific, throughout the three studies, I investigate the influence of brand structure and positioning, brand extension and brand portfolio management on brand market performance. The result of this research facilitates practitioners to link brand management to brand value.

Fifth, one of the core purposes of this research is to generalize marketing theories. Most previous literature on similar topics covered a limited number of categories and brands. My thesis is based on a raw dataset covering over 300 categories and more than 9,000 brands of consumer packaged goods (CPG) sold in the United States, i.e. the universe of the brands in the grocery industry. Moreover, the three individual studies are conducted at different levels. The study of brand equity drivers is done at branded product (brand version) level. The consumer-based brand equity study stimulates a brand level consideration. The brand portfolio management study is from the firm's perspective and focus on brand-brand interaction. All of the above sets up a good foundation to generalize the findings and extend the brand equity theory.

CHAPTER 2

BRAND STRATEGY, CUSTOMER

CHARACTERISTICS AND REVENUE PREMIUM

2.1 Introduction

Managers and academics are increasingly interested in understanding the linkages between resources deployed in developing marketing assets (such as brands and customer relationships) and the firm's market effectiveness (e.g., share and margin gains) (Vorhies and Morgan 2003) and financial performance (Rust et al. 2004). From this perspective, the marketing literature provides a well-developed theoretical rationale (Keller 1993; Srivastava, Shervani and Fahey 1998) and a growing body of empirical evidences (Barth et al. 1998; Madden, Fehle, and Fournier 2006; Rao, Agarwal and Dahlhoff 2004) linking brands with competitive advantage for the firms that own them. As a result, it is increasingly and widely accepted that brands are important intangible assets that can significantly contribute to firm performance (Ailawadi, Lehman, and Neslin 2003; Capron and Hulland 1999; Sullivan 1998). Among the most important findings from this stream of research is the fact that brand equity is one of the most important determinants of brand retail performance (Ailawadi, Lehman and Neslin 2003; Keller 2003).

Despite the wide agreement among scholars regarding the performance implications accruing to those firms that possess strong brands and brand equity (Keller and Lehmann, 2003), limited empirical evidence has been provided to demonstrate both the validity and the generalizability of the linkages between brand equity drivers and brand retail level performance. Existing research has either focused solely on category characteristics or marketing mix effects (e.g. Ailawadi, Lehmann and Neslin 2003;

Shankar and Bolton 2004), or been limited to a small number of product categories (e.g. Cataluna, Garcia and Phau 2006; Simon and Sullivan 1993; Randall, Ulrich and Reibstein 1998). Additionally, even fewer of these studies have attempted to address differences across categories of products. As a consequence, important gaps remain in the extant literature, in terms of generalizability of the existing findings, as well as addressing additional, but very relevant, brand management decisions, such as those related to brand structure, brand positioning or brand extensions which influence brand retail performance.

The objectives of this study are threefold. First, I contribute to the strategic brand management literature, by extending our understanding of how brand equity is created at the retail level. Second, I contribute to the extant literature by examining a comprehensive set of drivers of brand equity, which include brand structure and positioning, brand strategy, customer and category characteristics, and marketing mix elements. Third, I generalize the findings of existing research on brand equity in the setting of consumer packaged goods (Ailawadi, Lehmann and Neslin 2003; Bolton and Shankar 2004). Overall, this study contributes to closing some of the important gaps in the strategic brand management literature.

The empirical study examines some 9,000 brands of consumer packaged goods in more than 200 different categories in the grocery industry within the United States. This research provides generalizable insights into the role of major brand management decisions in creating brand equity at the retail level. The analysis shows the existence of significant cross-department variation for the effect of the identified drivers on brand equity. I find convincing empirical evidence that volume premium prevails over price

premium in driving revenue premium. The three sets of new brand equity drivers I brought to the study, i.e. brand structure and positioning, brand strategy and customer characteristics contribute significantly to the changes of the brand market performance measured with price, volume and revenue premiums. Low tier brands achieve higher revenue premium than top tier brands. Brand extension across categories and departments helps brands create synergy and realize higher revenue premium. Patronage from young customers and affluent families contributes to higher revenue premium of branded products.

I proceed by summarizing the strategic brand management and brand equity literatures, and reviewing the posited linkages between brand equity drivers and brand retail performance. I then present our empirical model and dataset used. This is followed by a description and discussion of my findings. Finally, I summarize academic and managerial implications of this study, and highlight some possible directions for future research.

2.2 Theoretical Framework

2.2.1 Brand Equity

Brand equity has been one of the main marketing research topics since late 1980s. While there are numerous conceptualizations of brand equity (Aaker 1991; Farquhar 1989,1990; Feldwick 1996; Keller 1993, 2003), brand equity is usually defined as the marketing effects or outcomes that accrue to a product given its brand name compared with those that would accrue if the same product does not have the brand name (Aaker 1991; Dubin 1998; Farquhar 1989; Keller 2003). Fortunately, most brand equity definitions share some common grounds in at least two respects. First, that "brand" is

different to and separable from the "product" or "service" that a firm sells. Second, that "equity" concerns the value of the brand to its owner (the firm), which is a function of the brand's utility to consumers (the firm's current and prospective customers).

Typically, academic researchers have adopted one of three primary levels of analysis that shape their definitional and empirical assessment approaches to brand equity: consumer-mindset level approaches; product-market level approaches; and firm-level financial approaches. These are shown in Figure A1 with key issues related to each level of analysis.

At the customer mindset level, academics and consultants agree that the value of a brand derives from customers' brand perceptions and their subsequent actions. Customers decide what to purchase and what not to purchase based on their preferences and their perceptions of brands (Villas-Boas 2004). The customer level process by which these preferences emerge and impact observed behavior can be captured using hierarchy of effects models (Keller and Lehmann 2006) and can be appropriately summarized via the following aspects: (1) brand awareness; (2) brand associations; (3) attitudes toward the brand; (4) brand attachment; and, (5) brand-related purchase and post-purchase behaviors. Brand awareness ranges from simple recognition to brand recall (Laurent, Kapferer and Roussel 1995). Brand associations are the pieces of information in consumers' memories that are activated by the brand name (Keller 2003). Customer attitudes towards the brand can range from negative effects such as hatred to simple acceptability or attraction (Chaudhuri and Holbrook 2001; Mittal 1990). Brand attachment ranges from disinterest to higher levels of the loyalty hierarchy such as advocacy, love, and even addiction (Fournier 1998). Finally, customer activity is the

ultimate behavioral outcome of brand equity, namely purchase, consumption frequency, involvement, price sensitivity, word-of-mouth communications, etc (e.g. Fullerton 2005).

At the product market level, several studies have analyzed the impact of customer mindset-level brand equity on product-market performance which is the aggregated observed behaviors of consumers of the brand. The primary elements of product-market based brand equity assessments are price premiums, increased advertising elasticities, decreased sensitivity to competitor's prices, and channel power (Hoeffler and Keller 2003; Keller and Lehmann 2006). Customer satisfaction as it relates to behavioral customer loyalty (e.g., retention rates, share-of-wallet, etc.), sales growth and market share is the key secondary outcome of brand equity observed at the product-market level. One of the primary product-market level outcomes of customer mindset-based brand equity is the ability that the firm can charge price premiums for its brands. Several studies have demonstrated this phenomenon (Park and Srinivasan 1994; Sethuraman 1996), as well as the relative immunity of stronger brands to negative demand effects following price increases (Sivakumar and Raj 1997). Stronger brands are more likely to create increased customer satisfaction (Boulding et al. 1993; Keller and Lehmann 2006). In turn, satisfied customers are more likely to remain loyal, be more receptive to cross-selling and up-selling efforts from the firm, tend to purchase higher margin products from the firm, are more likely to engage in positive word-of-mouth (Anderson et al. 2004; Fornell et al. 1996). Together, these product-market level behavioral and economic consequences of brand equity – via customer satisfaction – are likely to result in increased sales growth and increased market share (Morgan and Rego 2006). Additionally, brand equity, satisfaction and its consequences have also been shown to

increase the effectiveness of a firm's marketing efforts (Anderson et al., 2004; Fornell et al. 1996).

Finally, at the financial market level, superior financial performance and shareholder value creation are additional outcomes of brand equity. One of the most dramatic financial market changes over the last 30 years concerns the proportion of stock market capitalization accounted for by intangible assets. Comparing the 1970 to the 2000 stock market price-to-book ratio, one would find that in 1970 intangible assets accounted for 50% of that ratio, while in 2000 intangibles accounted for 80% of the ratio's value. Additionally, financial markets have consistently valued firms with brand assets above their net book value. Therefore, understanding how intangible assets translate into financial performance is a critical component of assessing brand equity outcomes. Considerable anecdotal evidence suggests that brand equity impact on corporate-level business performance. Strong brands were shown to be positively associated with larger return on investment (ROI) (Aaker and Jacobson 1994). The same authors also found that brand equity is positively associated with accounting profits (Aaker and Jacobson 2001). Additionally, Simon and Sullivan (1993) studied the nature and impact of brand equity on stock performance, and found that brand equity accounts for a large portion of intangible assets owned by the firm. Finally, researchers have studied the risk relevance of brand equity and linked it to systematic and unsystematic financial risks that investors and managers are dealing with (Rego, Billett and Morgan 2009).

In summary, brands with high levels of equity are characterized by superior performance including sustained price premiums, inelastic price sensitivity, high market shares, more successful expansion into new categories, and competitive cost structures

and high profitability (Keller and Lehmann 2003). Since brand equity has financial

benefits for the firm, researchers have studied proxies to measure this valuable asset

(Aaker 1991, 1996; Chaudhuri and Holbrook 2001; Keller 1993, 2003; Sethuraman and

Cole 1999; Simon and Sullivan 1993).

2.2.2 Brand Value Creation

To explain the phenomena of brand equity, Keller and Lehmann (2003)

developed the brand value chain (BVC) model. In their paper, they developed a

theoretically framework that explains how brand related investments affect firm financial

value by changing customer mindset and subsequent market performance. Brand value

creation begins with the firm's investments in marketing programs such as research and

development, trade support, marketing communications, advertising and promotions.

These marketing activities affect the consumer perceptions of the brand – i.e., the

customer mindset. The customer mindset consists of multi dimensional attributes,

including brand awareness, uniqueness and strength of associations, attitudes, attachment,

activities and experiences. The customer mindset is believed to influence how consumers

will end up behaving in the marketplace. Thus, marketing actions that lead to desirable

changes in the customer mindset are likely to result in marketplace performance, such as

price premiums, reduced price elasticities, increased customer loyalty, market share, and

the ability to successfully fend of competitors' actions and to more successfully expand

brands into other categories. A brand's marketplace performance is likely to transfer into

brand financial performance, as these marketplace performance characteristics are

associated with larger, more stable and more predictable cash flows for the firm

(Srivastava, Shervani and Fahey, 1998; 1999). The extant literature has developed a set of

important metrics that measure financial performance such as stock price, price-earnings ratio, and the overall market capitalization of the firm that owns the brand (Ambler et. al., 2002).

A similar theoretical framework (and associated empirical models) was developed by Ailawadi, Lehmann and Neslin (2003). In their study, the authors introduced revenue premium, which they propose as a metric of brand equity at the retail level. Their study developed a comprehensive framework for understanding, measuring and testing drivers of brand equity, using the revenue premium metric. The authors identified the brand's own and competitors' marketing mix, firm strength, and category characteristics as the determinants for brand equity (i.e., revenue premium). I extend this research by identifying and developing a more comprehensive set of determinants of brand equity. Specifically, I expand the set of brand equity drivers to include several strategic brand management decisions, namely brand positioning and brand extensions. Additionally, I also examine how customer characteristics influence brand equity. Strategic brand management decisions and customer characteristics are important determinants of brand equity, which have not been empirically examined in the existing literature. The conceptual framework includes six major determinants of brand equity, which include (1) brand structure, (2) brand positioning, (3) brand strategy, (4) customer characteristics, (5) category characteristics and (6) marketing mix (Figure A2). I look into the impact of brand equity drivers on both price premium and volume premium and investigate how revenue premium is generated jointly by price premium and volume premium. I make another important distinction for my study by carefully addressing and modeling cross-department differences. The extant literature has documented the variability of the

relationship between the product marketing efforts and market performance across various types of products (Cotterill, Putsis, and Dhar 2000; Cataluna, Garcia and Phau 2006; Hoch and Banerji 1993). However, current studies on brand equity have not focused on the differences in the effects of various determinants on brand equity change across product groups.

2.2.3 Brand Equity Measure

Following the work by Ailawadi, Lehmann, and Neslin (2003), I use revenue premium as the market performance measure for brand equity. Revenue premium is defined as the ratio of the revenue (price multiplied by sales quantity) of the branded product over its generic alternative (e.g. the private label product). Revenue premium is a complete measure in the sense that the computation includes both sales price and quantity. It is objective because this metric is based on sales data collected by store scanners.

I do not follow Ailawadi, Lehmann, and Neslin (2003)'s calculation of the revenue premium as the net revenue of the branded products over that of its generic alternative. Instead, I compute the revenue premium in the form of the ratio between the revenue of the branded product and its generic alternative for two reasons. First, revenue premium across departments are of different scales. Even after I use category level controls such as category revenue as Ailawadi, Lehmann, and Neslin (2003) did, the remaining unexplained variance in revenue premium would still be of different magnitude across categories. Whereas a ratio measure for revenue premium reflects the relative brand strength, controlling the size differences. Second, the scales for the determinants (i.e. the independent variables) do not change across categories. It is

statistically sound to have the scale of the dependent variable consistent across categories.

(1) $Revenue\ Premium = \frac{Volume_{Brand}*Price_{Brand}}{Volume_{Generic}*Price_{Generic}}$

2.2.4 Determinants of Brand Equity

I identify a comprehensive set of brand equity drivers, including (1) brand structure, (2) brand positioning, (3) brand strategy, (4) customer characteristics, (5) category characteristics, and (6) marketing mix.

2.2.4.1 Brand Structure

Among brand structure, I examine brand assortment and brand variation. Brand assortment is defined as the number of brands within the category. Its influence on brand equity and revenue premium is ambiguous. Assortment reflects the options that consumers have. Increased number of brands can intensify competition among brands. Shankar and Bolton (2004) showed that having more brands in a category decreases price premiums. High levels of competition make it harder for branded products to achieve large sales volume. Therefore, it is likely to reduce the revenue of each branded product. However, the availability of more brands changes the nature of competition between national brands and private label products. Namely, it might reduce private label market share (Dhar and Hock 1997; Hock 1996; Hock and Banerji 1993). This decrease in the private label revenue should increase the revenue premium for branded products.

I define brand variation as the number of various forms of similar products of the same brand within a category. Brand variation changes the distribution of channel resources and the competition within the category, and its impact on revenue premium is likely to be positive. Increased brand variation absorbs channel resources, specifically

shelf space and consumer spending (Low and Fullerton 1994; Shocker, Srivastava and Ruebert 1994). Brands characterized by increased variation generate loyalty by creating barriers to entry (Scherer and Ross 1990). This should contribute to the increase of sales and revenue premium. Although increasing the number of similar products (with similar profiles and functionalities) within a category can also cause demand cannibalization (Kapferer 1994; Park, Jaworski, and MacInnis 1986), adding a new product under the same brand name will be unlikely to hurt the overall sales for the brand in that category. Therefore, I expect the impact of brand variation on revenue premium to be positive.

2.2.4.2 Brand Positioning

As to brand positioning, I examine the position of the branded product in the brand tier within the category.

The position in brand tier is likely to determine the level of competition intensity. Brands in lower tiers and closer to private labels are more likely to be affected by private label sales than the upper/premium tier brands (Dhar and Hock 1997; Hoch and Lodish 2003; Pauwels and Srinivasan 2004). Lower tier brands are priced low and compete with both upper/premium brands and private labels. This is likely to result in lower market share and lower volume premium. On the other hand, strong national brands are much less affected by marketing activities from low tier brands and private label products (e.g. Krishnamurthi and Raj 1988, 1991; Kamakura and Russell 1989). Promoting premium brands causes customers to switch from other products in greater numbers than promoting these competing products will do reversely. Therefore, the high tier brands are more likely to achieve higher volume premium than low tier brands.

2.2.4.3 Brand Strategy

One measure I focus on for brand strategy is brand size. I define the size of portfolio as the total number of brands that are owned by the parent company. The size of the brand portfolio influence consumers' confidence in the product. When a firm expands its portfolio, it invests in the product the current and future cash flow of the brands in the portfolio (see Irnerfelt 1988). If the new product turns out to be inferior in quality, consumers will discover and opt to discard it and in turn trigger consumers' potential devaluation of the brand and jeopardize other products in the portfolio (Sullivan 1990). Therefore, the likelihood of a firm introducing an inferior product decreases as the size of portfolio increases. As such, consumers hence render more confidence in a brand with from a large firm portfolio. The size of the portfolio is expected to have positive impact on price and volume premium.

Companies can build their brand portfolios by acquiring existing brands, launching new brands or extending existing brands (Petromilli, Morrison and Million 2002). Among these different strategies, brand extensions share three major advantages (Kapferer, 1994). First, brand extensions allow the brand to remain up-to-date with innovation and product development. An extended brand can integrate improved technologies and new customer expectation. Second, brand extensions can provide significant advertising and marketing cost savings. Successful brand extensions allow firms to focus marketing and advertising expenditures on a smaller set of brands, as all new branded products are extensions of established brands. Finally, brand extensions reduce the cost and risk associated with new product launches. When a new product is marketed under an existing brand, efforts to educate and inform consumer are minimal.

Success rate for an extended brand is higher than that of an entirely new brand. Brand extensions can be made either within or across product lines (i.e. subcategory, category and department in this study). When a brand extension is done within a subcategory, the new product with the same brand name is very similar to the original product. I define this as within-subcategory offering[1]. If a new product is offered in another subcategory but in the same category, it is perceived less similar and more distant from the original product. I label such extension as multi-subcategory offering. The perceived similarity decreases furthermore if the new product is offered in another category within the same department (multi-category offering) or even in a different department (multi-department offering). An example of these different cross-offerings for a brand is shown in Figure A3-A5.

From the consumer viewpoint, well known brands convey brand attributes and benefits, consumers are more willing to accept brand extensions based on the reputation of the established brand (Farquhar 1989). A familiar brand provides credibility, thus reducing search time and costs (Ziethaml 1988). All of these increase the likelihood of the purchase of a brand that shares the same name. From the manufacturers' perspective, consumers' familiarity with the product provides cost saving in marketing brand extensions (Tauber 1981, 1988). Brand extensions may also create economies of scale in operations (Grant and Jammine 1988; operationalizing Palich, Cardinal, and Miller 2000). These efficiencies help firms manage their brand portfolios more effectively. Altogether, the above arguments suggest that brand extension can contribute to a high revenue premium.

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[1] Since I do not observe the order in which different versions of a brand is launched, in this study, I use the information on the brand's cross-area offering as a proxy to capture the potential effects of brand extension.

However, brand extensions can also dilute the core brand image and cause confusion regarding the brand's image (Loken and Roedder-John 1993), particularly if consumers perceive no fit among the cross-offered products (Aaker and Keller 1990; Broniarczyk and Alba 1994). The blurring of brand image may dilute the brand strength and make it less attractive (Morrin 1999; Roedder-John, Loken, and Joiner 1998). This can have a negative impact on sales and on the revenue premium for the brand. Therefore, I expect brand extensions that are "close" (i.e., within-category) to contribute more to the increase of revenue premium, whereas brand extensions that are "distant" (i.e., multi-departments) are more likely to have less positive impact on or even decrease revenue premium.

2.2.4.4 Customer characteristics

The characteristics of the customers purchasing the brand are likely to have significant impact on the revenue premiums generated by the brand. In line with the extant literature (Starzynsk, 1993; Hock, 1996; Sethuraman and Cole, 1999), I examined how the following customer characteristics are likely to influence revenue premiums: age, education, household affluence and household size.

With regards to customers' age, I expect age to negatively influence revenue premium. Different age groups show different purchase patterns. Elder people tend to have stronger preferences because of their richer past experiences (Szymanski and Busch 1987). Researchers have also showed that the quality gap between the national brands and their generic alternative has become smaller (Quelch and Harding, 1996). Thus, the increased product familiarity that elder customers exhibit, is likely to result in increased private label purchases (Hoch 1996). Additional, elder customers' strong preference can

drive their purchase toward the private labels that they have been buying. Thus, having elder brand customers is likely to result in lower national brand purchases and lower volume premium. Conversely, younger customers are likely to be image oriented and less familiar with private labels (Sethuraman and Cole 1999). Thus, younger customers are more likely to buy branded products and generate higher volume premiums. The above arguments suggest that the higher the proportion of elder customers the brand attracts, the lower the revenue premium that brand can capture.

The overall effect of education on revenue premium is unclear. On one hand, higher levels of education are associated with higher incomes and household affluence. More educated customers also tend to be less price sensitive (Setheraman and Cole 1999) and are also likely to search for fewer generic alternatives (Hock 1996). This would suggest a positive impact on revenue premium. On the other hand, more educated consumers may be better informed about the product attributes. As a result, the perceived risk of purchasing store brands may be lower. This in turn would lead to a reduced willingness to pay high premium for brands (Sethuraman and Cole 1999). This would also negatively impact on volume premium and revenue premium. Therefore, the combined effect remains ambiguous and becomes an empirical question for this study to address.

Household affluence is believed to positively influence the revenue premium of branded products. Affluent consumers tend to be less price-sensitive, resulting in higher price premiums. Empirical evidence suggests that affluent households also tend to buy fewer store brands (Hoch 1996; Starzynsk 1993). Overall, I expect more affluent household to be associated with increased revenue premiums.

The overall influence of household size on revenue premium remains unclear. Everything else equal, large size families have limited budget to spend on each family member. Therefore, large families tend to be more price-sensitive. Larger families are also less willing to pay premiums for branded products and are more likely to purchase generic products (Hock 1996; Sethuraman and Cole 1999). This suggests a negative impact on price premium. However, since large families tend to consume more (overall and comparatively), their purchase volume is likely to outweigh that of smaller families, thus contributing to increased volume premium. Depending on which factor dominates, the impact of household size on revenue premium can be positive or negative.

2.2.4.5 Category Characteristics

The extant literature has documented the variability of the relationship between the product marketing efforts and market performance across various types of products (Cotterill, Putsis, and Dhar 2000; Cataluna, Garcia and Phau 2006; Hoch and Banerji 1993). More specifically, Narasimhan, Neslin, and Sen (1996) and Ailawadi, Lehmann, and Neslin (2003) showed that promotion effectiveness differs across categories mainly because of inter-purchase times and stockpileability. I examine the effects that these category characteristics will likely have on revenue premium.

Purchase frequency has been shown to have a negative impact on price premium and revenue premium. Low purchase frequency, or long purchase cycle is likely to be associated with a longer consumption cycle. Thus, if the wrong purchase decision is made, consumers must live with the consequence longer before they can switch back to the right product. In general, it is believed that the quality of generic product is not as high as a branded product, which may cause a higher failure rate. Therefore, choosing a

generic product with a low purchase frequency is likely to be associated with higher perceived risk. Narasimhan, Neslin and Sen (1996) found that low purchase frequency is associated with fewer switches to a less preferred product. Sethuraman and Cole (1999) also demonstrated that low purchase frequency supports higher price premiums. Finally, Ailawadi, Lehmann, and Neslin (2003) empirically showed that longer inter-purchase cycles (i.e. low purchase frequency) are associated with higher revenue premium.

Stockpiling stimulates the change in purchase timing and quantities (Neslin, Henderson, and Quelch, 1985). Stockpileability is likely to be positively associated with revenue premium. If a product can be readily stockpiled, it is likely to be packaged and purchased in large quantity, and used for a longer time. Consumers must endure the consequences of their choice longer. This raises the perceived risk of buying a generic product for which the quality is not perceived as high as that of the national brands. Therefore, when stockpiling is possible, branded products are more likely to maintain a high price premium. In addition, the degree of stockpileability is directly related to purchase acceleration (Narasimhan, Neslin and Sen, 1996). In other words, consumers advance their purchases, buy more to take advantage of the deals, and consumer at an accelerated speed. Consequently, they react strongly to promotions when the product can be easily stockpiled. Therefore, in stockpileable categories, the national brands can have more intensive and effective promotions. The increase in sales from promotion for national brands is stronger. As a result, stockpileability contributes to a higher volume premium for branded products. Ailawadi, Lehmann, and Neslin (2003) have shown that stockpileability leads to high revenue premium measured with absolute dollar value.

2.2.4.6 Marketing Mix

With regards to marketing mix, I follow existing literature and examine the effect that sales promotions (i.e., coupons, deals and features) have in encouraging purchases. Sales promotions by a national brand "*push*" consumers to purchase more. This is likely to result – at least for the short run – in improved sales (i.e., volume premium) and increased cash flows (Dhar and Hock, 1997; Hoch, Montgomery and Park, 2003; Shankar and Bolton 2004). This contributes to a high revenue premium. However, if a price related deal is involved, the price premium for a product will be reduced. This will have negative impact on revenue premium. Therefore, I expect that non-price promotions positively impact revenue premium, whereas price related promotions may negatively impact revenue premium.

2.3 Data and Methodology

2.3.1 Data

It is important to mention that besides providing a more comprehensive framework for examining the impact of different determinants of brand equity on price, volume and revenue premium of a brand. This study utilizes a much larger database (Consumer Insights Data from the Information Resources Inc. – IRI) than existing empirical studies to provide more generalizable findings. The IRI data cover the universe of the packaged goods (CPG) from major grocery chains within the United States. In comparison, Ailawadi, Lehmann, and Neslin (2003) empirically examine revenue premium and its drivers on a dataset of 23 categories with 103 brands. My study includes more than 9000 brands in 200+ categories for the consumer packaged goods industry. It covers all 8 departments in the grocery chain: bakery (bread, muffins, doughnuts, etc.),

dairy (butter, cheese, milk, etc.), deli (meat, ham, sausage, etc.), edible grocery

(beverage, coffee, cereal, etc.), frozen food (frozen meat, frozen vegetables, ice-cream,

etc.), health and beauty (cosmetics, shampoo, vitamins, etc.), general merchandise

(batteries, light bulbs, socks, etc.) and non-edible grocery (pet food, detergent, toilet

tissue, etc.). Within each department, there are different categories, which are further

divided into subcategories. There are multiple CPG brands listed within each

subcategory. This study will cover the data between 1998 and 2000. Therefore this is a

typical cross sectional longitudinal dataset.

To prepare for the dataset for analysis, I first obtained brand performance

information (price, sales), retail marketing mix and customer demographic information

directly from the Consumer Insights Data. Then, I summarized the brand level product

feature, sub-category level brand structure, and category characteristics with the

information provided with the dataset.

Revenue premium can be driven by price premium, volume premium, or both

(Ailawadi, Lehmann, and Neslin 2003). As an empirical extension to this idea, I

decompose the revenue premium into price premium and volume premium. Then I study

how price premium and volume premium are driven by the sets of identified brand equity

drivers. These analyses are conducted simultaneously. Meanwhile, I need to incorporate

the difference across the eight grocery departments. This requires a system of equations

with random coefficients.

2.3.2 Methodology

There are alternative ways to set the model to incorporate the variability of the

association between revenue premium and its drivers. The simplest approach is to

estimate a separate regression model for each department. This procedure is done at the cost of degree of freedom. More importantly, it treats information from each department separately and fails to effectively pool information from the whole dataset. The second possibility is to use department dummy variables to capture a generic department effect. This method, widely recognized as "covariance method", treats the group dummy as a fixed effect and neglects all other sources of variability. This violates our belief of the variability for the associations of a more fundamental nature. In comparison, the formulation of a random coefficient for a system of equations seems to be the best option. I assume that all coefficients of the system of regression equations have two components: a fixed components (common for all departments) and a random component (constant within a department, but different across departments).

2.3.3 Model Formulation

Based on the conceptual framework, I develop an empirical model to study (a) the contribution of price premium and volume premium to revenue premium, and (b) the impact of brand equity drivers on price premium and volume premium.

(2) $\log(PricePremium_{ipt}) = \beta_{10p} + \beta_{11p}Year_i + \sum_J \beta_{1Jjp}BSTRUCTURE_{ijt} +$

$$\sum_L \beta_{1Llp}BSTRATEGY_{ilt} + \sum_M \beta_{1Mmp}DEMOGRAPHICS_{imt} +$$

$$\sum_R \beta_{1Rrp}CCHARACTER_{irt} + \sum_S \beta_{1Ssp}MKTGMIX_{ist} + u_{1ipt}$$

(3) $\log(VolumePremium_{ipt}) = \beta_{20p} + \beta_{21p}Year_i + \sum_J \beta_{2Jjp}BSTRUCTURE_{ijt} +$

$$\sum_K \beta_{1Kkp}BPOSITION_{ikt} + \sum_L \beta_{2Llp}BSTRATEGY_{ilt} +$$

$$\sum_M \beta_{2Mmp}DEMOGRAPHICS_{imt} + \sum_R \beta_{2Rrp}CCHARACTER_{irt} +$$

$$\sum_S \beta_{2Ssp}MKTGMIX_{ist} + u_{2ipt}$$

(4) $\beta_p = \beta + \delta_p$

(5) $\quad E\left(\delta_p\right) = 0$

(6) $\quad E\left(\delta_p \delta_p'\right) = \Sigma^\delta$ with $E\left(\delta_{gp} \delta_{hp}'\right) = 0, \ g, h \in (1,2) \ and \ g \neq h$

(7) $\quad E\left(u_{ipt}\right) = 0$

(8) $\quad E\left(u_{ipt} u_{ipt}'\right) = \Sigma^u$ with $E\left(u_{gipt} u_{hipt}\right) = 0, \ g, h \in (1,2) \ and \ g \neq h$

where i is the ith brand in department p. t is the time t.

$PricePremium_{ipt}$ is the log transformed price premium of brand in department p

at time t. Price premium is calculated as the ratio of the price of the branded product

divided by that of the generic product within the same subcategory.

$VolumePremium_{ipt}$ is the log transformed volume premium of brand in

department p at time t. Price premium is calculated as the ratio of the volume sales per

thousand households for the branded product divided by that of the generic product

within the same subcategory.

$BSTRUCTURE$ stands for brand structure. It includes 2 variables: category

assortment (ASSORT) and product variations (VARIATN).

$BPOSITION$ has 9 dummy indicators for positions in brand tier within a

subcategory. For brand tier positioning, I divide the brands in each subcategory into four

tiers based on their prices. I take the highest and lowest prices and divided the price range

into four equal segments. Then I assign each brand to one of these four segments based

on its price. Brands in these four tiers are named from high to low as super premium,

premium, everyday, and value brands accordingly. There are some subcategories ending

up with only two or three ties instead of four. The 9 indicators in the model include:

2T1T and 2T4T as high and low tier respectively in a two-tier subcategory; 3T1T, 3T2T,

3T3T and 3T4T as the top, mid-tier (in second and third segments) and low tier

respectively in a three-tier subcategory; 4T1T, 4T2T and 4T3T as the top, second and third tier respectively in a four-tier subcategory. 4T4T-the low tier in a four-tier subcategory indicator is dropped for identification purpose. Price tier positioning information is not included in the price premium equation because it by definition indicates the level of price premium.

BSTRATEGY stands for brand strategy, which includes brand size and brand extension in this study. BSTRATEGY includes 4 variables: brand size and 3 dummy indicators for 3 types of brand extension (MULTIDEPT as multi-department offering, MULTICAT as multi-category offering, and MULTISCT as multi-subcategory offering). Brand size (SIZE) is the number of brands that the parent company own in the grocery channel. I do not observe the order of launching different versions of a brand. However, I use information on cross-offering of the same brand name in different areas (subcategory, category and department in the grocery channel) to capture the effect of brand extension. By definition, a multi-department offering is a multi-category offering, which in turn is a multi-subcategory offering. The baseline situation is when a brand is offered within the same subcategory. The coding is in line with this nested structure (Figure A6). So the interpretation of the coefficient of cross-department offering is the incremental effect of cross-department offering over that of cross-category offering. In a similar token, the coefficient of cross-category offering is the incremental effect of cross-category offering over that of cross-subcategory offering.

DEMOGRAPHICS stands for consumer characteristics. It has 8 brand level variables which reflect deviation of demographic variables from the category mean: 2 indexes for age groups (AGEY as young female household head with age 18-29, AGEO

as elder female household head with age 45-54), 2 indexes for affluence (AFFLL as living by, AFFLH as living well), 2 indexes for education (EDUL less than high school for female household head, EDUH as college and graduate for female household head), 2 indexes for family size (FSIZES as family size of 1-2, FSIZEB as family size of 5+). The rest are a similar set of category level variables used as control variables.

Each demographic variable is defined as the dollar index of the branded product for different demographic breaks.

The dollar index for each demographic break is calculated as

(9) $\dfrac{\%\ of\ dollar\ spending\ within\ the\ demographic\ break}{\%\ of\ the\ sample\ households\ within\ the\ demographic\ break} * 100\%$

The dollar index for different age breaks provides insights into how the dollar value of the product purchase skews toward or away from various age breaks. A high index value of the consumer characteristics implicates more dollar purchase of the product is made by the households within the demographic break. An index above 115 or greater indicates that significantly more dollar purchase of the product is made by the households within that demographic break. An index below 85 means that the demographic segment purchases significantly less of these products.

$CCHARACTER$ stands for category characteristics. It includes 2 variables: purchase frequency (FREQ) and dummy indicator of stockpileability (PILE).

Purchase frequency (FREQ) is calculated as the inverse of the purchase cycle of the product.

Stockpileability (PILE) takes 1 if the products in the subcategory are stockpileable, and 0 otherwise.

$MKTGMIX$ stands for marketing mix. It includes 6 variables: national brand deal depth (NBDLDP), national brand deal sales (NBDL), national brand display sales (NBDISP), national brand feature sales (NBFEAT), national brand coupon sales (NBCOUP), and national brand price deal sales (NBPDL).

National Brand Deal Depth (NBDLDP) is calculated as the net percentage off for price deals minus that of the private label.

National Brand Price Deal Sales (NBDL) is calculated as the net percentage of volume sales on any deal minus that of the private label.

National Brand Display Sales (NBDISP) is calculated as the net percentage of volume sales on display minus that of the private label.

National Brand Feature (NBFEAT) is calculated as the net percentage of volume sales on feature minus that of the private label.

National Brand Coupon Sales (NBCOUP) is calculated as the net percentage of volume sales on couponing minus that of the private label.

National Brand Price Deal Sales (NBPDL) is calculated as the net percentage of volume sales on price deal minus that of the private label.

I address the cross-subcategory variations by allowing β_p to vary across departments.

The summary statistics for variables are listed in Table A1.

2.4 Results

2.4.1 Model Fitting

Based on the assumption of residual independence across equations, I am able to estimate each individual equation in the equation system separately. I believe by

incorporating department difference, I can better capture the variation of the relationship between the covariates and the performance measures across different types of products, and thus better explain the variation of price and volume premiums.

The system of equations is estimated using information of brands from the eight departments. The comparison of the proposed random coefficient model with the model with no random effect (without heterogeneity across departments) shows the model under the proposed theoretical framework performs better (Table A2) in terms of log likelihood, AIC, BIC and residual variance. By incorporating parameter variation across departments, my proposed model is able to reduce residual variance of log volume premium ratio from 2.5443 to 2.0534 (by 19.29%), and log price premium ratio from 0.1978 to 0.1754 (11.32%). This is a strong evidence that there are significant cross department variation that I need to capture in the model.

2.4.2 Brand Equity Drivers

The estimates show evident departmental variation of the effects of determinants on price premium and volume premium, and consequently on revenue premium across different departments. Revenue premium is driven dominantly with changes in volume premium instead of price premium. The effect of the key drivers such as brand structure and positioning, brand strategy and consumer characteristics in general is consistent with theory. However, there are some findings, such as category characteristics, do not agree completely with existing explanations and prior empirical conclusions. Next, I report the results in details.

2.4.2.1 Price versus Volume Premium on Revenue Premium

One focus of this study is to understand the importance of price and volume premium in driving revenue premium. From Equation (1), it can be easily shown that

(10) $\log(Revenue\ Premium) = \log(Price\ Premium) + \log(Volume\ Premium)$

This means that the overall log ratio based revenue premium is the net sum up of the log ratio based price and volume premium. Therefore, by examining the magnitude of log price and volume premium ratio, I am able to show the driving force of revenue premium. Then, I plot the category mean of log price and volume premium ratio of the branded products (Figure A7). The 45 degree line separates the price premium dominant categories versus the volume dominant categories. I found that 168 out of the 227 (74%) categories, revenue premium is predominately determined by volume premium. The dominant impact of volume premium on revenue premium is corroborated later in a more quantitative way by the estimated regression coefficients, which show that brand equity drivers impact on revenue premium by mainly changing volume premium instead of price premium.

2.4.2.2 Effects of Brand Structure

Table A3 reports the effects of brand structure drivers. For all the estimates, I show them in two parts: first, the overall effects and departmental level variation from the overall effect, e.g. Table A3 and Table A4; and second, the overall effects and the department level raw estimates, e.g. Table A5 and Table A6.

For price premium, category assortment and brand variation have no significant overall effect on price premium, but the effects are split at department level. Brand

variation has no significant overall effect on price premium, but at department level, brands in dairy, general merchandise and non-edible department show positive impact.

For volume premium, category assortment has overall negative impact with no exception at the department level. Brand variation has positive effect on volume premium which is unanimous across departments.

By checking the coefficients from price premium equation (Eq. 2) and volume premium (Eq. 2), I derive the marginal effect on revenue premium by one unit change of focal covariates.

(11) $Log(PPR_{ip.New}) = Log(PPR_{ip.Old}) + \beta_{1kp} * 1Unit$

(12) $Log(VPR_{ip.New}) = Log(VPR_{ip.Old}) + \beta_{2kp} * 1Unit$

From (11) and (12), I have

(13) $\frac{RPR_{ip.New}}{RPR_{ip.Old}} = \frac{PPR_{ip.New}}{PPR_{ip.Old}} * \frac{VPR_{ip.New}}{VPR_{ip.Old}} = \exp(\beta_{1kp} + \beta_{2kp})$

From which I conclude

(14) $\begin{cases} RPR_{ip.New} > RPR_{ip.Old} \ if \ \beta_{1kp} + \beta_{2kp} > 0 \\ RPR_{ip.New} = RPR_{ip.Old} \ if \ \beta_{1kp} + \beta_{2kp} = 0 \\ RPR_{ip.New} < RPR_{ip.Old} \ if \ \beta_{1kp} + \beta_{2kp} < 0 \end{cases}$

Therefore, by summing up the coefficients of the two equations, i.e. the effect of various performance drivers on log transformed price premium and volume premium ratios, I can derive their impact on the overall log transformed revenue premium ratio. Moreover, the magnitude of the coefficients explains the importance of price premium and volume premium in driving revenue premium.

In fact, combining the effects on price and volume premium, I find that category assortment has an overall negative effect (with the sum of βs for price and volume premium being -0.0415). There is no exception at department level. Brand variation has

positive impacts on revenue premium unanimously across board (with the sum of βs for price and volume premium being 0.4595).

Finally, it is evident that the magnitude of the estimated coefficients in the volume premium equation is far more exceeding those in the price premium equation. As such, the same change in the performance driver makes a more significant impact on volume premium than on price premium, both of which directly and additively act on the revenue premium. This pattern is consistent for the effects of most of the drivers, which are shown in the later parts. As such, I have reasons to believe that volume premium is more important than price premium in driving the revenue premium.

2.4.2.3 Effects of Brand Positioning

Price tier positioning information is not included in the price premium equation because it by definition indicates the level of price premium.

Effects of brand positioning on volume premium is shown in Table A7-A10.

For a four-tier subcategory, the order of volume premium performance (best to worst) is value, everyday, premium and super premium tier. The only departmental exception is health and beauty, where premium brands perform better than everyday brands. For a two-tier subcategory, low tier brands perform better than high tier brands with no departmental exceptions. For a three-tier subcategory, there are two situations: a mid-tier of premium brands (2nd tier) or everyday brands (3rd tier). In each case, the order of performance (best to worst) is low, median and high tier. However, a mid-tier of premium brand which is away from low tier value brand performs better than a mid-tier everyday brand which is close to the low tier brand (a coefficient of -0.3804 not

significant v.s. -0.6050 significant). This pattern is significantly strong for brands in dairy, edible grocery and health and beauty departments.

2.4.2.4 Effects of Brand Strategy

Table A11-A14 displays the effects of brand portfolio and different levels of cross-offering of the same brand name across different areas.

For price premium, brand size has overall positive impact on price premium with no apparent exception. This is in line with the expectation that large number of brands from a company provide customers with confidence in the quality of the product made by the firm. Multi-subcategory offering has no overall effect while at the department level, brands in edible grocery and general merchandise have positive impact. The coefficients of multi-category offering show the incremental effect of it compared with the effect of multi-subcategory offering. Therefore, overall, multi-category offering has no incremental impact on price premium compared with multi-subcategory offering with the only departmental exception of edible grocery, showing negative effect. Multi-department offering leads to higher price premium than multi-category offering and there is an agreed pattern across departments (in fact, there is no identified variation across departments).

For volume premium, brand size has positive effect on volume premium with no exception at the department level. Multi-subcategory offering has overall positive impact with no apparent exception. Multi-category offering shows no significant difference on volume premium than multi-category offering, but the effects are split among departments. On the whole, multi-department offering has more positive effect on volume premium than multi-category offering with no apparent exceptions.

As to the combined effect on revenue premium, brand size has an overall positive impact with agreed pattern across departments. Multi-subcategory offering has overall positive impact with the exception of diary departments. Multi-category offering leads to slightly low revenue premium than multi-subcategory offering, but the effects are split among departments. Overall, multi-department offering has more positive effect on revenue premium than multi-category offering with no departmental exception.

To better illustrate the cross-selling results, I take the baseline situation of the brand offered only in one subcategory, and normalize the price of it to be $1, volume sales to be 100, and revenue therefore to be $100. Then I transform the estimated coefficients to show the effect of different types of brand extension on price, volume and revenue using Eq.11-13. The results are easy to interpret and shown in Table A15-A16.

In general, multi-subcategory and multi-department offering helps to maintain slightly high price, but with split patterns across departments. Multi-category offering leads to slightly lower price, with split patterns across departments. Volume wise, all three types of cross offering contribute to high volume of sales. The only exceptions at department level are brands in dairy and non-edible department, which have low volume premium when the brands are offered across categories. The biggest effect is when the brands are offered across departments, which is unanimous across all departments. This leads to the interesting finding that the multi-department offering is associated with the highest revenue premium. This extension does not show the most dilution of the brand image and the least created synergy as I hypothesized. This might be partly due to the reason that companies doing multi-department offering are comparatively resourceful and the brand itself is strong by getting more financial and managerial support from the

company. This leads to an easy creation of synergy and low probability of image dilution. Another reason is that many brands offer multiple products across departments as a part of their massive brand extension strategy. Examples include Hillshire Farm (deli and edible grocery), Green Giant (frozen food and edible grocery), Contadina (deli, dairy, and edible grocery), Johnsons (health and beauty, and general merchandise), etc. These brands are mass market products and they are targeting the majority of the population with a moderate pricing. Consequently they can achieve high volume and revenue premium.

2.4.2.5 Effects of Consumer Characteristics

I use the category level consumer characteristics as the control variable for category differences so that I can study the pure effect of brand level consumer characteristics. The estimates of these controls are listed in Table A17-A20.

Since the demographic measures that I use are buying index (continuous variable for each demographic group), I compare the effects of different demographic groups by checking the net difference between these coefficients. This is slightly different from the conventional interpretation used for estimates of dummy demographic variables. The results are displayed in Table A21-A24.

For price premium, elder household head does not show significant contribution to high price premium with departmental effects split. On average, well-educated customers contribute to high price premium with no apparent exception. Overall, affluent customer and small size family contribute to high price premium with the agreement across department.

For volume premium, age on a whole has a negative effect. For every department, young customers contribute at least as much to volume premium as elder customers. Well-educated customers do not contribute to high volume premium with no apparent exceptions at department level. Getting by households in general don't do as well as affluent households in terms of volume premium. The negative sign for all the coefficient of family size variables indicates that no matter how much the demographic group buys the branded products, its members buy more volume of the competing private labels at the mean time and consequently cause a lower volume premium. However, in general, large families contribute to less negative volume premium than single families with no apparent exception at the department level.

As to revenue premium, young and affluent customers have overall positive impact with an agreed pattern at the department level. The negative signs for the coefficients of education and family size variables show that no matter how much the demographic group buys the branded product, members in the group buy more dollar value of the competing private labels at the same time, which results in a lower revenue premium. In general, well educated customers lead to even lower revenue premium with the only exception for frozen food brands. Customers from small families relatively do better in terms of revenue premium with the agreed pattern at the department level.

2.4.2.6 Effects of Category Characteristics

Overall, purchase frequency and stockpileability have no significant effects on price premium with the departmental effects split (Table A25-A28).

As a whole, purchase frequency has negative impact on volume premium with no apparent exception at the department level. Stockpileability has no significant overall impact on volume premium with effect split across departments.

Combining the effects on both price premium and revenue premium, I find that overall effect of purchase frequency on revenue premium is negative with no departmental exception. By a similar token, the overall effect of stockpileability on revenue premium is slightly positive with split effect across departments.

2.4.2.7 Effects of Marketing Mix

Table A29-A32 summarize the relationship between marketing mix drivers and price/volume premium.

For price premium, deal depth has an overall negative effect with the only exception in edible grocery department. Deal has a positive effect on price premium with no apparent exception across departments. Display and feature have negative impact on price premium unanimously across department. The overall effect of couponing is positive with no apparent exception. Price reduction has negative impact on price premium with no apparent exception.

For volume premium, deal depth and feature sales have positive effect without any apparent exception. Deal has no significant overall impact but the effects are positive for general merchandize and non-edible grocery. The effect of display is split among departments, but overall is not significant. Couponing has positive impact unanimously across all departments. Price reduction has negative effect on volume premium with no apparent exception.

For the combined effect on revenue premium, deal, feature and couponing have overall positive impact with no exception at department level. On the whole, deal depth has positive impact except for diary and deli department. Display gives an overall negative effect but at department level the effect is split. Price reduction has in general a negative effect with the exception of bakery brands.

2.4.2.8 Importance of Brand Equity Drivers

After obtaining the net effect of each individual brand equity driver, I proceed to summarize how important each set of brand equity drivers that I identified contribute to the change of brand market performance. I use two studies to investigate the importance of brand equity drivers with results shown in Table A33-A36.

Firstly, I define the base model as the model with year dummies and category controls such as category characteristics and category level customer characteristics. Then I alternatively add only one of the different sets of brand equity drivers to the base model to examine how much improvement each individual set of drivers bring to model fit. I test the effect of marketing mix, brand structure, brand strategy, customer characteristics and brand positioning with M1 to M5 respectively. Except for M5 which only applies to volume premium equation, all the other models include effects on both price and volume premium. The result shows that among all sets of drivers, customer characteristics have the biggest impact on price premium, followed by marketing mix. Brand structure and brand strategy has only minor contribution to the explanation of variation of price premium. For volume premium, brand structure contributes the most, followed by marketing mix and brand strategy. Brand positioning and customer characteristics only help to achieve moderate improvement for model fit.

Secondly, I use the same definition for base model and add the sets of brand equity drivers one at a time to the model to examine how the sets of drivers incrementally improve the explanatory power of the model till a full model is constructed. The order of addition reported is marketing mix (in M1), brand structure (in M6), brand strategy (in M7), customer characteristics (in M8) and brand positioning (in M9). Among all these models, M9 applies to only volume premium. All the rest cover both the price and volume premium. The result replicates the findings in first study. For price premium equation, the biggest improvement of model fit is realized by adding customer characteristics, followed by marketing mix. Brand structure and brand strategy bring marginal improvement. For volume premium equation, the biggest contribution to model fit is made by adding brand structure, followed by marketing mix. Brand strategy and brand positioning provide moderate improvement for model fit. Customer characteristics do contribute, but the least among all the drivers.

2.5 Contributions and Implications

In this article, I use revenue premium as a retail level measure of brand equity. Based on marketing theory, I identify a comprehensive set of drives of brand equity, including brand management decisions and customer characteristics. To show a complete picture of how revenue premium is created, I consider both price premium and volume premium, and show their partial contribution to revenue premium. Then, I test the impact of the identified drivers on price premium and volume premium of branded products, and lead them to the change of revenue premium. My findings reveal that despite the fact that both price premium and volume premiums contribute to the change of revenue premium, revenue premium is dominantly impacted by the change of volume premium. The four

sets of new brand equity drivers I brought to the study, i.e. brand structure and positioning, customer characteristics and brand strategy contribute significantly to the changes of the brand market performance measured with price, volume and revenue premiums. The effects of key drivers on revenue premium, such as brand structure and positioning, brand strategy and consumer characteristics are in general consistent with our theoretical understanding. Meanwhile, some interesting empirical findings are also presented and explained. Throughout the analysis, cross-department difference is considered to offer more insightful knowledge for managers. As I expected, variation in the effects of brand equity drivers on brand performance across departments is evident.

This research makes material contributions to both academic and business fields.

A fundamental challenge for managers is to identify the best strategy inputs to increase brand value. This research extends the existing conceptual foundation by identifying various drivers for revenue premium, a newly proposed brand equity measure. The drivers include brand structure and positioning, brand strategy, customer characteristics, category characteristics, and marketing mix. In prior studies on revenue premium, researchers merely focus on revenue premium and a selective number of brand equity drivers. To make an extension, I look into the impact of a comprehensive set of brand equity drivers on both price premium and volume premium and investigate how revenue premium is generated and affectedly jointly by price premium and volume premium. I empirically test and summarize the effectiveness of different drivers in generating brand equity. I am able to demonstrate the added value of brand structure and positioning, brand extension, and consumer characteristics to the performance of branded products at the retail level. The results of this research help to complete the understanding

of relationship between brand equity and its antecedents. The result of this research facilitates practitioners to link brand management to brand value. Based on the proposed framework and generalized results, marketing professionals can understand how the value of their brand is created and changed at the retail level. Thus, efficient allocation of resources can be made to maximize the return on investment.

My approach facilitates an in-depth understanding of how brand equity (measured as revenue premium) is generated. I do not investigate directly the relationship between identified drivers of brand equity and revenue premium. Instead, I decompose the change of revenue premium into the effects of price premium and volume premium. Meanwhile, I investigate how price premium and volume premium are created respectively by drivers of brand equity. This has not been tried by prior research works and provides a more complete picture of the generation of revenue premium.

One of the core purposes of this research is to generalize a marketing theory. Most previous literature on similar topics focused on a limited number of categories and brands. This research covers over 200 categories and more than 9,000 brands of consumer packaged goods (CPG) sold in the United States. This sets up a good foundation to generalize the findings and extend the brand equity theory.

I acknowledge that products in different categories respond differently to our marketing activities. To my best knowledge, this research is the first to address the category heterogeneity in related works. This study takes the approach to effectively and efficiently investigate a system of model equations when incorporating the variation across departments. My findings reveal the cross category variation on how each driver contributes to the change of brand equity. Thus, this paper contributes to developing a

generalized theory across all grocery departments, while showing to the practitioners the appropriate adjustments to be made in marketing different types of consumer packaged products.

2.6 Limitations and Future Research

On limitation for this research is that this study only generalizes the findings for the consumer packaged goods (CPG). This is mainly due to the data availability. Due to the specific industry characteristics and consumer purchasing behavior, not all findings from this study can be extended to apply in other product categories, such as durables, clothing, automobiles, luxury goods or services. It relies on future research to empirically examine the theoretical framework and make generalization in other product categories.

Moreover, this research focuses on the objective measure of various brand equity drivers and their impact on revenue premium. Like most existing empirical studies, it neglects the possible impact of consumer mindsets on consumer's preference to the branded products. Although both consumer based perceptions and product marketing efforts are proved to affect the brand equity (e.g. Sethuraman and Cole 1999; Cotterill, Putsis, and Dhar 2000; Cataluna, Garcia and Phau 2006; Hoch and Banerji 1993), few studies have combined objective and subjective measures to study how they contribute to brand equity (Ailawadi, Lehmann, and Neslin 2003). In addition, prior studies focus on the validity of various brand equity measures calculated at either individual or product level (Ailawadi, Lehmann, and Neslin 2003; Simon and Sullivan 1993). Although many people view brand equity from either a consumer-based or a product-based perspective, there are few studies successfully focusing on the causal linkages between individual level determinants and product performance measures (Sethuraman and Cole 1999). This

calls for a study on the drivers of brand performance measures, combining subjective information and objective data, while linking customer level information with product level measures. Specifically, I can focus on how consumer-based brand equity (CBBE) drivers such as perceived quality, product awareness and familiarity measured with opinion surveys incrementally explain a brand's revenue premium, a brand equity measure from the retail performance perspective. The objective is to add to previous studies the investigation of the linkage between consumer perception and revenue premium, and combine objective measures and subjective information to explain brand equity. This will improve the understanding on the complex mechanism through which the consumer level brand equity drivers and product level determinants jointly impact brand equity.

CHAPTER 3

WE KNOW IT SHOULD, BUT HOW DOES BRAND

EQUITY LIFT BRAND MARKET PERFORMANCE

3.1 Introduction

One of the challenges that brand managers face is to justify the efficacy of brand management activities in performance metrics that are interpretable and comprehensible by firm executives. In particular, practitioners are under increasing pressure to justify the effectiveness of brand investments. Rust and colleagues (2004, P.76) raised the concern that "this lack of accountability has undermined marketers' credibility, threatened the standing of the marketing function within the firm, and even threatened marketing's existence as a distinct capability within the firm." Responding to this need, numerous studies explore the links between the consumer-based brand equity (CBBE) and firm financial metrics (e.g. Aaker and Jacobson 1994, 2001; Mizik and Jacobson 2008; Rego, Billet and Morgan 2009). This stream of research reached the consensus that consumer-based brand equity (CBBE) does 1) provide incremental information in explaining financial returns, and 2) relate positively to firm financial performance.

With these recent advancements in the knowledge on brand equity, there are two needs emerge to address the essential but unanswered question of how exactly customer mindset (i.e. brand knowledge) are converted to firm performance. First, we need to know how the improved customer state of mind lifts firm financial performance through the "customer mindset-market performance-financial performance" chain (Keller and Lehmann 2003, 2006). Beyond knowing merely that there exists a positive association, brand managers and firm executives are eager to know in more detail how improved

consumer-based brand equity (CBBE) is converted to brand market performance, which in turn drives firm financial performance. This expanded knowledge will facilitate the use of brand and marketing strategies to optimize return on investment. The second issue is the dearth of empirical evidence supporting the link between consumer-based brand equity (CBBE) and brand market performance. This is an axiom of brand equity theory with limited empirical validation. An empirical exploration will fill this gap and contribute to the completeness of the existing theory on brand value chain.

This research examines the impact of the consumer-based brand equity metrics from EquiTrend$^{©}$ on a comprehensive set of market performance metrics (penetration, loyalty, market share, price and revenue). My sample contains a total of 769 products covering 216 major brands that are sold in the grocery channel in the United States. The results show that the consumer-based brand equity (CBBE) provides incremental explanatory power for brand market performance beyond a set of other determinants such as brand positioning, marketing mix, customer demographics, and category characteristics. In addition, the positive equity-marketplace performance association is moderated by a set of product and category features (i.e. purchase frequency, price, stockpileaibilty, and category assortment), as well as brand strategies (such as brand portfolio size and cross-offering of different versions of a brand into different areas).

The remainder of the paper is organized as follows: I first elaborate my conceptual framework and develop hypothesis to be tested. Then, I introduce my data and empirical model. Next, I present the empirical results. Finally, I conclude with a discussion of marketing implications and future research.

3.2 Theoretical Framework

3.2.1 Brand Equity- Brand Performance Association

Brand's equity reflects the value that the brand offers to consumers (Aaker 2004; Berthon, Hulbert, and Pitt 1999; Lane and Jacobson 1995). It is believed generally that brands with high levels of equity are associated with superior performance including sustained price premiums, inelastic price sensitivity, high market shares, a successful expansion into new categories, competitive cost structures and higher profitability (Keller and Lehmann 2003). The marketing literature provides a large number of cases that suggest strong brands have both.

Marketing investments potentially stimulate the development of brand value. These inputs relate to activities such as: (a) product research, development, and design; (b) marketing communications; and (c) employee training and selection (Keller 1993; Keller and Lehmann 2003). To consumers, these efforts directly engender high levels of awareness, strong attachment, positive attitude, and unique associations in consumers' memory pertaining to the brand (Keller 1993; Keller and Lehmann2003). A well-built brand offers "comfort, security and value" (Sivakumar and Raj 1997) and becomes a symbol for not only sources of product, but also quality and commitment (Hoch 1996; Quelch and Harding 1996; Sivakumar and Raj 1997). Trust for brand is generated through personal experience as an emotional connection, both of which reinforce brand loyalty (e.g., Chaudhuri and Holbrook 2001).

It is generally believed that a superior brand knowledge (awareness, associations, attitudes, attachment, etc.) provides a brand with competitive advantage over other products in terms of market performance (Hoch 1996; Hoch, Montgomery and Park

2003; Steiner 2004). The value created in consumer's mind alters purchasing behavior in favor of the brand by facilitating product identification, reducing search costs, and eliciting repeat purchase (Berthon et al. 1999; Keller 2003). These changes create loyal consumers who are inclined to avoid brand-related information search, neglect the marketing efforts of rivals, consider and re-buy only that brand, and eventually reduce the "churn" among the brand's customer base (e.g. Newman and Werbel 1973; Oliver 1997). This may be particularly relevant for low involvement purchase decisions such as frequently purchased consumer packaged goods (e.g., Hoyer and Brown 1990). The series of empirical findings corroborated the argument that strong brands (e.g. products with superior quality and high prices) are more rewarded by their marketing actions (e.g. pricing, sales promotion, personal selling, etc.) than lower quality competitors (Blattberg and Wisniewski 1989; Sethuraman 1996; Cotterill and Putsis 2000). In particular, cross-promotional effects are asymmetric and promoting higher quality brands impacts weaker brands (and private label products) disproportionately (e.g. Allenby and Rossi 1991; Blattberg and Wisniewski 1989; Krishnamurthi and Raj 1988, 1991). Accordingly, promoting strong brands generates more switching than does promoting weaker brands (e.g. Kamakura and Russell 1989). Moreover, higher market share brands are less deal elastic (Bemmaor and Mouchoux 1991; Bolton 1989; Vilcassim and Jain 1991) and price sensitive (e.g., Ailawadi, Neslin, and Lehmann 2003; Allenby and Rossi 1991). Finally, brands with high equity are bequeathed with competitive advantages including the opportunity for successful extensions and creation of barriers to competitive entry (e.g. Farquhar 1989). All of these lead the brands with favorable customer state of mind to

enjoy superior market performance with respect to penetration, loyalty, market share, price premium and revenue premium (e.g. Keller and Lehmann 2003, 2006).

In brand equity literature, the value of brands is commonly assessed using a measure of the state of mind of consumers (Keller and Lehmann 2003; Mizik and Jacobson 2008). From the customer's standpoint, brand equity is the surplus attraction from a particular product generated by the "non-objective" name of the product offering rather than by the product attributes (Keller and Lehmann 2006). A brand may be in parity with the physical product at its inception, but it can evolve with connections beyond the objective product over time through activities and influences such as advertising, usage experience, customer relationship management, etc. As such, the brand forms a specific brand related customer state of mind. The measures of the mindset usually captures one or multiple aspects of the hierarchy of effects models, i.e. awareness, association, attitude, attachment and activity (e.g., Aaker 1991, 1996; Ambler and Barwise 1998; Keller 1993; Keller and Lehmann 2001, 2006). Consumer-based brand equity (CBBE) measures often demonstrate the basic underlying dimensions of brand equity and strong diagnostic power by signaling the change of a brand's value and providing the reasons for the change (Ailawadi, Lehmann, and Neslin 2003). Correspondingly, several commercial versions of these measures are developed and used by both researchers and practitioners, e.g., Young and Rubicam's Brand Asset Valuator (BAV)(Knowles 2003; Mizik and Jacobson 2008), and EquiTrend[©] (Aaker and Jacobson 1994; Rego, Billet and Morgan 2009).

Extant literature has documented the contributions that the consumer-based brand equity (CBBE) makes to explaining firm financial performance. For example, Mizik and

Jacobson (2008) investigated the five "pillars" (i.e., central brand attributes) of the Young

& Rubicam Brand Asset Valuator model: differentiation, relevance, esteem, knowledge,

and energy. Their analysis concluded that perceived brand relevance and energy provide

incremental information to accounting measures in explaining stock returns. In addition,

changes in differentiation have impact on future-term accounting performance, which in

turn affects stock return. These results are robust and invariant to the use of different

accounting performance measures and risk adjustments. Earlier, Aaker and Jacobson

(1994) used the EquiTrend$^{©}$ measure to examine associations between measures of

perceived brand quality and security returns. The study involved 34 "established"

consumer products firms, for which the brand constitutes a significant fraction of the

firm's overall sales. This empirical work covered a three year period 1990-92 and found

that a change in perceived quality has a significant and positive influence on stock return

as the theory predicted. In a follow-up study, Aaker and Jacobson (2001) investigated the

level of value relevance of brand attitude, a key component of consumer-based brand

equity (CBBE) in terms of predicting future earnings and thus firm value in high-

technology markets. The authors demonstrated that changes in brand attitude are

associated contemporaneously with stock return and drive accounting financial

performance. Jacobson and Aaker (1987) conducted a research on the Profit Impact of

Market Strategy (PIMS) data and found the lagged perceived quality to be positively

related to current return on investment for four businesses groupings (consumer durables,

capital goods, raw and semi-finished goods, and components). Recently, Rego, Billett

and Morgan (2009) examined the effectiveness of consumer-based brand equity (CBBE)

on firm risk reduction with the data of 252 leading firms in EquiTrend$^{©}$ dataset through

the period of 2000-2006. Their findings supported the claim that the consumer-based brand equity (CBBE) has risk relevance, in the sense that it is associated with firm systematic and unsystematic risk and explains variance of the risk measures beyond the prediction by the existing financial models.

However, this study aims to examine the performance relevance of the consumer-based brand equity (CBBE) for a couple of reasons.

Firstly, marketplace performance measures (price premium, revenue premium, loyalty, market share, penetration, etc.) are important to senior managers, because they are built on a culmination of various mechanisms through which the brand provides value to customers. They are the basis for achieving improved financial performance. In practice, these measures serve as the measurement of a brand's success and achievement among consumers. As such, linking the consumer-based brand equity (CBBE) measures with brand market performance helps managers understand the impact of customer mindset on operational effectiveness and provides valuable information for strategic management decisions.

Second, according to the theory of brand value chain (Keller and Lahmann 2003), brand market performance is the direct antecedence of firm financial performance. The impact of consumer-based brand equity (CBBE) on firm financials is through market performance. The positive equity-performance association has been taken for granted without a formal empirical validation. In another word, for a variety of reasons (e.g., unavailability of data), there is a paucity of empirical work documenting the performance relevance of these customer mindset metrics. This obvious gap makes our understanding of brand value creation incomplete. The exploration of the linkage between consumer-

based brand equity (CBBE) and brand marketplace metrics can fill the gap in the literature and add on to our understanding of the complete chain reaction.

Stemming from the above notions, I formally propose the empirical test of the association between the consumer-based brand equity (CBBE) and brand market performance. In doing so, I propose that:

H1:   Brand market performance is positively associated with the consumer-based brand equity (CBBE).

3.2.2 Moderation of Equity-Performance Association

Extant knowledge suggested that the association may vary as a function of certain product, category and firm characteristics, in particular, price, purchase frequency, stockpileability, category assortment and firm brand portfolio size. In addition, there is a plethora of evidences to form the argument that the cross-selling of different products under the same brand name will affect the strength of the association.

3.2.2.1 Price and Purchase Frequency

Price and purchase frequency will have impact on the equity-performance relationship due to the perceived financial and performance risk associated with the product. Perceived risk originates from two sources: the perception of the likelihood that something will go wrong and the perception of the seriousness of the consequences if it does (Kaplan et al. 1974; Taylor 1974; Bettman, 1973; Lopes 1995). It is generally agreed that overall perceived risk can be categorized into the following aspects: financial, safety, social, psychological, and time\opportunity (Cunningham 1967; Jacoby and Kaplan 1972; Perry and Hamm 1969; Roselius 1971). Among these, the performance risk correlates highest with the overall perceived risk (Kaplan, Szybillo and Jacoby 1974).

The substantial research showed that in case of high perceived risk, consumers search for diversified information to justify the decision (for a meta-analysis of this issue, see Gemlinden 1985), and hence rely on various available sources of information, such as word of mouth, advertising, and interpersonal sources (e.g.. Garner 1986). Extending this conceptualization to an infrequently purchased product, if a wrong buying decision is made, a consumer may expose him/herself to a longer period of negative performance consequences and psychological costs (anxiety, frustration, downtime, etc.) until the next purchase. Alternatively, the consumer may opt to discard the bad choice instead of waiting for the next round of buying. However, the financial loss will be instantaneous and complete. Either way, the accruing high perceived risk will lead consumers to put more weight on various available information with regard to the brand in helping justify the decision.

In another occasion of infrequently purchased products, which are used only once a while in the year, when consumers make a new purchase, all the product and brand related information utilized during previous purchase is no longer accessible and diagnostic. Therefore, consumers need to rely more on brand related information to justify the current decision.

Drawing from the above outlined notions, I propose that:

H2.   The strength of the association between consumer-based brand equity (CBBE) and brand market performance is stronger for brands with high price.

H3.   The strength of the association between consumer-based brand equity (CBBE) and brand market performance is stronger for brands that are infrequently purchased.

3.2.2.2 Stockpileability

Stockpiling results in high perceived risk through an accumulation of inventory with an expensive stake and longer consumption period. There is a large degree of purchase acceleration in categories with products easy to stockpile (see Litvack, Calantone, and Warshaw 1985). This drives consumers to purchase more and respond strongly to sales promotions (Narasimhan, Neslin and Sen 1996). To fully take advantage of the deals, consumers are likely to advance their purchase in large quantity and hence consume for a long period after the promotion. The consequent high monetary and performance risk associated with large volume purchase and long consumption period drives consumers to emphasize on brand strength information. As such, I propose that:

H4:   The strength of the association between consumer-based brand equity (CBBE) and brand market performance is stronger for brands in stockpilable categories.

3.2.2.3 Category assortment

It is generally held that a large category assortment indicates more competition in the category. As such, consumers may resort to various information sources to assess each individual option and validate their decision. It stems from the conceptualization that consumers are "cognitive misers" and do not consider all accessible and diagnostic knowledge sources because information search is costly, particularly in the case of many alternatives (Fiske and Taylor 1991). Usually, consumer will first try to retrieve the most accessible information that has been elaborated, triggered with retrieval cues, and inferred from other associations (Feldman and Lynch 1988). Candidates for the set of information can be from product attributes, brand associations, and firm messages (see

Biehal and Sheinin 2007; Brown and Dacin 1997; Feldman and Lynch 1988; Keller 1987; Lynch, Marmorstein, and Weigold 1988). In evaluating a product, information relevant to a strong brand will be more accessible and ready for diagnosis because of the high awareness and familiarity. Therefore, a high (low) perception of quality and brand familiarity will not only render the brand a favorable (less favorable) assessment in its own right, but also increase (decrease) the influence of this information on consumer's choice, due to the accessibility and diagnosticity natural of information related to a strong brand. Hence, I propose that:

H5:   The strength of the association between consumer-based brand equity (CBBE) and brand market performance is stronger for brands in categories with large assortments.

3.2.2.4 Brand Portfolio Size

Firms add brands to its portfolio to accommodate various needs, such as market situation, segmentation, product range expansion, production economies of scale, channel power, etc. (see Kapferer 2001; Keller 2008; LaForet and Saunders 1999). When a firm launches a brand, it invests in the product from current and future cash flow of other products in the portfolio (see Wernerfelt 1988). If the product turns out to be inferior in quality, consumers will discover that and avoid it in the future. This may trigger a devaluation of the brand and jeopardize other products affiliated with it (Sullivan 1990). Hence, the likelihood of a firm introducing an inferior product diminishes as the size of the affiliation increases. Therefore, consumer will be likely to cast confidence in a brand within a large array despite the overall perception on the brand. Therefore the association between the customer mindset and brand marketplace metrics is attenuated after the

customer's confidence in the product is formed with the obtained brand size information. This forms the justification of the proposal that:

H6: The strength of the association between consumer-based brand equity (CBBE) and brand market performance is weaker for brands in a portfolio with large number of brands.

3.2.2.5 Cross-selling of a brand

I consider the instances of a brand name being used for multiple products. Instead of evaluating product based solely on its own attributes, consumers may try to relate a given brand version to other products affiliated with the brand (see, e.g., Aaker and Keller 1990; Farquhar, Herr, and Fazio 1989) based on product characteristics, such as physical features, the needs the products satisfy, or product usage contexts (Aaker and Keller 1990; Maclnnis and Nakamoto 1990). Following the accessibility-disagnosticity framework, besides the product specific attributes, information related to the shared brand name may be easy to access and retrieve for use (see Feldman and Lynch 1988; Fiske and Taylor 1991). Therefore, brand related information will be utilized as a major information resource for customers to evaluate the focal product. Within this context, I argue that:

H7: The strength of the association between consumer-based brand equity (CBBE) and brand market performance is stronger for the branded products having different versions sharing the same brand name and offered across different areas.

3.2.3 Other Drivers of Brand Performance

Drawing from extant marketing literature and my first essay, I summarize the rest of brand performance drivers as (1) brand strategy, (2) customer characteristics, (3)

marketing mix and (4) category characteristics. These drivers serve as the control variables for the current study.

3.3 Data and Model

3.3.1 Data

My empirical study is mainly based on the Consumer Insights Data from the Information Resources Inc. (IRI). The IRI data contains aggregated performance of brands from major grocery chains within the United States. The data cover fast moving consumer packaged goods (CPG) from 8 merchandise departments in grocery stores: bakery (bread, muffins, doughnuts, etc.), dairy (butter, cheese, milk, etc.), deli (meat, ham, sausage, etc.), edible grocery (beverage, coffee, cereal, etc.), frozen food (frozen meat, frozen vegetables, ice-cream, etc.), health and beauty (cosmetics, shampoo, vitamins, etc.), general merchandise (batteries, light bulbs, socks, etc.), and non-edible grocery (pet food, detergent, toilet tissue, etc.). There is a hierarchical structure within each department. Within department there are different categories, followed by subcategories and brands. The consumer insights data are collected and reported annually. There are over 300 categories and more than 700 subcategories, with a total of 9,000 national brands in the original data set.

I supplement the IRI data with consumer-based brand equity (CBBE) metrics with Harris Interactive's EquiTrend$^©$ database. EquiTrend$^©$ uses brand salience, perceived quality and purchase intention to measure brand strength. These three variables reflect consumers' awareness of the brand (familiarity), and the strength of positive (perceived quality and purchase consideration) associations with the brand in the customer mindset – which comprise the core constructs of Keller's (1993, 2008) conceptualization of

customer base brand equity (CBBE). The brand's equity score is determined by a calculation of familiarity (salience), perceived quality and purchase intent, as a way to compositely reflect brand strength. The actual equation is done by indexing familiarity and purchase intent. This is followed by weighting the familiarity score, which is then multiplied by the mean of quality and purchase intent. The result is finally indexed on 100 (Brandweek, 2006). The EquiTrend[©] data has been used to examine the effects of difference in brand equity on financial performance (e.g. Aaker and Jacobson 1994; Rego, Billet and Morgan 2009). EquiTrend[©] database includes brands owned by a large number of firms across a wide range of different categories. In operationalizing the concept of consumer-based brand equity (CBBE), the Harris Interactive collects annual data from more than 20,000 U.S. consumers for more than 1,000 large brands across 35 categories every year. The consumer sample is designed to be representative of the U.S. population over 15 years of age, and each brand in the database is rated by over 1200 consumers. The EquiTrend[©] measure was cross-validated with another widely accepted consumer-based brand equity (CBBE) measure- Young & Rubicum's Brand Asset Valuator (Knowles 2003; Mizik and Jacobson 2008) and showed a high correlation of .82 for the brands reported in both data sets (Rego, Billet and Morgan 2009).

My study includes 3 years of data (2000, 2002 and 2003). The merge of Consumer Insights data and EquiTrend[©] results in a subset of 769 products from 216 brands covering all 8 grocery departments with a total of 1402 observations.

3.3.2 Model

The model is formulated as follows:

(15) $Perform_i = \beta_0 + \beta_1 Equity_i + \sum_K \beta_{Kk} Equity_i * Moderator_{ik} +$

$$\sum_T \beta_{Tt} DYear_{it} + \sum_D \beta_{Dd} Dept_{id} + \sum_L \beta_{Ll} Brand_{il} +$$

$$\sum_N \beta_{Nn} Marketing_{in} + \sum_M \beta_{Mm} Consumer_{im} +$$

$$\sum_P \beta_{Pp} Category_{ip} + \varepsilon_i$$

$Perform_i$ stands for the performance measure of brand i. There are five

measures being studied separately: penetration (% of household buyer), repeated

purchase (% of repeated buy), market share, price premium and revenue premium. In

case of multiple brand versions for one brand due to cross-area offering, the subcategory

level brand version performance is obtained. These measures form a representative set of

important aspects of brand market performance (see Farris et al 2006; Keller and

Lehmann 2003, 2006). The penetration dimension determines the degree of appeal of the

brand within the given demographic segment. The loyalty dimension measures the level

of brand purchase retained by loyal customer. The market share dimension gauges the

success of the marketing program in driving the sales of the brand within the product

category. The price dimension captures the surplus value that the brand is endowed with

compared to other equivalent alternatives. Finally, the revenue dimension reflects the

brand's ability to generate revenue stream amongst the comparable products. The

definitions of them are as follows:

(16) $\% \; of \; Household \; Buying = \dfrac{Brand \; Buyers}{Total \; Sample \; Households} * 100\%$

(17) $Share \; of \; Requirements = \dfrac{Brand \; Volume \; Sales}{SubCategory \; Volume \; Sales \; by \; Item \; Buyer} * 100$

(18) $Market\ Share = \dfrac{Dollar\ Brand\ Sales}{Dollar\ Subcategory\ Sales} * 100\%$

(19) $Price\ Premium = log(\dfrac{Brand\ Price}{Price\ of\ Generic\ Equivalent})$

(20) $Revenue\ Premium = log\ (\dfrac{Brand\ Revenue}{Revenue\ of\ Generic\ Equivalent})$

% of buy, share of requirements and market share enter into the model after being

logit-transformed.

The subscript t for performance and other predictor measures is omitted.

$Equity_i$ is the EquiTrend$^{©}$ brand i's equity score.

$Moderator_{ik}$ stands for the moderator for the equity-performance association. It

includes price margin (POVER) over the lowest priced brand within the subcategory,

purchase frequency (FREQ), stockpileability (PILE), category assortment (ASSORT),

firm brand portfolio size (SIZE), and cross-selling of different versions of a brand

(EXT1-multi-subcategory offering, EXT2-multi-category offering, and EXT3-multi-

department offering).

The key parameters are β_1 which tests the direct association between consumer-

based brand equity (CBBE) and brand market performance (H1), as well as β_{Kk} which

captures the moderating effects (H2-H7).

$DYear_{it}$ is the dummy indicator for year.

$Dept_i$ is the dummy indicator for grocery department.

$Brand_{il}$ stands for the brand strategy for brand i, including brand tier position

and cross-selling of a brand. For brand tier positioning, I divided the brands in each

subcategory into four tiers based on their prices. We took the highest and lowest prices

and divided the price range into four equal segments. Then I assigned each brand to one

of these four quartiles based on its price. Brands in these four tiers are named from high to low as super premium, premium, everyday, and value brands accordingly. There are some subcategories ending up with only two or three ties instead of four. Thus, 2T1T and 2T4T are defined as high and low tier respectively in a two-tier subcategory; 3T1Tand 3T4T as the top and low tier respectively in a three-tier subcategory; 3T2T as the mid-tier falling into the 2nd price quartile; 3T3T as the mid-tier falling into the 3rd price quartile; 4T1T, 4T2T, 4T3T, 4T4T as the top, second, third and lowest tier respectively in a four-tier subcategory. 4T4T will be dropped in analysis for identification purpose. I categorize brand cross-selling information into multi-sub-category offering (EXT1), multi-category offering (EXT2) and multi-department offering (EXT3). Brand portfolio size is recorded with variable SIZE.

$Marketing_{in}$ stands for marketing mix. It includes 6 variables: national brand deal depth (NBDLDP), national brand deal sales (NBDL), national brand display sales (NBDISP), national brand feature sales (NBFEAT), national brand coupon sales (NBCOUP), and national brand price deal sales (NBPDL).

National Brand Deal Depth (NBDLDP) is calculated as the net percentage off for price deals minus that of the private label.

National Brand Price Deal Sales (NBDL) is calculated as the net percentage of volume sales on any deal minus that of the private label.

National Brand Display Sales (NBDISP) is calculated as the net percentage of volume sales on display minus that of the private label.

National Brand Feature (NBFEAT) is calculated as the net percentage of volume sales on feature minus that of the private label.

National Brand Coupon Sales (NBCOUP) is calculated as the net percentage of volume sales on couponing minus that of the private label.

National Brand Price Deal Sales (NBPDL) is calculated as the net percentage of volume sales on price deal minus that of the private label.

$Consumer_m$ stands for consumer characteristics. It has 8 brand level variables which reflect deviation of demographic variables from the sub-category mean: 2 indexes for age groups (AGEY as young female household head with age 18-29, AGEO as elder female household head with age 45-54), 2 indexes for affluence (AFFLL as living by, AFFLH as living well), 2 indexes for education (EDUL less than high school for female household head, EDUH as college and graduate for female household head), 2 indexes for family size (FSIZES as family size of 1-2, FSIZEB as family size of 5+). There is a similar set of 8 category level variables used as additional control variables.

Each demographic variable is calculated as the dollar index of the branded product for different demographic breaks.

The dollar index for different age breaks provides insights into how the dollar value of the product purchase skews toward or away from various age breaks. A high index value of the consumer characteristics implicates more dollar purchase of the product is made by the households within the demographic break. An index above 115 or greater indicates that significantly more dollar purchase of the product is made by the households within their demographic break. An index below 85 means that the demographic segment purchases significantly less of these products.

$Category_{ip}$ stands for category characteristics. It includes 3 variables: purchase frequency (FREQ), dummy indicator of stockpileability (PILE), and category assortment (ASSORT).

Purchase frequency (FREQ) is calculated as the inverse of the purchase cycle of the product.

Stockpileability (PILE) takes 1 if the product in the category is stockpileable, and 0 otherwise.

Category assortment (ASSORT) is the total number of the brands within the sub-category.

The summary statistics of the variables are listed in Table A37.

3.3.3 Estimation

The model is estimated with weighted least square method for several reasons.

First, the data contain brands that potentially have multiple brand versions. There are on average 3 products under one brand name with the highest being 28 and lowest 1. However, for each brand name there is only one brand equity score as opposed to different brand equity scores for different brand versions. If we see the brand equity score as an aggregated measure for the brand strength for all versions, it will be appropriate to aggregate performance and all related variables for all the brand versions to the brand level. In this way, we will have a one to one match between the brand performance measure and the brand equity score at the same and comparable level. However, this will reduce the sample size from 1402 to 471, which lead to a low degree of freedom considering the size (> 60) of parameters in the model. Therefore, it is better we keep the observations at a disaggregated (brand version) level.

Second, related to the first point, if we have the analysis at the brand version level and assign equal weight to each observation, brands with more versions such as Kraft (28 versions) Hershey's (18 versions) and Heinz (15 versions) will have more influence on the results than any single-version brand. A treatment is needed to solve this unbalanced weight of information.

Finally, due to the relative small number of observations for every brand (on average 2.2 observations for all versions of a brand per year) versus the number of parameters, it will be hard to run random effects model to get reliable brand level and overall effects (such as baseline performance, equity-performance association, and moderating effects) while taking care of the unbalanced size of observations for each brand.

A feasible solution is to use weighted least square regression by assign different weights to each observation. Weighted regression is used widely in survey data analysis to correct for disproportionality of the sample with respect to the target population of interest (e.g. DuMouchel and Duncan 1983; Pfefferman 1993; Potthoff, Woodbury and Manton 1992). A normal practice is to assign the weights represent the inverse of the sample inclusion probability so that the observations from the same sub-group will have equivalent weight in contributing to the final estimates (e.g. Cox 1987; Kish 1990; Potthoff, Woodbury and Manton 1992). Another widely used application is to use weighted regression to incorporate local spatial relationship into the regression framework. In particular, Fotheringham, Brunsdon and Charlton (2002) developed geographically weighted regression (GWR) as an alternative for the local analysis of relationship in multivariate data sets. In getting the local estimates for parameter, GWR

pulls the information of the whole data set, albeit assigns high weights to the observations that are nearby the focal location (Brunsdon, Fotheringham, and Charlton 1998; Fotheringham, Brunsdon and Charlton 2002). In this way, GWR attaches more weights to those observations that are more valuable in detecting the local relationship.

Drawing from these notions, I used several weighing schemes to a) control the balance of contribution of each brand's information (similar to the pick of weight as the inverse of the sample inclusion probability in survey data analysis) and gauge the importance of each brand version to the overall brand in the estimation process (similar to the high weight assignment to nearby observations in GWR).

The final choice of the weight for each (brand version) observation is the proportionate of its squared sales over the total squared sales of all versions of that specific brand. In this set up, each brand versions with large sales will get a high weight in showing their importance to the brand. In addition, the total weight for all versions of a brand adds up to 1, which serves to balance the contribution of each brand to the final estimates. By doing so, any brand version never gets a weight higher than 1, and it achieves 1 when there is only one version of that brand. A description of the potential statistical and practical meaning is listed in Appendix A. The comparison of the alternative weight schemes in terms of fit statistics is reported in Table A38. The final choice of weight gives the best result in terms of a) overall adjusted R-Square across the five performance measure models and b) the lift of explanatory power by the brand equity related information which is one of the key questions being examined in this study.

3.4 Results and Findings

I ran 3 competing models: the base model without equity variable (M0), the model with only equity variable (M1), and the full model with all hypothesized equity variable and interaction terms (M2). The results show that consumer-based brand equity (CBBE) contributes to the explanation of variation in brand market performance. The association between consumer-based brand equity metrics and brand marketplace metrics is moderated by purchase frequency, stockpileability, and cross-selling of a brand in an expected way. However, price has impact on the equity-performance association, but the effect does not follow the expected pattern. The estimates are described below.

3.4.1 Fit Statistics

Table A39 summarizes the model fit statistics. Comparing the fit statistics between M0 and M1, we found that adding equity variable will increase the explanatory power of the model. The adjusted R-square increment ranges from 0.002 (0.37% from 0.5409 to 0.5429 in Share of requirements Model) to 0.0796 (15.41% from 0.5165 to 0.5967 in Penetration Model). The Root MSE is reduced accordingly. This suggests that adding consumer-based brand equity (CBBE) information in general helps to explain the variation of brand market performance. By comparing the fit statistics between M1 and M2, I find that models for all five performance measures improved their adjusted R-square. The change varies from 0.0160 (3.07% from 0.5216 to 0.5376 in Market Share Model) to 0.0326 (12.87% from 0.2533 to 0.2859 in Price Premium Model). This demonstrated the relevance as well as necessity of the consideration of the moderating effects for the equity-performance relationship. Overall, by incorporating consumer-based brand equity (CBBE) related information, we can significant improve model fit.

The overall lift in adjusted R-square has a range from 0.0376 (7.50% from 0.5013 to

0.5389 in Revenue Premium Model) to 0.1119 (21.67% from 0.5165 to 0.6284 in the

Penetration Model). The Root MSE is reduced accordingly. All the above outlined

statistics indicate the incremental power of equity related information in explaining brand

market performance.

3.4.2 The Hypothesis

The result in model 2 show that not all hypothesized moderators acts on the

equity-performance relationship. To obtain the parsimonious model for each performance

measure, I keep only the identified moderators in the model, by retaining its interaction

terms with equity score within each performance measure model, and dropping the rest of

the interaction terms. This results in the proposed model M3. The estimates for the key

variables are listed in Table A40-A41.

3.4.2.1 Equity-Performance Association

Before I include the interaction terms, the overall equity-performance relationship

is significant and positive for all five performance measures. In the proposed model with

moderators, the equity-price premium relationship becomes insignificant. The rest four

remain positive and significant.

The EquiTrend$^©$ brand equity measure focus on perceived quality and salience

(awareness) of the brand. A regression of equity on quality and salience shows the equity

score is loaded heavily on salience instead of perceived quality (standardized estimated

coefficient of 0.71 vs 0.37). This reflects that in consumers mind, brand equity is

intrinsically biased toward awareness. In grocery industry, the high quality products

which are priced high, target the niche market and may lose volume of sales. However,

the moderately priced products with moderate perceived quality appeal to the general public and obtain volume of sales. This leads to high visibility and salience for these brands. In trading off quality with salience to derive EquiTrend© brand equity score, the brands with moderate quality and price but high salience end up with high equity score because of the mechanism that assigns more weight on salience. This justifies the weak equity-price premium link.

To verify the above postulation, I ran replace the Equity score in the model with perceived quality and salience respectively and run the model with a full set of control variables and interaction terms. The results show a positive quality-price premium relationship (standardized estimate of 0.2642, p=0.059) and negative salience-price premium relationship (standardized estimate of -0.1975, p=0.062). This further proves that it is the salience (awareness) that weakens the overall equity-price premium relationship.

3.4.2.2 Moderators

Price moderates the equity-performance relationship, but high price margin over the minimum price (of any brand) within the subcategory weakens the equity-share of requirements relationship. It only strengthens the relationship in the market share model. So H2 is not supported.

The purchase frequency is found to negatively impact the equity-performance association because the estimated coefficients for the equity-frequency interaction are significantly negative for % buy, market share price premium and revenue premium models. This is in favor of H3.

The estimates for coefficient of equity and stockpileability interaction is positive and significant for price premium model. The result partially supports H4.

In examining the interaction between equity and category assortment, I found that in price premium and revenue premium models, there exists a significantly positive moderating effect of assortment on equity-performance association. This is in support for the proposed H5.

The size of the brand portfolio is found to negatively affect the equity-performance relationship for share of requirements, market share and revenue premium. Contrary to our expectation, the estimate for the equity-size interaction coefficient is positive for the price premium model. Thus, H6 is partially supported.

The estimated coefficients for the equity-cross selling interaction show that selling a brand's versions in different areas will reinforce the equity-performance association for all measures, because at least one of the estimated coefficients for the equity-extension interaction is positive and significant. There is no conflicting pattern found. As such, the H7 is supported.

3.4.2.3 Control Variables

The estimates for control variables are included in Table A42-A43.

3.5 Implications

Building on the works in brand management, I empirically tested the association between consumer-based brand equity (CBBE) and product market performance. The representative set of measures reflect different aspects of a brand's market performance, featured by penetration, loyalty, market share, price and revenue (Keller and Lehmann 2003, 2006; Farris et al 2006). From practitioner's standpoint, they are important metrics

for brand performance evaluation (see Farris et al 2006). I also jointly tested the hypothesis of possible moderating effects of specific product and category characteristics as well as brand strategy.

The empirical test demonstrated the incremental information that is incorporated in the consumer-based brand equity (CBBE) in explaining brand market performance. The finding is noteworthy considering the importance of knowing exactly how the customer mindset drives brand market performance. In this sense, the current research fills an important gap in empirical research. Existing literature contains multiple studies relating to consumer-based brand equity (CBBE) to firm financial performance. However, the dearth of empirical exploration limits our knowledge on the relevance of customer mindset to brand /firm market performance, which in turn drives the financial metrics. Even though it is assumed that a positive customer mindset contributes to brand market performance, no research has validated it empirically. This study shows how the improved consumer-based brand equity (CBBE) contributes to the above outlined different facets of the brand market performance, which are used heavily by firm executives as guidelines for brand management and marketing strategy. The findings support the positive theoretical equity-performance association and provide insightful information on how to use brand management tools to achieve different operational goals (i.e. share, revenue, loyalty, etc.), and hence change specific firm financial metrics.

The unveiling of associations between consumer-based brand equity (CBBE) and the five different brand market performance measures provides meaningful implication to brand manager by its own right. Consumer-based brand equity (CBBE) may help the brand to reach high penetration, market share and revenue. However, its boost for

customer loyalty is weak. One explanation for this phenomenon is that after customer is in the market, they gain more direct information for the brand through trial and usage. The subjective positive/negative mindset pertaining to the brand is outweighed and changed its role to be the supplementary information for judgment. The other weak association is between equity and price premium. There are three points to rationalize this finding. Firstly, this study is conducted in the grocery setting. Within grocery industry, the relative price range within each category is essentially small, compared to other categories such as clothing, cosmetics, watches, cars, etc. Secondly, due to the recently evolution within grocery industry, in particular the prevalence of private label products, competition within each product category was intensified, which is followed by a competition in price and shrinkage of price range (see Hoch, Montgomery and Park 2003; Steiner 2004). Thirdly, in grocery industry, the influential brands may not be the top tier ones targeting the niche market, but those appealing to the vast majority through mass marketing. Hence, we may not observe the positive equity-price premium association.

By checking the potential moderating effects for the equity–performance association, the question at issue is that how we can adapt our implementation of brand management in achieving different performance goals. The findings provide abundant information on how we can effectively use brand management under different conditions for specific purposes. This research suggests that for brands in the infrequently purchased and stockpileable categories, the equity-performance relationship is in general stronger. Therefore, we need to specially nurture and improve our brand image within these categories in the consideration of a high conversion of customer mindset to market performance. This study also demonstrated that cross selling of brand versions may

enhance the equity-performance relationship except for the share of requirements. This is highly relevant to brand managers in the sense that the effects of brand extension are multiplicative, and more significant than extant research has implied. In the example of an offering that might be too far-reaching, the negative impact on brand performance is not only from the dilution of the brand image per se, but also from the additional conversion of the loss of brand equity due to the reinforced equity-performance relationship. Putting all these moderating effect together, this research gives brand managers insights into how they can design an effective brand strategy for a brand to achieve a specific objective and how to efficiently allocate limited resources for every member in the brand portfolio to maximize return on investment. For instance, if revenue is the goal, special attention needs to be called for infrequently purchased brands, in particular those of more product versions and listed within a large category assortment.

Lastly, in studying the equity-performance association, I included a comprehensive set of performance drivers, such as brand strategy, marketing mix, customer characteristics and category characteristics. This set up removes the part of the effects that equity has on brand market performance due to its mediation of other performance drivers. The remaining is the net impact of customer mindset on brand market performance. This attempt removes the omitted variable bias and reveals the true contribution of consumer-based brand equity (CBBE) on brand market performance. Based on this argument, this study gives a complete and objective picture for the determination for brand market performance, which combines extant marketing researches from various areas.

3.6 Limitations and Future Research

One limitation is that this study generalizes the findings for consumer packaged products. However, different product categories own different inherent features. This limits the extension of the results of current study to other product categories. As an example, a follow up study was conducted on the food and non-food brands in the dataset respectively to shown even within CPG products, there are nuances being identified. The findings (summarized in Table A44) showed that for both product types, adding consumer-based brand equity (CBBE) information in general increases the explanatory power for the model.

The pattern is very similar to the previous findings for the overall dataset, with marginal or no increment for share of requirements and price premium models but significant improvement for the rest. However, the improvement in fit statistics such as adjusted R-square is significantly larger for % buy, market share, and revenue premium model among the food brands than among the non-food brands. Equity related information helps explain the price premium for non-food product, but not for food products. These findings suggested that it is worthwhile to check the variation of the proposed hypothesis across different product segments. Finding the corresponding differences will have huge practical meaning for firm executives. Since the current research is on consumer packaged products, the findings in this research are generalizable for the grocery industry. For future research, it is advisable to study the effects for other business sectors with different product lines, business structure and competition situation.

Moreover, for the current study, I treat the relationship between consumer-based brand equity and brand market performance as unchanged across different types of

products. However, if we study on a diversified list of industries or products, such as durables, automobiles, clothing, luxury goods, and services, the cross-section variation of the relationship needs to be accounted for. Even for the current dataset, there are minor differences found between different types of products (food and non-food).

CHAPTER 4

BROTHERHOOD IN FIRM BRAND PORTFOLIO

4.1 Introduction

Consumer packaged goods (CPG) firms usually own more than one brand covering multiple product lines. The growth of the brand portfolio and expansion of a product line may reflect consumer demands, e.g. creating a frozen or shelf-stable version of a perishable product (see Keller 2008, P442). In other cases, multiple brands across product lines will expand segment coverage (LaForet and Saunders 1999) and leverage economies of scale in manufacturing or distribution (Keller 2008, P442; Porter 1985, P343). Such multi-brand firms may gain attention from retailers and increase their power in the channel (see Kapferer 1994 P153; Keller 2008, P435). Regardless of the concerns about product redundancy and brand overlap, it remains a tendency for consumer packaged goods firms to keep multiple brands in its reservoir (LaForet and Saunders 2005).

Current literature has been mainly focusing on the determinants of the brand strategy, i.e. why firms choose specific brand portfolio strategy (e.g. Doyle 1989; Ind 1990; Kotler 1972; Murphy 1987; Olins 1989). However, there are limited efforts being put to understand how these brand portfolio strategies exactly work in terms of performance improvement. A question arises of how it works to have a portfolio of brands as opposed to why. For example, does the presence of brands from the same firm help? Does large number of brands, i.e. a sizable portfolio have an impact? Does the performance of sibling brands affect brand performance? In understanding the above, does it matter where the sibling brand is? Do inconsistent brand quality images across the

brand portfolio make a difference? From the managerial standpoint, the answers for the above questions will provide crucial information in major marketing decisions such as branding, brand positioning, brand merger and acquisition, brand pruning, brand portfolio maintenance, etc.

There are few researches studying the linkage between the elements of brand portfolio strategy and brand market level performance. Almost all extant studies on brand performance developed models based on individual brand or a few brands, neglecting the fact that brands within a firm are closely associated in the sense that a set of sibling products are manufactured, marketed and operated by the same parent firm (e.g. Aaker and Keller 1990; Park, Milberg, and Lawson 1991). This study calls for brand performance models to incorporate effects of having multiple sibling brands affiliated with a brand. This necessity is apparently crucial if we consider the growing trend of brands extended to different product categories and added to a firm's portfolio.

I conducted an empirical study on over 1700 brands from 350 firms sold in the grocery channel in the United States. I looked at five brand market performance measures covering different aspects such as penetration, loyalty, market share, price and revenue. The model is developed and tailored to test four effects (size, performance, distance and quality variation) of brand-brand interaction within a firm's portfolio. All information is aggregated to brand level in case of different branded products (extensions) share the same brand name. The results showed that the presence of sibling brands, the size and the performance of them have significant impact on a focal brand's market performance. Moreover, these impacts vary when the distance between a brand and its siblings differs.

Finally, different patterns were found for these effects for different performance measures.

I structure the remainder of the article as follows: I first elaborate my conceptual framework and effects to test. Then, I introduce my data and empirical model. Next, I present the empirical results. Finally, I conclude with a discussion of marketing implications and future research.

4.2 Theoretical Framework

A good brand architecture serves the purpose of managerial impact, clarity, synergy and leverage (Aaker and Joachimsthaler 2000). Multi-brand, according to many commentators (e.g. Kapferer 2001, LaForet and Saunders 2005) is now a common practice for consumer packaged goods firms. A typical example is the CPG giant Procter & Gamble. Figure A8-A9 show a fraction of its brand portfolio. Procter & Gamble owns multiple brands across food and non-food segments, covering various product categories in different departments (e.g. dish detergent and laundry detergent in non-edible grocery department, soap and shampoo in health and beauty department, and coffee in edible grocery, etc.).

Although brands included in the portfolio can serve as a cash cow being milked for profits, a value product to attract new customers, or a prestige product to add credibility for the portfolio (Keller 2008, P442), decisions on brand portfolio strategy are not entirely market driven, in the sense that other considerations, such as administrative centralization, company philosophy, market situation, segmentation, and product range expansion, etc. have played determining role (LaForet and Saunders 1999). In particular, developing stand-alone brand is a valid alternative when synergistic gain from a house

brand is marginal (Kapferer 2001), or a brand has reached the limit on how far it can stretch (Aaker and Joachimsthaler 2000). In many cases, multi-brand is a good solution for market segmentation and differentiation in minimizing cannibalization, and to avoid channel conflicts (Kapferer 2001). Moreover, strategy, rather than short-term individual product issues, has an increasing influence on branding decisions (Murphy, 1987). A portfolio member can exist simply by acting as a flanker to protect flagship brands, attracting a particular market segment not being currently covered, securing shelf presence and retailer dependence, or seizing variety seekers who might otherwise switch to products from competitors (Keller 2008 P442). One last consideration is the need of building up firewalls among products at risks by using individual brands to fend off shocks from various scandals (Stein 2004).

In contrast, another stream of literature reminds being cautious to brand proliferation (e.g. Carlotti, Coe, and Perry 2004; Varadarajan, DeFanti and Busch 2006). It is argued that brand deletion ought to be considered not only when a brand is old and redundant, but also in the presence of deficiency in extendibility, modifiability, perceived quality, channel specificity, and/or strategic role (Varadarajan, DeFanti and Busch 2006).

Existing literature on brand portfolio management focuses on understanding how "market" drives the brand portfolio strategy as opposed to justifying the efficacy of the undertaken approach, i.e. how the strategy in return drives the "market". A case in point is how elements of brand portfolio management influence the brand market performance.

By appealing to extant research of brand and brand management, I examine the effects of a comprehensive set of determinants on brand market performance, including brand portfolio management, followed by brand strategy, customer characteristics,

marketing mix and category characteristics. A sketch of them is shown in Figure A10.

The effects of brand portfolio management have never been empirically studied in an

extensive manner and become the focus for this study.

4.2.1 Within the Brand Portfolio

As previously mentioned, more and more firms elect to adopt complex brand

portfolios with a mixture of stand-alone brands, corporate brands, sub-brands, endorsed

brands, and co-brands rather than the conventional single brand strategy (Laforet and

Saunders 1994, 1999, 2004, Aaker and Joachimsthaler 2000).

The influence of brand portfolio on brand market performance can be explained

from both the aspects of demand (customer) and supply (manufacturer and retailer) based

on theorems from different streams of literature. The overall influence of brand portfolio

on member brand performance is the net effect of the competing positive and negative

impact from both the demand and supply sides.

4.2.1.1 Demand Side

The interaction among brands within the same portfolio help shed light on the

efficacy of firm operating on multiple brands as it is shown that brand relatedness helps

firms to command targeting and segmentation, brand portfolio management, and

marketing efficiency (Aaker and Joachimsthaler 2000). Relatedness is cultivated through

the means of common brand names and logos, similar trade mark and design, similar or

related advertising, promotion of complementary usage, and even proximate shelf

location (Aaker and Joachimsthaler 2000; Rajagopal and Sanchez 2004). From the

customer's standpoint, the associative network theory, the accessibility-diagnosticity

framework and signal theory contribute to the explanation of the positive inter-brand

relationship. Meanwhile, cannibalization among brands competing for the same customer spending will negate the association among member brands in a firm's portfolio.

Associative network theory (Collins and Loftus 1975) provides a general representation by portraying the many types of associations between brands in a portfolio. This theory conceptualizes brand knowledge as having a node linked to a variety of associations, such as brand claims, evaluations, and attributes (Keller 1993; Morrin 1999). Accordingly, brand portfolio information is conceptualized as a brand network with a set of interlinked brand nodes. These links are enhanced through repeated exposure and consumer learning. Furthermore, brands within a brand portfolio tend to possess similarity in quality standards, brand image, and advertising execution elements, which provide consumer with additional cues to picture the underlying structure of brand portfolios.

To establish and reinforce the association network for its brand portfolio, firms send messages to consumer by, among other ways, advertising (specifically institutional advertising), public relations (e.g. product publicity, consumer education, sponsorship, internet website, etc.) and sales promotions. These corporate related messages not only enhance an image that encompasses many aspects of the company (Drumwright 1996; Johnson and Zinkhan 1990), but also pass to consumers' judgments about the products the company markets (Duncan and Moriarty 1998; Gurhan-Canli and Batra 2004; Hatch and Schultz 2001; Raju and Dhar 1999). In doing so, firms intend to leverage their images and reputations in the hope to influence consumers' beliefs in and attitude toward the brand portfolio that they carry. The information incorporated in these activities has been converted to perceived product values and evaluations (Goldberg and Hartwick

1990), price perceptions (Creyer and Ross 1996), brand beliefs and attitudes (Biehal and Sheinin 2007; Sheinin and Biehal 1999), product characteristics (Brown and Dacin 1997), product purchase intentions (Sen and Bhattacharya 2001), and product choices (Creyer and Ross 1996). The associations make the information of sibling brands available for consumers to access and diagnose at the time of evaluating a target brand.

According to the accessibility–diagnosticity framework, the information should be accessible and diagnostic for consumer to make a judgment, and more overlapping associations among inputs enhance knowledge transfer between concepts by triggering the relative accessibility and diagnosticity of one when evaluating the other (Ahluwalia and Gurhan-Canli 2000; Keller 1987). This is important because consumers tend to use accessible and diagnostic information, to form product beliefs especially when there is limited information on that product. In evaluating a focal product, consumer will try to access and diagnose the information on this specific product, information on associated products, information on overall image of the products in a firm's portfolio, corporate message (ability/ social responsibility, or both), etc. (see Ahluwalia and Gurhan-Canli 2000; Biehal and Sheinin 2007; Brown and Dacin 1997; Dick, Chakravarti, and Biehal 1990). When accessible and diagnosable, information from the rest of the portfolio supplements consumer's knowledge of the focal brand by signaling consumers with a beam or a frown.

Signaling theory (Wernerfelt 1988; Rao and Ruekert 1994) suggests that when a (primary) brand joins a group of established (secondary) brands, the perceived quality of the established brands is used as a cue to assess the primary brand. The new brand will gain considerable "endorsement" from the established brands. Fang and Mishra (2002)

further extended the theory in the context of quality and cross-merchandising. Drawing from these arguments, the information on sibling brands in the same brand portfolio that are accessed and diagnosed by consumers will serve as a signal in directing consumers' evaluation of a focal brand.

All of these has no conclusive impact on the performance of member brand, but indicate a positive performance interaction among brands in the portfolio.

However, in determining category assortment, major consumer packaged goods retailers may opt to adopt the wide and/or deep strategy which targets a broad market with full section of items, accommodates diversified customer needs, and increases traffic and customer loyalty (Berman and Evans 2004 P352). Consequently, they make a compromise by listing substitutes in the assortment within or cross categories and allowing the sales to shift from one brand to another. Hence, in instances of a multi-brand firm selling brands that are potentially replaceable to each other in terms of usage and functionality and targeting the same segment of customers, cannibalization is likely to occur and negatively impact the performance of the brand (Kapferer 1994; Keller 2008; Park, Jaworski, and MacInnis 1986). Accordingly, the performance association among similar products tends to be negative.

4.2.1.2 Supply Side

On the channel side, there are abundant arguments providing context for interpreting the interaction among brands. Brands from the same brand portfolio share the channel power that the firm possesses in collaborating with retailers. Retailers, in particular grocery store and supermarket, play a key role in both pulling the customers to the assortment of products in store and pushing the products to end-users, whose

contribution can not be entirely replaced by brand manufacturer. Their main functions can be categorized as physical distribution (transportation, warehousing, inventory control, material handling, etc.), promotion (advertising, sale promotion, personal selling, etc.), exchange and communication (with customers), marketing management (customer relationships and organizational productivity, etc.), and marketing information (data collection and analysis, information system, marketing research, etc.) (Berman and Evans 2005 P7; Ferrell and Pride 2003 P352). The marketing partnership between manufacturers and retailers may partially account for the performance interactions among the member brands within a firm's portfolio. The competition for channel power between brand manufacturers and retailers leads to the alliance between brand manufacturer and retailer. As is reflected in the relationship-oriented practice, especially in supermarket chains, category management, whereby channel members collaborate to manage products by category rather than by individual item. Category management guided the channel members toward being responsive to customer needs, efficient in inventory management, and cooperative in data utilization (Berman and Evans 2005, P31). One critical support that brand manufacturers secure for their portfolio is shelf space, the ultimate interface for the exchange between branded products and customer needs. Retailers stay in the frontline and have the most visible and direct contact with customers. Because selling space in retail chain is limited, it is most likely allocated to those goods that generate the most customer traffic and sales, and in turn drive the inventory turnover rate. Hence, in creating their own equity, retailers are predisposed to stock and sell quality brands, and, as a result, provide support weighing heavily in favor of strong multi-brand firms (Kapferer 1994 P153). As an example, the allocation of shelf

space by a retailer may be in proportion to the number of the firm's major brands. Other supports that a brand manufacturer receives from retailers and hence shared simultaneously among its brand portfolio include marketing research implementation, communication, physical distribution (transportation and inventory), financing, and customer service (maintenance and repair) (Keller 2008, P215).

Besides possessing the common resources from the retail channel, brands from the same portfolio share resources within the firm, including fabrication facilities, research and development, quality control, advertising, promotion, marketing expertise, sales forces, service network, order processing, etc. (Porter 1985, P343). This has a material impact on the overall marketing and operation cost position of the brands, and creates synergy by all the brands involved.

All of the above lead to a positive inter-brand association among all portfolio members in terms of performance.

On the flip side, similar products from the same firm are likely to compete for the limited resources within the firm such as cash utilization, marketing and sales force, purchase input, product technology, research and development, manufacturing, quality control, logistics, hiring and training, etc. (see Porter 1985, P338). All of the above mentioned inter-brand contests contribute to a negative performance association among brands.

Drawing from the above notions, in the retail channel, brands from a multi-brand firm has interactions among themselves. The sibling brands' overall impact on a focal brand is the net effect of the positive and negative influence on both the demand and supply side.

4.2.2 The Four Effects

In operationalize the investigation on the influence of siblings on the focal brand in the same brand portfolio, I categorize the impact of sibling brands into 4 effects: size, performance, inter-brand distance, and quality variation, as opposed to checking only the performance interaction between the focal brand and its relatives.

4.2.2.1 Size Effect

The size effect investigates how the size of sibling brands affects the performance of the focal brand. Besides the above mentioned effects on both directions, the size of the sibling brands will have an additional influence related to consumers' confidence in the product. When a firm expands its portfolio, it invests in the extension not only the cumulated fund from one product line, but also the future cash flow of other brands affiliated with the brand (see Wernerfelt 1988). If the new brand turns out to be inferior in quality, consumers will discover and opt to discard it. This in turn triggers consumers' potential devaluation of the brand and jeopardize other products affiliated with it (Sullivan 1990). Therefore, the bond for quality among brand affiliations tightens as the portfolio grows. Consumers will capture the tendency that the likelihood of a firm introducing an inferior product diminishes as the size of the affiliation increases, and hence render more confidence in a brand with higher backing. Moreover, evidences in previous research that people employ statistical heuristics (i.e., intuitive rule-of-thumb inferential procedures) such as law of large numbers in solving everyday problems (see Nisbett et al. 1983 for a comprehensive review). In the context of portfolio growth, people are inclined to give favorable judgment and become more confident in the extension when they see a large number of products that have been successfully attached

to the firm. In the example of brand extension, Dacin and Smith (2008) suggested consumer's confidence in their evaluations of the quality of a brand extension will increase as the number of products affiliated with the parent brand increases. However, the overall effect of the size of siblings largely depends on the positive impact due to the improved confidence compared to the negative effects related to cannibalization and resource competition within a sizable portfolio. Moreover, the pattern of the overall size effect is expected to vary with the change of the distance between the brand and its siblings.

4.2.2.2 Performance Spillover Effect

The performance spillover effect focuses on the performance association among brands, i.e. how the performance of sibling brands impacts on that of the focal brand. It stem from the previous arguments that due to the underlying association among the brands within a firm's portfolio, the preference of a member brand is affected by its product specific characteristics, as well as the accessible and diagnostic information on other sibling brands, which often serves as a signal for overall quality and reliability. Moreover, the brands from the same portfolio share the same channel support from retailers and internal firm resources. As such, brands from the same firm share commonalities on both the demand and supply side which can be featured by positive interactions in terms of performance. However, the positive association may be mitigated or even negated due to the cannibalization and resource competition within the portfolio.

4.2.2.3 Distance Effect

The distance effect checks how inter-brand distance influences the member brand performance. If a sibling brand is in a closely related area, it joins the focal brand to

exhaust the channel resources, such as shelf space and consumer spending (Low and Fullerton 1994; Shocker, Srivastava and Ruebert 1994) and create a barrier to entry (Porter 1985 P491; Scherer and Ross 1990). Meanwhile, a well conceived brand portfolio will generate marketing and operational synergies, including the enhanced firm and brand visibility, reinforced associations among brands, cost efficiency (due to scale economies, shared cost in marketing communication and manufacturing), and proficient management team (Aaker 2004, P33; Arker and Joachimsthaler 2000; see Porter 1985, P327). This helps the portfolio members to achieve competitive advantage over the stand alone brands without any interrelated relatives. On the flip side, if brand lines are not sufficiently differentiated, in particular when brands are launched to capture the depth of a product line or attract variety-seekers, cannibalization may significantly impair the performance of each brand, which in turn may negatively affect the brand's performance (Kapferer 1994; Keller 2008; Park, Jaworski, and MacInnis 1986). The overall effect is a combination of the two. However, the strength of the two opposite effects is expected to be weaker as the distance between the brand and its sibling increases. Therefore, the overall pattern may change accordingly. In studying the size and spillover effects, I incorporate the distance of other sibling brands into consideration.

4.2.2.4 Quality Variation

Quality variation captures the impact of variation in brand quality within the portfolio on brand performance. Drawing from social judgment theory, research found that for a given sample of instances, people show greater confidence when they perceive the sample as homogeneous with respect to the focal feature rather than heterogeneous (e.g., Thagard and Nisbett 1982). Following this conceptualization, I embrace the

argument that the strength of a brand would be diluted with an inferior product in the firm's portfolio, because of the uncertainty that indirectly arises from the performance deviation among existing affiliations in addition to the direct negative inferences about the original product (see Sullivan 1990; Wernerfelt 1988). Moreover, the deviation works in both directions, in the sense that an affiliated product with a noticeably superior quality shows the same adverse effect on consumer confidence in the focal brand as a negative deviation does (Rubin 1990). Dacin and Smith (2008) showed that as portfolio quality variance increases, consumers' confidence in their evaluations about the quality of an extension of the brand decreases. Based on these findings, the high variation in the quality of sibling brands may negatively impact the brand performance.

4.2.3 Other Drivers

In addition, extant knowledge on brand performance and the results from my study in the first essay suggest that brand strategy, marketing mix, customer characteristics and category characteristics drive the market performance of the brands.

4.3. Data and Model

To explore the effect of brand portfolio management on brand market performance, I conducted the empirical study with the Consumer Insights Data from the Information Resources Inc. (IRI). IRI studies brands from major grocery chains within the United States. The data cover fast moving consumer packaged goods (CPG) from 8 merchandise departments in grocery stores: bakery (bread, muffins, doughnuts, etc.), dairy (butter, cheese, milk, etc.), deli (meat, ham, sausage, etc.), edible grocery (beverage, coffee, cereal, etc.), frozen food (frozen meat, frozen vegetables, ice-cream, etc.), health and beauty (cosmetics, shampoo, vitamins, etc.), general merchandise

(batteries, light bulbs, socks, etc.), and non-edible grocery (pet food, detergent, toilet tissue, etc.). There is a hierarchical structure within each department. The CPGs are assigned to different categories, which is in turn divided into subcategories, listing multiple CPG brands. The Consumer Insights Data are collected annually. There are over 300 categories and more than 700 subcategories, with a total of 9,000 national brands in the original data set. To obtain the brand ownership information, I merge the Consumer Insight Data with the information from external sources such as U.S. Patent and Trademark Office (USPTO) documents and firm websites. I teased out brands owned by firms that operate on only one brand in the grocery channel, and it boils down to a subset of 1733 brands from 355 firms. These brands cover 480 sub-categories from 230 categories in all of the 8 grocery departments. This study focuses on the year between 1998 and 2000. The distribution of the size of brand portfolio for the firms in this study is summarized in Table A45.

4.3.1. Dependent Measures

I chose 5 dependent measures of brand market level performance (see Keller and Lehmann, 2003, 2007) from five dimensions: penetration (% buy), loyalty (share of requirements), market share (sub-category market share), price (price premium) and revenue (revenue premium). The penetration dimension determines the degree of appeal of the brand within the given demographic segment. The loyalty dimension measures the level of brand purchase retained by loyal customer. The market share dimension gauges the success of the marketing program in driving the sales of the brand within the product category. The price dimension captures the surplus value that the brand is endowed with

compared to other equivalent alternatives. Finally, the revenue dimension reflects the

brand's ability to generate revenue stream amongst the comparable products.

4.3.2. Model Formulation

(21) $Perform_{if} = \beta_0 + \sum_G(\gamma_{Gg}Size_{ifg} + \alpha_{Gg}Perform_{ifg}) + \delta QualityVar_f +$

$$\sum_T \beta_{Tt}DYear_{ift} + \sum_L \beta_{Ll}Brand_{ifl} + \sum_N \beta_{Nn}Marketing_{ifn} +$$

$$\sum_M \beta_{Mm}Consumer_{ifm} + \sum_P \beta_{Pp}Category_{ifp} + \varepsilon_{if}$$

$Perform_{if}$ stands for the performance measure of brand i in firm f. There are

five measures used: penetration (% of household buyer), loyalty (Share of requirements),

market share, price premium and revenue premium. % buy, loyalty and market share

enter the model after being logit-transformed. In case of multiple brand versions for one

brand due to brand extension, the subcategory level brand version performance is

obtained, and the brand level performance is aggregated (weighted with sub-category

revenue) across all these brand versions. The definitions of them are as listed in second

essay.

g is the indicator to show the presence of sibling brands covered in section (g) of

the hierarchy in the grocery channel, i.e. within the same category, across categories but

within the same department, across departments but within the same product segment

(food or non-food) and across product segments.

$Size_{igf}$ shows the number of brand i's siblings offered at each level of the

hierarchy in the grocery channel.

$Perform_{igf}$ shows the (weighted) average performance of the brand i's siblings

offered at each level of the hierarchy in the grocery channel.

$QualityVar_f$ is the quality variation for all the brands within the firm. It is calculated as the variance for the price tier positioning, which is from high to low defined as super premium, premium, everyday, and value. Price has been traditionally used as a proxy for product quality tier (e.g. Aribarg and Arora 2008; Kamakura and Russell 1989; Randall, Ulrich, and Reibstein 1998) and thus the variance of the price positioning naturally reflects the variation of the product quality.

γ_g, α_g and δ are the key parameters to estimate, indicating the effects of size, performance spillover, distance, and quality variation.

$DYear_{ift}$ is the dummy indicator for year.

$Brand_{il}$ stands for the brand strategy for brand i, including brand tier position and brand extension (surrogated with cross-offering). For brand tier positioning, I divided the brands in each subcategory into four tiers based on their prices. I took the highest and lowest prices and divided the price range into four equal segments. Then I assigned each brand to one of these four segments based on its price. Brands in these four tiers are named from high to low as super premium, premium, everyday, and value brands accordingly. There are some subcategories ending up with only two or three ties instead of four. Thus, 2T1T and 2T4T are defined as high and low tiers respectively in a two-tier subcategory; 3T1T, 3T2T, 3T3T and 3T4T as the top, mid-tier (in second and third quartiles) and low tier respectively in a three-tier subcategory; 4T1T, 4T2T, 4T3T, 4T4T as the top, second, third and lowest tier respectively in a four-tier subcategory. 4T4T will be dropped in analysis for identification purpose. As to brand cross-selling, I use 3 variables to represent cross-subcategory (INTERSCT), cross-category (INTERCAT) and cross-department (INTERDPT) offerings.

$Marketing_{in}$ stands for marketing mix. It includes 6 variables: national brand deal depth (NBDLDP), national brand deal sales (NBDL), national brand display sales (NBDISP), national brand feature sales (NBFEAT), national brand coupon sales (NBCOUP), and national brand price deal sales (NBPDL).

National Brand Deal Depth (NBDLDP) is calculated as the net percentage off for price deals minus that of the private label.

National Brand Price Deal Sales (NBDL) is calculated as the net percentage of volume sales on any deal minus that of the private label.

National Brand Display Sales (NBDISP) is calculated as the net percentage of volume sales on display minus that of the private label.

National Brand Feature (NBFEAT) is calculated as the net percentage of volume sales on feature minus that of the private label.

National Brand Coupon Sales (NBCOUP) is calculated as the net percentage of volume sales on couponing minus that of the private label.

National Brand Price Deal Sales (NBPDL) is calculated as the net percentage of volume sales on price deal minus that of the private label.

$Consumer_{im}$ stands for consumer characteristics. It has 8 brand level variables which reflect deviation of demographic variables from the sub-category mean: 2 indexes for age groups (AGEY as young female household head with age 18-29, AGEO as elder female household head with age 45-54), 2 indexes for affluence (AFFLL as living by, AFFLH as living well), 2 indexes for education (EDUL less than high school for female household head, EDUH as college and graduate for female household head), 2 indexes

for family size (FSIZES as family size of 1-2, FSIZEB as family size of 5+). There is a similar set of 8 category level variables used as additional control variables.

Each demographic variable is calculated as the dollar index of the branded product for different demographic breaks.

The dollar index for different age breaks provides insights into how the dollar value of the product purchase skews toward or away from various age breaks. A high index value of the consumer characteristics implicates more dollar purchase of the product is made by the households within the demographic break. An index above 115 or greater indicates that significantly more dollar purchase of the product is made by the households within their demographic break. An index below 85 means that the demographic segment purchases significantly less of these products.

$Category_{ip}$ stands for category characteristics. It includes 3 variables: purchase frequency (FREQ), dummy indicator of stockpileability (PILE), and category assortment (ASSORT).

Purchase frequency (FREQ) is calculated as the inverse of the purchase cycle of the product.

Stockpileability (PILE) takes 1 if the product in the category is stockpileable, and 0 otherwise.

Category assortment (ASSORT) is the total number of the brands within the sub-category.

The summary statistics of the variables are listed in Table A46.

4.3.3. Aggregation

Due to brand extension, many of the brands under study have more than one product version. One example is the different versions of Ivory product in laundry detergent, dish detergent, and soap categories (refer to Figure A8 and Figure A9). Under this circumstance, all related variables are aggregated to brand level for the following reasons[2]. First, this study focuses on brand-brand relationship among a firm's brand portfolio. The aggregation at brand level matches the level of effects that I am exploring. Second, at lower level of aggregation, such as performance of brand versions at subcategory level, the measure may be exposed to more product specific or subcategory specific errors (even after including control variables) . The aggregation will, to some extent, even these noises out in a study of brand level effects. Third, if there are brand portfolio related effects (such as a version of the focal brand is affected by products/versions of other brands in terms of the four effects under study) existing at disaggregate level, the aggregation will be unlikely to wipe it out. So aggregation won't affect my detection of the effect if it exists. Lastly, the dataset is sufficiently large to allow aggregation and still maintain a high degree of freedom for estimation.

Weighted average method is used for aggregation. The disaggregated data contain information at subcategory level for each brand version (branded product). The weight used in this process is the subcategory total revenue, which is the sum of the revenue of all branded products in the subcategory. This is to control the category differences in size. If a brand has a version occupying 20% market share in a large subcategory. It sells another version in a small category and seize 80% market share. The large subcategory is

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[2] The model is estimated with disaggregated data, and the results are not as good as with the aggregated one, in terms of the % of total variance explained, and the incremental explanatory contribution that the brand portfolio information brings to the model.

10 times larger in revenue. For example, it makes more sense to put more weight toward 20% of the market share in the large subcategory, because it closely reflects the market share it achieve across all the areas the brand covers.

Then, the model is estimated with ordinary least square method.

4.4. Results

Hereafter, I list the results and their implications.

4.4.1 Model Fit

Table A47 summarizes the model fit statistics. There are 5 proposed models for the 5 different performance measures. The base models are without the key variables related to the different features of the brand portfolio. The results showed that after including the key variables, the model fit improved significantly. The inclusion of the key variables increases the adjusted R-square from 0.290 to 0.348 (increase by 19.99%) for the penetration model, 0.439 to 0.465 (increase by 5.95%) for the share of requirements model, 0.424 to 0.447 (increase by 5.48%) for the market share model, 0.177 to 0.270 (increase by 52.57%) for the price premium model and 0.417 to 0.531 (increase by 27.18%) for the revenue premium model. It also reduces the mean square error from 1.126 to 1.079 for the penetration model, 0.735 to 0.718 for the share of requirements model, 1.209 to 1.185 for the market share model, 0.557 to 0.524 for the price premium model, and 1.491 to 1.338 for the revenue premium model. This confirms the contribution of the proposed variables with regard to brand portfolio management to explaining brand market level performance.

4.4.2. The Effects

The estimates for the key variables are listed in Table A48-A49.

Number of sibling products. The number of brands presenting in the segment, no matter within or cross-category and department will have positive impact on % buy, share of requirements, market share and revenue premium. The justification is drawn from the notion that the size of the brands fortifies consumers' confidence in the products made by the company. Equally importantly, the scales of economy takes place both internally with respect to production, logistics and marketing, and externally as the firm gains channel power in securing support from retailers. In a similar way, the number of brands presenting across categories but within the same department will have positive impact on price premium. In comparison, the number of sibling brands offered in less similar areas (such as across segments) has little to help with the performance of the focal brand (except for the positive cross-segment size effect in penetration model). This might be due to the weak association between brands with little similarity in feature, less synergy created within the company in operating on very different products, and difficulty in negotiating for retailer support across product lines.

Performance spillover. The performance spillover for within category and cross-category offering displays positive interaction for all five performance measures. The performance of the sibling products within the category makes the strongest signal to consumers with regard to the quality level of brands made by the parent firm. The financial rewards generated by the successful siblings can be allocated to fuel the growth of all the firm brands. Moreover, the good performance of parent firm's products in similar area will help to ascertain retailer's confidence and acquire more retailer support

in related areas. These provide a context for explaining the positive spillover. However, brands that are positioned close to each other in similar areas are inevitably competing with each other for the same customers, which is typically featured as cannibalization. Equally important is the fact that all these brands from the parent firm may be rivaling each other for the same resources within the firm and from the retailer. However, these negative effects have been dominated by the synergies created. The positive spillover shows the net effect of possible affect and favorable knowledge transferred from sibling brands and operational gains over the negative effects due to cannibalization and internal rivalry among brands.

Distance effect. When the distance of offering increases, the size effect declines in magnitude for % buy, market share, price premium and revenue premium. Similarly, with increased distance, the performance spillover declines in magnitude, but the overall effect remains positive for the measures of market share and revenue premium for cross-segment offer.

Quality variation. Quality variation has only negative effect on share of requirements, which suggest that loyal customers are still sensitive to quality variation when considering repeat purchase. Quality variation positively affects the % buy and market share probabaly because firms adopt different brand positioning to deal with different competitive situations across categories. These strategies will cause the quality variation (proxied with price positioning variation across different categories in this study), but meanwhile strengthen each brand's competitiveness within each category. This leads to the optimized results for penetration and market share. In the similar token, the impact of quality variation on price premium and revenue premium is positive. This

might be due to the multi-brand firm's proactive brand strategy in coping with private label encroachment. Most national brand manufacturers now think of the store brand as another national brand with improved quality, who targets national brands and became a tough source of competition (see Hoch and Banerji 1993; Hoch 1996; Sayman, Hoch and Raju 2002). In many categories, the store brand generates higher revenue than national brands. In reacting to the huge challenge, national brands are taking aggressive approaches such as formulating a "Me Too" strategy by creating value flankers (reduce quality) and/or distancing by innovating with new and improved product (quality) (Hoch 1996). In either way, as a member of the portfolio, the focal brand is more likely to distinguish itself from the store brand or its "Me Too" fellows, and hold the position as a quality product. This leads to a high price premium. Meanwhile, these tactics increased quality variation of the brands within a firm, which in turn hardly or even negatively impact on the brand market performance against other brands. However, these efforts might be successful in fighting back the attacks from the private labels and end up with a higher revenue performance against store brands than doing nothing. Based on the above arguments, it is reasonable to believe the tailored brand positioning strategy adopted by the firm leads to quality variation, but is likely to fit well the competition situation within each category. Therefore, we see a high penetration, market share, price premium and revenue premium associated with quality variation.

4.4.3. Control Variables

The estimates for control variables are included in Table A50 and Table A51.

4.5. Discussion

For various reasons, there is a paucity in literature to study how brand portfolio decisions affect brand market performance. In comparison, the field weighted heavily toward exploring and summarizing why firms are adopting multi-brand approach. The majority of existing empirical studies on brand performance either focus on individual brand or a few brands, or exclude the influence from the rest of the brand portfolio on the focal brands (e.g. Aaker and Keller 1990; Park, Milberg, and Lawson 1991). This study found material contribution of the information related to brand portfolio management on the performance of individual member brand, including the inter-brand distance, size and performance of sibling brands, and quality variation within the firm's portfolio. This fills the gap in empirical research on the efficacy of various brand portfolio decisions and extends the previous theoretical works in explaining how these decisions exactly affect brand market level performance.

The five market performance measures in study reflect the different aspects of brand strength: penetration, loyalty, market share, price and revenue (Keller and Lehmann 2003, Ferris et al 2006). The elements of brand portfolio management show significantly different patterns of impact on these performance measures. This finding is noteworthy considering firms are setting different objectives for different brands, under different circumstances, and at different stages. Furthermore, in directing brand strategy toward brand market performance, we need to be specific on the goal. If we emphasize on our revenue performance against the generic products, having multiple well-

performing brands within the same department or even the same category will improve the overall revenue premium. Moreover, having more of these siblings with revenue performance within a certain distance helps build more confidence of the focal brand in achieving high revenue premium.

This study found that size, performance, inter-brand distance, and quality variation of the rest of the brand portfolio jointly act on the performance of the member brand. Based on these results, we are able to see the complication of enrolling or pruning brands. The change in portfolio coverage, brand positioning, number of brands and quality variation within the portfolio jointly and simultaneously change the member brand performance. This recapitulates the importance of firms understanding in great detail the effects of brand portfolio decision. Only after firms know what individual decision can accomplish, can they find the optimal strategy to achieve a particular objective.

In addition, this research validates the findings by existing literature on the brand portfolio management. Having sibling brands within the firm can realize in both positive and negative effects on the brand's market performance from both demand and supply side. From a customer's standpoint, the brand associations are often operationalized and manifested through product features (Aaker and Keller 1990, Carpenter et al. 1994, Keller 1993), promotion and advertising (Boulding et al. 1994), packaging (Aaker 1991), and price (Rao and Monroe 1989), and hence reinforced through repeated exposure and consumer learning of the similar quality standard, brand image, marketing mix execution of the brand portfolio. In evaluating a brand, consumers tend to access and diagnose not only information on that specific brand, but also the information on associated products.

Hence, the rest of the brand portfolio signals the quality and service standard and changes consumers' perception on the focal brand. Meanwhile, products with similar usage and functionality, which target the same segment of customers will be likely to cannibalize and negatively impact the performance of each other (Kapferer 1994; Keller 2008; Park, Jaworski, and MacInnis 1986). In the supply channel, the brands from the same manufacturer share internally resources within the firm, including fabrication facilities, research and development, quality control, advertising, promotion, marketing expertise, sales forces, service network, order processing, etc. (Porter 1985, P343), and externally the support from retailers including sorting and assorting, advertising and promotion, communication, physical distribution (transportation and inventory), marketing research implementation, financing, and customer service (maintenance and repair) (Keller 2008, P215). Meanwhile, these brands might compete for the same limited resources. In my empirical study, I found the elements featuring different aspects of brand portfolio management, such as brand distance, size, and performance are associated with member brand market performance. The overall effects of how far the sibling is, how many they are and how well they perform is a combination of all positive/negative effects on both the demand and supply sides. These revealed effects capture the comprehensiveness of all these demand and supply side mechanism in much the same way the extant theories propose.

Moreover, many findings are of substantial practical meaning. In particular, it is found that the performance interaction within the same product area (category and department) is significantly stronger. This stems from the notion that the semantic feature similarity within the same type for product facilitates the transfer of preference of brands

(Aaker and Keller 1990; Boush and Loken 1991) in the presence of potential cannibalization. The manifested strong association among products with functional and attribute similarity shed the light on how we can leverage the brand architecture and marketing strategy to achieve our goals. It is important for brand managers to understand that preference transfer does not occur equally across all products. When firms pass information to consumers by advertising, promotion, corporate message, and public relationship, managers might adapt the communications for specific product segments based on detailed goals to achieve. If Proctor and Gamble is to push the sales for its laundry account (such as Tide, Cheer, Bounce, Gain), an advertisement highlighting dish washing products (Cascade, Dawn, Ivory or Joy) will probably trigger a spillover from dish detergents to laundry detergents because these two series of product are of some commonality and within the same department..

Lastly, in solving everyday problems, statistical heuristics-law of large numbers (Nesbett et al. 1983) provides interpretation on the confidence rendered to large number of offering (Dacin and Smith 2008). Another justification is based on the rationale that the firm with sizable portfolio of brands builds up a strong quality bond among brands and hence is less likely to offer an inferior product to ruin the established affiliation. My empirical results validate the hypothesis and demonstrate a positive association between size of sibling brands and the market performance (share of requirements, market share and price premium) of the target brand. Although my findings show that the number of brand affiliations is likely to help the brand instead of harming it, it does not necessarily imply that managers can expand the brand portfolio infinitely. As the challenge of

managing quality, nurturing the brand associations, and coordinating marketing strategy within the firm rises exponentially with the growing size of the brand portfolio.

4.6. Limitations and Future Research

There are limitations for the current research.

First, although our empirical research was conducted with the grocery setting, we expect our theoretical framework and findings to withstand in other product categories (such as costumes, cosmetics, sports goods, electronics, office supplies, etc.) or even in durable products (e. g. appliances, automobile, furniture, etc.) and services (such as telecommunication, hotel, airline, etc.). The proposed effects may show slightly different pattern or demonstrate with different magnitude. For example, for durables like automobile, the interactions among the brands from the same firm are expected to be stronger for several reasons: First, consumer are more involved in the purchase process and search for thorough information on brands and firm. In doing so, the brand-firm and brand-brand associations get stronger, with more and more linkages being unveiled and inspected by consumer. Second, due to the large number of attributes for durables, the product specific information is not always complete, comparable or comprehensible, and hence cues pertaining to other sibling products/brands and the firm are needed for assessment. Third, the perceived risk is high for durables because any wrong decision will be costly in terms of money, time and psychological emotion. Thus, consumers are inclined to scrutinize all external cues other than the attribute of product itself. Finally, durable products may provide consumers with social symbols, and in turn consumers are inclined to attach values of sibling brands and the firm to the brand in consideration.

Based on these conceptions, future research may expand the study to other product categories, such as durables and services to complement the theory.

Moreover, for the current study, we tested and revealed the overall effects of sibling brands from the parent company on individual member brands, including brand size, performance and distance. Based on the conceptualization, the overall effect is a composite of negative and positive effects covering the domains of demand and supply. However, due to the data availability, we are not able to capture the detailed information to separate these effects. There will be a plethora of rewards if we can take apart all these individual factors and demonstrate their net effects on brand market performance. By achieving this, firm executives will be in a better position to foresee the impact of cross-functional (e.g. inter-department collaboration and resource allocation within the firm) and strategic (e.g. brand portfolio management) decisions on brand performance. In doing so, firms can achieve best return on investment as a result of understanding the market and adopting the optimized strategy.

CHAPTER 5

CONCLUSION

My thesis consists of three independent studies, which center on brand equity and brand performance. All three studies improve our knowledge on brand value creation, and point out the direction for future brand research.

5.1 Achieved Objectives

My thesis use three studies to examine different parts of the relationship within the rich framework of brand value chain. A summary of the comparison is shown in Table A52.

In the first essay, I identify a set of drivers of brand equity and develop a conceptual framework to investigate how brand equity is created and strengthened by determinants such as brand structure and positioning, brand strategy, customer characteristics, category characteristics, and marketing mix. Based on a comprehensive dataset of almost the universe of the U.S. grocery industry, I reveal the linkage between brand equity and its determinants. Among all the brand equity drivers, brand structure and positioning, brand strategy and customer characteristics are first time empirically tested in the literature. In this study, I use revenue premium, a fairly new marketing metric, as the retail level measure of brand equity (Ailawadi, Lehmann, and Neslin 2003), and decompose it into price premium and volume premium. Then, I study the effects of various brand equity drivers on price, volume and revenue premium. I also consider the variation of the effects of brand equity drivers on price, volume and revenue premiums across different types of products. The results show convincing empirical evidence that volume premium prevails over price premium in driving revenue premium. The three sets

of new brand equity drivers under study, i.e. brand structure and positioning, brand strategy and customer characteristics have significant effects on the changes of the brand market performance measured with price, volume and revenue premiums. Low tier brands achieve higher volume and revenue premium than top tier brands. Brand cross-offering over different areas helps brands create synergy and realize higher revenue premium. Young customers and affluent families contribute to higher revenue premium of branded products.

My second essay investigates the association between consumer-based brand equity (IBBE) and brand market performance, as well as the moderators of this association. For this study, I use a comprehensive set of market performance (penetration, loyalty, market share, price and revenue) of 216 major brands sold in the grocery channel in the U.S. The consumer-based brand equity (IBBE) measure is from the EquiTrend$^{©}$ database. I find that consumer-based brand equity provides incremental explanatory power for brand market performance beyond the explanation by the set of performance determinants of brand strategy, marketing mix, customer demographics, and category characteristics, which are revealed and studied in the first essay. In addition, the equity-performance association is influenced by a set of product and category features (such as purchase frequency, stockpileability, and category assortment), as well as brand strategy (portfolio size and brand cross-offering).

In my third essay, I empirically study the effects of firms having multiple brands across different areas on brand performance. Using measures such as penetration, loyalty, market share, price and revenue premium, I model brand market performance as a function of different elements of the firm brand portfolio, the size and performance of

sibling brands, the inter-brand distance, and quality variation (surrogated by price positioning). The dataset covers some 1,700 brands from over 350 firms sold in the grocery stores in the U.S. All measures are aggregated to brand level in case of different branded products (extensions) share the same brand name. It is found that firm level brand portfolio information provides incremental explanatory power for brand market performance beyond the explanation by a comprehensive set of performance determinants of brand strategy, marketing mix, customer demographics, and category characteristics. The results demonstrate the remarkable effectiveness of firms managing products across different areas. The empirical study indicates that the size and the performance of sibling brands from the same firm have significant impact on a focal brand's market performance. These impacts changes with the change of inter-brand distance. Finally, different patterns are detected for these effects across different performance measures.

5.2 Future Research Direction

The topics related to brand equity and brand market level performance have been widely studied in the field. My thesis draws readers' attention to different drivers of brand equity. All three essays fill the gaps in the existing brand literature and add to our understanding on how brand value is created at the retail level. However, there are inevitably limitations which will direct follow-up research.

One limitation for this research is that this thesis only generalizes the findings for the consumer packaged goods (CPG). This is mainly due to the data availability. I expect the theoretical framework and findings to withstand to some extent in other product categories (such as costumes, cosmetics, sports goods, electronics, office supplies, etc.)

or even in durable products (e. g. appliances, automobile, furniture, etc.) and services (such as telecommunication, hotel, airline, etc.). However, due to the specific industry characteristics and consumer purchasing behavior, not all findings from this study can be applied in every other product categories. It relies on future research to empirically examine the theoretical framework and make generalization in other product categories.

Through my empirical studies, I obtained interesting findings that are generalizable for brand management knowledge, especially in the consumer packaged goods industry. However, for some effects, for example, the positive performance spillover between sibling brands within the same brand portfolio, more in-depth examination is worth making to understand the cause of the positive interactions. Specifically, more investigation is needed to reveal whether the overall positive spillover is from the demand side (consumer preference spillover) or from the supply side (manufacturer and retailer synergy creation), or both. Another example is the slightly different patterns of the effects of brand equity drivers on the different brand performance metrics. More efforts should be put to understand what causes the variation in order to compromise the seemingly discrepancies. In one word, more follow-up studies can be done to further investigate and capture the causes of the revealed effects and patterns.

Lastly, with regard to the brand value chain framework, my thesis looks at the retail performance of price, volume sales, revenue, loyalty, penetration, and market share, etc. It leaves out two other, but important considerations. One element is profit. Profit is no doubt a key measure for brand performance, which is by all means as important as (if not more important than) the above performance metrics. However, due to the limitation of data availability (mainly cost information), profit can't be computed in my studies so

far. In the future, it will be desirable if cost information can be obtained and the profitability of brand be investigated thoroughly in this context. The other missing link is between some of the brand equity drivers and firm financial performance. This is highly relevant to firms owning a number of brands. My thesis emphasizes on the retail level performance and neglects the firm financials behind the individual brand performance. It will be meaningful for marketing managers to know how their decisions are directly or indirectly converted to firm financial performance. This is a more convincing way to show the effectiveness of marketing investment. Therefore, extending the current modeling framework to firm financial metrics is another direction for future studies on similar topics.

APPENDIX

WEIGHING OBSERVATIONS

Assume we have i=1,…, n brands, and for each brand i, we have

(A1) $Y_i = X_i\beta + \varepsilon_i \quad \varepsilon_i \sim N(0, \sigma^2)$

Y is the performance measure and X is the vector of predictors for Y. This means that if we study brand level drivers for brand performance, it is reasonable to believe that after controlling all the observed information, the residual is i.i.d.

Due to the brand extension, a brand may have multiple versions. Hence, at the level of brand versions, for each version j of brand i,

(A2) $Y_{ij} = X_{ij}\beta + \varepsilon_{ij} \quad \varepsilon_{ij} \sim N(0, \sigma_{ij}^2)$

To get the overall performance and predictors for brand i, one approach is to use weighted average[3] based on (money) sales of each brand for both independent and dependent variables.

(A3) $Y_i = \sum_J \frac{Sale_{ij}}{\sum_J Sale_{ij}} Y_{ij}$ and $X_i = \sum_J \frac{Sale_{ij}}{\sum_J Sale_{ij}} X_{ij}$

From the above, we have

(A4) $Y_i = X_i\beta + \varepsilon_i = \sum_J \frac{Sale_{ij}}{\sum_J Sale_{ij}} X_{ij} + \sum_J \frac{Sale_{ij}}{\sum_J Sale_{ij}} \varepsilon_{ij}$

(A5) $\varepsilon_i = \sum_J \frac{Sale_{ij}}{\sum_J Sale_{ij}} \varepsilon_{ij}$

However, the aggregation will reduce sample size and lose information. Therefore, it is better off to build models at brand version level with weighted regression when sample size is a concern.

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[3] To get control for category size, we may opt to use the category revenue with weight as $\frac{Category\ Revenue_{ic_j}}{\sum_J Sale_{ic_j}}$, c_j being the category for version j of brand i.

Alternative 1: Assign the weight to each brand version of a brand as proportionate to its sales over the total brand sales, i.e. $\frac{Sale_{ij}}{\sum_J Sale_{ij}}$.

Take a brand j (j=1, 2, …, J) with $Sale_{ij}$ and assume all other brands are equivalent to brand version j (including sales, predictability of independent variables, distribution of residual, etc.). It is equivalent to have $m = \frac{\sum_J Sale_{ij}}{Sale_{ij}}$ (generalizable to indivisible case) number of identical j version of the brand.

Thus, we assume residuals of different versions of a brand are not i.i.d. i.e.

$$\varepsilon_{ij} \sim N(0, \sigma_{ij}{}^2),\ \varepsilon_{ik} \sim N(0, \sigma_{ik}{}^2) \text{ with } \sigma_{ij}{}^2 \neq \sigma_{ik}{}^2 \text{ and } j, k, \dots \in (1, 2, \dots, J)$$

and

(A6) $Var(\varepsilon_i) = \frac{1}{m} Var(\varepsilon_{ij}) = \frac{Sale_{ij}}{\sum_J Sale_{ij}} Var(\varepsilon_{ij})$

Therefore, if we want to have model with observations at the level of brand versions, to make the error terms i.i.d. across observations, we may use $\frac{Sale_{ij}}{\sum_J Sale_{ij}}$ as the weight in the regression to solve the problem of heteroskedasticity.

As such, in generalizing the above derivation, I suggest that for each brand version j, we use the ratio of a brand version's sales over the total sales of all versions of that brand, i.e. $\frac{Sale_{ij}}{\sum_J Sale_{ij}}$ as the weight for the weighted regression.

By doing so, for each brand, the total weights for all of its versions add up to 1. The weight of each brand version among the different versions of that brand is proportionate to its sales. In this way, we assign more weight to those brand versions with more sales (importance), and keep the balance of weight at brand level (all equal to 1). This makes good statistical and heuristic sense.

Furthermore, extending the idea of giving more weight to the brand version with high sales, albeit restricting the weight of any brand version to be no larger than 1. I develop

Alternative 2: Assign the weight to each brand version of a brand as proportionate to its squared sales over the total squared sales of all versions, i.e. $\frac{Sale_{ij}^2}{\sum_J Sale_{ij}^2}$.

In this set up, the brand version with large sales gets a higher weight than in alternative 1, and the weights for all versions of a brand still add up to 1. In another word, a brand version never gets a weight higher than 1, and it achieves 1 when there is only one version for that brand.

Table A1
Fit Statistics (Essay One)

Variable Description	N	Miss	Mean	Std Dev	Minimum	Median	Maximum
Log Price Premium	17175	0	0.337	0.501	-0.553	0.292	1.416
Log Volume Premium	17175	0	-1.982	2.066	-8.154	-2.018	4.906
Year 99 Dummy	17175	0	0.307	0.461	0.000	0.000	1.000
Year 00 Dummy	17175	0	0.383	0.486	0.000	0.000	1.000
Perchase Frequency	17175	0	0.015	0.022	0.004	0.012	0.210
Stockpileable	17175	0	0.244	0.430	0.000	0.000	1.000
Category assortment	17175	0	26.453	23.060	3.000	20.000	123.000
Brand Variation	17175	0	1.420	1.510	1.000	1.000	45.000
Hi -Two Tier	17175	0	0.014	0.118	0.000	0.000	1.000
Lo-Two Tier	17175	0	0.037	0.190	0.000	0.000	1.000
Super Premium-Three Tier	17175	0	0.041	0.197	0.000	0.000	1.000
Premium-Three Tier	17175	0	0.015	0.122	0.000	0.000	1.000
Everyday-Three Tier	17175	0	0.040	0.196	0.000	0.000	1.000
Value-ThreeTier	17175	0	0.151	0.358	0.000	0.000	1.000
Super Premium-Four Tier	17175	0	0.087	0.282	0.000	0.000	1.000
Premium-Four Tier	17175	0	0.114	0.317	0.000	0.000	1.000
Everyday-Four Tier	17175	0	0.203	0.402	0.000	0.000	1.000
Brand Size	17175	0	17.049	28.703	1.000	2.000	117.000
Multi-subcategory Offering	17175	0	0.828	0.378	0.000	1.000	1.000
Multi-category Offering	17175	0	0.722	0.448	0.000	1.000	1.000
Multi-dept offering	17175	0	0.356	0.479	0.000	0.000	1.000
Deal Depth	17175	0	-0.029	0.102	-0.487	-0.026	0.648
Price Deal Sales	17175	0	-0.019	0.170	-0.625	-0.017	0.725
Display Sales	17175	0	-0.006	0.079	-0.592	-0.011	0.705
Feature Sales	17175	0	-0.021	0.119	-0.554	-0.025	0.789
Coupon Sales	17175	0	0.020	0.039	-0.018	0.000	0.408
Price Reduction Sales	17175	0	-0.005	0.083	-0.548	-0.008	0.629
Young	17175	0	-4.095	40.164	-175.698	-4.474	319.451
Old	17175	0	1.253	23.569	-126.930	0.079	200.825
Just Educated	17175	0	6.229	73.374	-221.881	-5.856	1113.660
Well Educated	17175	0	-1.569	23.120	-140.277	-1.618	129.488
Getting By	17175	0	3.255	22.435	-73.513	0.773	150.387
Affluent	17175	0	-3.282	27.199	-145.104	-2.246	167.308
Single Family	17175	0	0.928	15.248	-89.983	0.363	92.897
Large Family	17175	0	0.454	41.116	-169.071	-1.139	262.703
Young (Category)	17175	0	95.968	26.949	13.453	93.090	268.143
Old (Category)	17175	0	105.848	9.689	43.862	105.522	169.436
Just Educated (Category)	17175	0	95.744	22.245	19.507	94.901	268.585

Table A1-continued

Well Educated (Category)	17175	0	98.444	10.859	45.103	98.205	152.638
Getting By (Category)	17175	0	93.623	9.587	49.562	93.503	139.549
Affluent (Category)	17175	0	106.384	12.168	54.567	105.579	180.415
Single Family (Category)	17175	0	86.774	12.040	20.606	87.640	133.754
Large Family (Category)	17175	0	125.504	27.732	35.487	122.749	274.221

Table A2
Model Fit (Essay One)

Model	-2Log (Likelihood)	AIC	BIC	Residual
Volume Premium				
With Department Differences	61913	61992.7	61995.8	2.0534
Without Department Differences	65050	65051.6	65059.3	2.5443
Price Premium				
With Department Differences	19323	19450.6	19455.6	0.1754
Without Department Differences	21234	21235.9	21243.7	0.1978

Table A3
Effects of Brand Structure: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Category Assortment	0.0034 **	-0.0013	-0.0007	0.0009	-0.0003
Brand Variation	-0.0048	0.0076	0.0026	-0.0068	0.0096
Volume Premium					
Category Assortment	0.0128 ***	-0.0080 **	-0.0057	0.0103 ***	-0.0412 ***
Brand Variation	0.0537	0.0948	0.1466 *	-0.2629 ***	0.4499 ***
Revenue Premium					
Category Assortment	0.0162	-0.0093	-0.0063	0.0112	-0.0415
Brand Variation	0.0489	0.1024	0.1492	-0.2697	0.4595

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A4
Effects of Brand Structure: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Category Assortment	-0.0008	-0.0044 **	0.0064 ***	-0.0033 **	-0.0003
Brand Variation	-0.0118	0.0128	-0.0188 **	0.0190 **	0.0096
Volume Premium					
Category Assortment	-0.0074 *	-0.0046	-0.0005	0.0029	-0.0412 ***
Brand Variation	-0.0561	0.0626	-0.0379	-0.0007	0.4499 ***
Revenue Premium					
Category Assortment	-0.0082	-0.0090	0.0059	-0.0004	-0.0415
Brand Variation	-0.0679	0.0755	-0.0566	0.0183	0.4595

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A5
Effects of Brand Structure: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Category Assortment	0.0031 ***	-0.0016 ***	-0.0010	0.0006 **	-0.0003
Brand Variation	0.0048	0.0172 *	0.0123	0.0028	0.0096
Volume Premium					
Category Assortment	-0.0283 ***	-0.0491 ***	-0.0469 ***	-0.0309 ***	-0.0412 ***
Brand Variation	0.5036 ***	0.5446 ***	0.5965 ***	0.1869 ***	0.4499 ***
Revenue Premium					
Category Assortment	-0.0253	-0.0508	-0.0478	-0.0303	-0.0415
Brand Variation	0.5084	0.5618	0.6088	0.1897	0.4595

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A6
Effects of Brand Structure: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Category Assortment	-0.0011	-0.0047 ***	0.0061 ***	-0.0036 ***	-0.0003
Brand Variation	-0.0022	0.0225 **	-0.0091	0.0286 ***	0.0096
Volume Premium					
Category Assortment	-0.0486 ***	-0.0458 ***	-0.0417 ***	-0.0383 ***	-0.0412 ***
Brand Variation	0.3938 ***	0.5125 ***	0.4120 ***	0.4491 ***	0.4499 ***
Revenue Premium					
Category Assortment	-0.0497	-0.0505	-0.0356	-0.0419	-0.0415
Brand Variation	0.3917	0.5350	0.4029	0.4777	0.4595

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A7
Effects of Brand Positioning: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Volume Premium					
2T1T	NA	0.7997 *	-0.2134	-0.5418	-0.6501 *
2T4T	NA	0.5924 **	-0.0036	-0.5146 **	0.2107
3T1T	0.4494	0.9180 ***	-0.6130	0.3549	-0.8021 ***
3T2T	-0.2063	1.4551 ***	NA	0.3838	-0.3804
3T3T	0.0135	0.1687	-0.0463	0.1734	-0.6050 ***
3T4T	-0.1774	0.1235	-0.2061	0.1394	-0.1129
4T1T	0.0191	0.0615	-0.0187	-0.1059	-0.8547 ***
4T2T	0.0187	-0.0250	0.0935	-0.1442 **	-0.5538 ***
4T3T	0.1114	-0.0154	0.0847	-0.1861 **	-0.3248 ***

Note:　　* p<.10;　** p<.05;　*** p<.01.

Table A8
Effects of Brand Positioning: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Volume Premium					
2T1T	0.5778	0.2173	0.3255	-1.1652 ***	-0.6501 *
2T4T	0.3492	-0.1080	-0.3250	0.0096	0.2107
3T1T	-0.3965	-0.3707	-0.3272	-0.0149	-0.8021 ***
3T2T	-0.5259	-0.2893	-0.3391	-0.4783	-0.3804
3T3T	-0.2886	0.0408	-0.2162	0.1548	-0.6050 ***
3T4T	-0.4131 ***	0.2586 *	-0.0142	0.2893 **	-0.1129
4T1T	-0.0055	-0.0388	0.0912	-0.0029	-0.8547 ***
4T2T	0.0595	-0.0536	0.0421	0.0090	-0.5538 ***
4T3T	0.1991 *	-0.0664	-0.2768 ***	0.1497	-0.3248 ***

Note: * $p<.10$;   ** $p<.05$;   *** $p<.01$.

Table A9
Effects of Brand Positioning: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Volume Premium					
2T1T	NA	0.1496	-0.8635	-1.1919 ***	-0.6501 *
2T4T	NA	0.8031 ***	0.2071	-0.3039 ***	0.2107
3T1T	-0.3527	0.1159	-1.4151 ***	-0.4473 ***	-0.8021 ***
3T2T	-0.5867 **	1.0747 ***	NA	0.0034	-0.3804
3T3T	-0.5915 ***	-0.4363 ***	-0.6513 ***	-0.4316 ***	-0.6050 ***
3T4T	-0.2903 *	0.0106	-0.3190 *	0.0264	-0.1129
4T1T	-0.8356 ***	-0.7932 ***	-0.8735 ***	-0.9607 ***	-0.8547 ***
4T2T	-0.5351 ***	-0.5788 ***	-0.4603 ***	-0.6979 ***	-0.5538 ***
4T3T	-0.2135 **	-0.3403 ***	-0.2402 **	-0.5110 ***	-0.3248 ***

Note: * p<.10; ** p<.05; *** p<.01.

Table A10
Effects of Brand Positioning: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Volume Premium					
2T1T	-0.0723	-0.4328	-0.3246	-1.8153 ***	-0.6501 *
2T4T	0.5599 ***	0.1027	-0.1143	0.2203	0.2107
3T1T	-1.1986 ***	-1.1728 ***	-1.1293 ***	-0.8170 ***	-0.8021 ***
3T2T	-0.9063 ***	-0.6697	-0.7195 ***	-0.8587 ***	-0.3804
3T3T	-0.8936 ***	-0.5642 ***	-0.8212 ***	-0.4503 ***	-0.6050 ***
3T4T	-0.5260 ***	0.1456	-0.1271	0.1763 *	-0.1129
4T1T	-0.8602 ***	-0.8935 ***	-0.7635 ***	-0.8576 ***	-0.8547 ***
4T2T	-0.4942 ***	-0.6074 ***	-0.5117 ***	-0.5447 ***	-0.5538 ***
4T3T	-0.1257	-0.3913 ***	-0.6016 ***	-0.1752 **	-0.3248 ***

Note: * p<.10; ** p<.05; *** p<.01.

Table A11
Effects of Brand Strategy: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Brand Size	0.0002	-0.0001	-0.0002	0.0003	0.0010 ***
Multi-subcategory Offering	-0.0136	-0.0593	-0.0548	0.0417	-0.0046
Multi-category Offering	0.0412	0.0025	-0.0079	-0.0691 ***	-0.0113
Multi-dept offering	0.0000	0.0000	0.0000	0.0000	0.0266 ***
Volume Premium					
Brand Size	-0.0004	-0.0009	-0.0012	0.0004	0.0075 ***
Multi-subcategory Offering	0.0664	-0.2076	-0.0480	0.1992 **	0.2215 **
Multi-category Offering	0.1106	-0.0842	-0.0752	0.2427 **	-0.0458
Multi-dept offering	-0.0121	0.1624 *	0.1392	-0.1018	0.3251 ***
Revenue Premium					
Brand Size	-0.0001	-0.0010	-0.0015	0.0008	0.0085
Multi-subcategory Offering	0.0528	-0.2669	-0.1028	0.2408	0.2170
Multi-category Offering	0.1518	-0.0818	-0.0831	0.1736	-0.0571
Multi-dept offering	-0.0121	0.1624	0.1392	-0.1018	0.3517

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The first two sections include the incremental effect of each cross-offering strategy on log transformed price premium and volume premium.

Note: The third section includes the calculated incremental effect of each brand strategy on the log transformed revenue premium.

Table A12
Effects of Brand Strategy: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Brand Size	-0.0001	0.0005	-0.0011 ***	0.0005	0.0010 ***
Multi-subcategory Offering	0.0193	0.0917 **	-0.0144	-0.0107	-0.0046
Multi-category Offering	0.0113	-0.0087	-0.0143	0.0450	-0.0113
Multi-dept offering	0.0000	0.0000	0.0000	0.0000	0.0266 ***
Volume Premium					
Brand Size	-0.0023	-0.0020	0.0058 ***	0.0007	0.0075 ***
Multi-subcategory Offering	0.0191	0.0554	-0.0798	-0.0047	0.2215 **
Multi-category Offering	0.0278	0.0950	-0.0235	-0.2931 ***	-0.0458
Multi-dept offering	-0.1140	0.1417	-0.2420 **	0.0266	0.3251 ***
Revenue Premium					
Brand Size	-0.0024	-0.0016	0.0047	0.0012	0.0085
Multi-subcategory Offering	0.0385	0.1471	-0.0942	-0.0153	0.2170
Multi-category Offering	0.0391	0.0863	-0.0377	-0.2482	-0.0571
Multi-dept offering	-0.1140	0.1417	-0.2420	0.0266	0.3517

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The first two sections include the incremental effect of each cross-offering strategy on log transformed price premium and volume premium.

Note: The third section includes the calculated incremental effect of each brand strategy on the log transformed revenue premium.

Table A13
Effects of Brand Strategy: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Brand Size	0.0012 **	0.0009 ***	0.0007	0.0013 ***	0.0010 ***
Multi-subcategory Offering	-0.0182	-0.0639	-0.0594	0.0371 **	-0.0046
Multi-category Offering	0.0298	-0.0089	-0.0193	-0.0804 ***	-0.0113
Multi-dept offering	0.0266 ***	0.0266 ***	0.0266 ***	0.0266 ***	0.0266 ***
Volume Premium					
Brand Size	0.0071 ***	0.0066 ***	0.0063 ***	0.0079 ***	0.0075 ***
Multi-subcategory Offering	0.2879 **	0.0140	0.1736	0.4207 ***	0.2215 **
Multi-category Offering	0.0648	-0.1300	-0.1209	0.1969 ***	-0.0458
Multi-dept offering	0.3130 ***	0.4875 ***	0.4643 ***	0.2234 ***	0.3251 ***
Revenue Premium					
Brand Size	0.0083	0.0075	0.0070	0.0092	0.0085
Multi-subcategory Offering	0.2697	-0.0499	0.1142	0.4578	0.2170
Multi-category Offering	0.0947	-0.1389	-0.1402	0.1165	-0.0571
Multi-dept offering	0.3396	0.5141	0.4909	0.2500	0.3517

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The first two sections include the incremental effect of each cross-offering strategy on log transformed price premium and volume premium.

Note: The third section includes the calculated incremental effect of each brand strategy on the log transformed revenue premium.

Table A14
Effects of Brand Strategy: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Brand Size	0.0009 ***	0.0015 **	-0.0001	0.0015 ***	0.0010 ***
Multi-subcategory Offering	0.0148	0.0871 **	-0.0190	-0.0152	-0.0046
Multi-category Offering	0.0000	-0.0200	-0.0256	0.0337	-0.0113
Multi-dept offering	0.0266 ***	0.0266 ***	0.0266 ***	0.0266 ***	0.0266 ***
Volume Premium					
Brand Size	0.0051 ***	0.0055 *	0.0133 ***	0.0082 ***	0.0075 ***
Multi-subcategory Offering	0.2407	0.2769 *	0.1417	0.2169 **	0.2215 **
Multi-category Offering	-0.0180	0.0492	-0.0692	-0.3389 ***	-0.0458
Multi-dept offering	0.2111	0.4669 ***	0.0831	0.3517 ***	0.3251 ***
Revenue Premium					
Brand Size	0.0061	0.0069	0.0131	0.0096	0.0085
Multi-subcategory Offering	0.2555	0.3640	0.1227	0.2017	0.2170
Multi-category Offering	-0.0180	0.0292	-0.0948	-0.3053	-0.0571
Multi-dept offering	0.2377	0.4935	0.1097	0.3783	0.3517

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The first two sections include the incremental effect of each cross-offering strategy on log transformed price premium and volume premium.

Note: The third section includes the calculated incremental effect of each brand strategy on the log transformed revenue premium.

Table A15
Effects of Brand Strategy: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Brand Size	$1.00	$1.00	$1.00	$1.00	$1.00
Multi-subcategory Offering	$0.98	$0.94	$0.94	$1.04	$1.00
Multi-category Offering	$1.01	$0.93	$0.92	$0.96	$0.98
Multi-dept offering	$1.04	$0.95	$0.95	$0.98	$1.01
Volume Premium					
Brand Size	101	101	101	101	101
Multi-subcategory Offering	133	101	119	152	125
Multi-category Offering	142	89	105	185	119
Multi-dept offering	195	145	168	232	165
Revenue Premium					
Brand Size	$100.84	$100.75	$100.70	$100.93	$100.85
Multi-subcategory Offering	$130.96	$ 95.13	$112.10	$158.06	$124.23
Multi-category Offering	$143.97	$ 82.80	$ 97.44	$177.59	$117.34
Multi-dept offering	$202.19	$138.45	$159.20	$228.03	$166.80

Note: The first section is the resulted price for multi-dept offering when the baseline strategy of no extension has a price of $1.00.

Note: The second section is the resulted volume of sales for multi-dept offering when the baseline strategy of no extension has a volume of 100.

Note: The last section is the resulted revenue for each brand strategy when the baseline strategy of no extension has a revenue of $100.

Table A16
Effects of Brand Strategy: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Brand Size	$1.00	$1.00	$1.00	$1.00	$1.00
Multi-subcategory Offering	$1.01	$1.09	$0.98	$0.98	$1.00
Multi-category Offering	$1.01	$1.07	$0.96	$1.02	$0.98
Multi-dept offering	$1.04	$1.10	$0.98	$1.05	$1.01
Volume Premium					
Brand Size	101	101	101	101	101
Multi-subcategory Offering	127	132	115	124	125
Multi-category Offering	125	139	108	89	119
Multi-dept offering	154	221	117	126	165
Revenue Premium					
Brand Size	$100.61	$100.69	$101.32	$100.97	$100.85
Multi-subcategory Offering	$129.10	$143.91	$113.06	$122.34	$124.23
Multi-category Offering	$126.80	$148.17	$102.83	$ 90.16	$117.34
Multi-dept offering	$160.83	$242.70	$114.76	$131.61	$166.80

Note: The first section is the resulted price for multi-dept offering when the baseline strategy of no extension has a price of $1.00.

Note: The second section is the resulted volume of sales for multi-dept offering when the baseline strategy of no extension has a volume of 100.

Note: The last section is the resulted revenue for each brand strategy when the baseline strategy of no extension has a revenue of $100.

Table A17
Control of Category Level Consumer Characteristics: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Young (Category)	0.0024	-0.0030 *	0.0011	0.0023	0.0017
Old (Category)	-0.0012	0.0028 *	-0.0013	0.0008	0.0004
Just Educated (Category)	-0.0014	-0.0006	-0.0020 *	0.0000	-0.0001
Well Educated (Category)	0.0000	0.0000	0.0000	0.0000	0.0010
Getting By (Category)	-0.0021	0.0004	-0.0004	0.0044 *	0.0067 ***
Affluent (Category)	0.0020	-0.0045 *	-0.0001	0.0035	0.0078 ***
Single Family (Category)	0.0008	-0.0018	-0.0037	0.0076 ***	0.0012
Large Family (Category)	-0.0013	0.0014	0.0012	0.0028 ***	-0.0008
Volume Premium					
Young (Category)	0.0285 **	-0.0108	-0.0336 ***	-0.0184 **	0.0041
Old (Category)	-0.0094	0.0038	0.0063	0.0048	0.0223 ***
Just Educated (Category)	-0.0017	0.0112 ***	-0.0039	0.0004	-0.0003
Well Educated (Category)	0.0121	0.0050	-0.0086	0.0189 **	-0.0001
Getting By (Category)	0.0151	-0.0014	-0.0302	0.0003	0.0136
Affluent (Category)	-0.0244	0.0262 **	0.0033	-0.0179 *	-0.0002
Single Family (Category)	0.0098	0.0193	-0.0173	-0.0686 ***	0.0004
Large Family (Category)	-0.0068	0.0136 *	0.0200 **	-0.0160 ***	0.0047

Note: * p<.10; ** p<.05; *** p<.01

Table A18
Control of Category Level Consumer Characteristics: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Young (Category)	-0.0049 ***	0.0070 ***	-0.0028 *	-0.0021	0.0017
Old (Category)	-0.0009	0.0029 *	-0.0015	-0.0015	0.0004
Just Educated (Category)	0.0008	0.0029 **	-0.0009	0.0013	-0.0001
Well Educated (Category)	0.0000	0.0000	0.0000	0.0000	0.0010
Getting By (Category)	-0.0011	0.0027	-0.0046 *	0.0008	0.0067 ***
Affluent (Category)	0.0031	-0.0036	-0.0056 **	0.0054 **	0.0078 ***
Single Family (Category)	-0.0030	0.0062 *	-0.0048 *	-0.0014	0.0012
Large Family (Category)	0.0020	-0.0012	-0.0028 **	-0.0021	-0.0008
Volume Premium					
Young (Category)	0.0416 ***	-0.0120	0.0091	-0.0043	0.0041
Old (Category)	0.0165 **	-0.0106	0.0027	-0.0140 **	0.0223 ***
Just Educated (Category)	0.0011	-0.0093 **	0.0034	-0.0013	-0.0003
Well Educated (Category)	-0.0302 ***	-0.0070	0.0041	0.0057	-0.0001
Getting By (Category)	-0.0177	-0.0221	0.0023	0.0536 ***	0.0136
Affluent (Category)	-0.0020	-0.0059	0.0202 *	0.0004	-0.0002
Single Family (Category)	0.0438 **	-0.0086	0.0347 **	-0.0131	0.0004
Large Family (Category)	-0.0021	-0.0112	0.0108 *	-0.0082	0.0047

Note: * $p<.10$; ** $p<.05$; *** $p<.01$

Table A19
Control of Category Level Consumer Characteristics: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Young (Category)	0.0041 *	-0.0013	0.0028 **	0.0041 ***	0.0017
Old (Category)	-0.0008	0.0032 **	-0.0009	0.0012 *	0.0004
Just Educated (Category)	-0.0015	-0.0008	-0.0021 *	-0.0001	-0.0001
Well Educated (Category)	0.0010	0.0010	0.0010	0.0010	0.0010
Getting By (Category)	0.0046	0.0072 ***	0.0064 *	0.0111 ***	0.0067 ***
Affluent (Category)	0.0098 ***	0.0033	0.0076 **	0.0113 ***	0.0078 ***
Single Family (Category)	0.0020	-0.0007	-0.0025	0.0088 ***	0.0012
Large Family (Category)	-0.0021	0.0006	0.0004	0.0020 ***	-0.0008
Volume Premium					
Young (Category)	0.0326 ***	-0.0067 *	-0.0295 ***	-0.0143 ***	0.0041
Old (Category)	0.0129	0.0261 ***	0.0286 ***	0.0271 ***	0.0223 ***
Just Educated (Category)	-0.0020	0.0109 ***	-0.0042	0.0001	-0.0003
Well Educated (Category)	0.0120	0.0049	-0.0087	0.0188 ***	-0.0001
Getting By (Category)	0.0288	0.0122	-0.0166	0.0139 **	0.0136
Affluent (Category)	-0.0246	0.0260 ***	0.0030	-0.0181 ***	-0.0002
Single Family (Category)	0.0102	0.0197	-0.0170	-0.0683 ***	0.0004
Large Family (Category)	-0.0021	0.0183 ***	0.0247 ***	-0.0113 ***	0.0047

Note: * $p<.10$; ** $p<.05$; *** $p<.01$.

Table A20
Control of Category Level Consumer Characteristics: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Young (Category)	-0.0031 ***	0.0088 ***	-0.0010 **	-0.0004	0.0017
Old (Category)	-0.0005	0.0033 *	-0.0011	-0.0011	0.0004
Just Educated (Category)	0.0007	0.0028 **	-0.0010 **	0.0012 **	-0.0001
Well Educated (Category)	0.0010	0.0010	0.0010	0.0010	0.0010
Getting By (Category)	0.0057 *	0.0094 ***	0.0021	0.0075 ***	0.0067 ***
Affluent (Category)	0.0109 ***	0.0042	0.0022	0.0132 ***	0.0078 ***
Single Family (Category)	-0.0019	0.0074 **	-0.0036 *	-0.0002	0.0012
Large Family (Category)	0.0012	-0.0020	-0.0036 ***	-0.0029 **	-0.0008
Volume Premium					
Young (Category)	0.0457 ***	-0.0079 **	0.0133 ***	-0.0002	0.0041
Old (Category)	0.0387 ***	0.0117	0.0250 ***	0.0083 **	0.0223 ***
Just Educated (Category)	0.0009	-0.0096 **	0.0031 *	-0.0016	-0.0003
Well Educated (Category)	-0.0303 ***	-0.0071	0.0040	0.0056	-0.0001
Getting By (Category)	-0.0041	-0.0085	0.0160 *	0.0672 ***	0.0136
Affluent (Category)	-0.0022	-0.0062	0.0199 **	0.0002	-0.0002
Single Family (Category)	0.0442 ***	-0.0082	0.0351 ***	-0.0127	0.0004
Large Family (Category)	0.0026	-0.0065	0.0155 ***	-0.0034	0.0047

Note: * $p<.10$; ** $p<.05$; *** $p<.01$.

Table A21
Effects of Brand Level Consumer Characteristics: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Young	-0.0001	0.0000	-0.0003	0.0004 **	0.0002
Old	-0.0004	-0.0001	0.0001	-0.0006	0.0005
Just Educated	-0.0001	-0.0001	0.0000	-0.0002 **	-0.0001 *
Well Educated	0.0001	0.0006	-0.0001	0.0016 ***	0.0009 **
Getting By	-0.0010	0.0023 **	-0.0009	0.0009	-0.0016 **
Affluent	-0.0016 *	-0.0002	0.0006	0.0001	0.0045 ***
Single Family	0.0000	0.0000	0.0000	0.0000	0.0019 ***
Large Family	0.0003	0.0000	-0.0002	0.0003	-0.0016 ***
Volume Premium					
Young	-0.0003	0.0001	0.0002	0.0016 **	0.0018 ***
Old	0.0000	0.0001	0.0000	0.0000	-0.0019 ***
Just Educated	0.0000	0.0000	0.0000	0.0000	-0.0001
Well Educated	-0.0003	-0.0007	0.0000	-0.0034 **	-0.0025 **
Getting By	0.0000	0.0000	0.0000	0.0000	-0.0042 ***
Affluent	-0.0001	-0.0010	-0.0011	0.0019 *	0.0006
Single Family	0.0007	-0.0008	-0.0002	-0.0011	-0.0035 **
Large Family	0.0000	0.0000	0.0000	0.0000	-0.0018 ***
Revenue Premium					
Young	-0.0004	0.0001	-0.0002	0.0020	0.0020
Old	-0.0004	0.0000	0.0001	-0.0006	-0.0014
Just Educated	-0.0001	-0.0001	0.0000	-0.0002	-0.0002
Well Educated	-0.0002	-0.0001	-0.0002	-0.0018	-0.0015
Getting By	-0.0010	0.0023	-0.0009	0.0009	-0.0058
Affluent	-0.0017	-0.0012	-0.0005	0.0020	0.0051
Single Family	0.0007	-0.0008	-0.0002	-0.0011	-0.0015
Large Family	0.0003	0.0000	-0.0002	0.0003	-0.0034

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A22
Effects of Brand Level Consumer Characteristics: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Young	0.0003	0.0000	-0.0003	-0.0001	0.0002
Old	-0.0002	0.0024 ***	-0.0004	-0.0007	0.0005
Just Educated	0.0000	0.0001	0.0002	0.0000	-0.0001 *
Well Educated	-0.0005	-0.0021 ***	0.0004	0.0000	0.0009 **
Getting By	-0.0001	-0.0017 *	0.0011	-0.0004	-0.0016 **
Affluent	0.0004	-0.0020 *	0.0033 ***	-0.0005	0.0045 ***
Single Family	0.0000	0.0000	0.0000	0.0000	0.0019 ***
Large Family	0.0003	-0.0004	-0.0005 **	0.0002	-0.0016 ***
Volume Premium					
Young	0.0003	-0.0001	-0.0011	-0.0006	0.0018 ***
Old	0.0000	0.0000	0.0002	-0.0002	-0.0019 ***
Just Educated	0.0000	0.0000	0.0000	0.0000	-0.0001
Well Educated	0.0019	0.0007	-0.0014	0.0032 *	-0.0025 **
Getting By	0.0000	0.0000	0.0000	0.0000	-0.0042 ***
Affluent	0.0004	0.0002	-0.0022	0.0019	0.0006
Single Family	-0.0001	-0.0008	0.0009	0.0013	-0.0035 **
Large Family	0.0000	0.0000	0.0000	0.0000	-0.0018 ***
Revenue Premium					
Young	0.0006	-0.0001	-0.0014	-0.0007	0.0020
Old	-0.0002	0.0024	-0.0002	-0.0009	-0.0014
Just Educated	0.0000	0.0001	0.0002	0.0000	-0.0002
Well Educated	0.0014	-0.0014	-0.0009	0.0032	-0.0015
Getting By	-0.0001	-0.0017	0.0011	-0.0004	-0.0058
Affluent	0.0008	-0.0017	0.0011	0.0014	0.0051
Single Family	-0.0001	-0.0007	0.0010	0.0014	-0.0015
Large Family	0.0003	-0.0004	-0.0005	0.0002	-0.0034

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A23
Effects of Brand Level Consumer Characteristics: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Young	0.0001	0.0002	-0.0001	0.0006 ***	0.0002
Old	0.0001	0.0004	0.0006	0.0000	0.0005
Just Educated	-0.0002	-0.0002	-0.0001	-0.0003 ***	-0.0001 *
Well Educated	0.0010	0.0016 ***	0.0008	0.0025 ***	0.0009 **
Getting By	-0.0026 ***	0.0007	-0.0025 **	-0.0007	-0.0016 **
Affluent	0.0029 ***	0.0043 ***	0.0052 ***	0.0046 ***	0.0045 ***
Single Family	0.0019 ***	0.0019 ***	0.0019 ***	0.0019 ***	0.0019 ***
Large Family	-0.0013 ***	-0.0016 ***	-0.0018 ***	-0.0013 ***	-0.0016 ***
Volume Premium					
Young	0.0015 *	0.0019 ***	0.0019 **	0.0033 ***	0.0018 ***
Old	-0.0019 ***	-0.0019 ***	-0.0019 ***	-0.0020 ***	-0.0019 ***
Just Educated	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
Well Educated	-0.0028	-0.0032 **	-0.0025	-0.0058 ***	-0.0025 **
Getting By	-0.0042 ***	-0.0042 ***	-0.0042 ***	-0.0042 ***	-0.0042 ***
Affluent	0.0005	-0.0004	-0.0005	0.0025 **	0.0006
Single Family	-0.0027	-0.0043 **	-0.0037 *	-0.0046 ***	-0.0035 **
Large Family	-0.0018 ***	-0.0018 ***	-0.0018 ***	-0.0018 ***	-0.0018 ***
Revenue Premium					
Young	0.0016	0.0021	0.0018	0.0039	0.0020
Old	-0.0018	-0.0015	-0.0013	-0.0020	-0.0014
Just Educated	-0.0003	-0.0003	-0.0002	-0.0004	-0.0002
Well Educated	-0.0017	-0.0016	-0.0017	-0.0033	-0.0015
Getting By	-0.0068	-0.0035	-0.0067	-0.0048	-0.0058
Affluent	0.0034	0.0039	0.0046	0.0071	0.0051
Single Family	-0.0008	-0.0024	-0.0018	-0.0027	-0.0015
Large Family	-0.0031	-0.0033	-0.0035	-0.0031	-0.0034

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A24
Effects of Brand Level Consumer Characteristics: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Young	0.0005 **	0.0002	-0.0001	0.0001	0.0002
Old	0.0003	0.0029 ***	0.0001	-0.0002	0.0005
Just Educated	-0.0001	0.0000	0.0000	-0.0001	-0.0001 *
Well Educated	0.0004	-0.0012	0.0014 ***	0.0010 *	0.0009 **
Getting By	-0.0017 **	-0.0033 ***	-0.0005	-0.0020 **	-0.0016 **
Affluent	0.0049 ***	0.0026 ***	0.0078 ***	0.0040 ***	0.0045 ***
Single Family	0.0019 ***	0.0019 ***	0.0019 ***	0.0019 ***	0.0019 ***
Large Family	-0.0013 ***	-0.0020 ***	-0.0021 ***	-0.0015 ***	-0.0016 ***
Volume Premium					
Young	0.0020 ***	0.0016 *	0.0007	0.0011	0.0018 ***
Old	-0.0020 ***	-0.0020 ***	-0.0018 ***	-0.0022 ***	-0.0019 ***
Just Educated	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
Well Educated	-0.0006	-0.0017	-0.0038 **	0.0007	-0.0025 **
Getting By	-0.0042 ***	-0.0042 ***	-0.0042 ***	-0.0042 ***	-0.0042 ***
Affluent	0.0010	0.0008	-0.0016	0.0025	0.0006
Single Family	-0.0035 *	-0.0042 **	-0.0025	-0.0021	-0.0035 **
Large Family	-0.0018 ***	-0.0018 ***	-0.0018 ***	-0.0018 ***	-0.0018 ***
Revenue Premium					
Young	0.0026	0.0018	0.0006	0.0013	0.0020
Old	-0.0016	0.0009	-0.0016	-0.0024	-0.0014
Just Educated	-0.0002	-0.0001	0.0000	-0.0002	-0.0002
Well Educated	-0.0001	-0.0029	-0.0024	0.0017	-0.0015
Getting By	-0.0059	-0.0075	-0.0047	-0.0062	-0.0058
Affluent	0.0059	0.0034	0.0063	0.0065	0.0051
Single Family	-0.0016	-0.0023	-0.0006	-0.0002	-0.0015
Large Family	-0.0031	-0.0037	-0.0039	-0.0032	-0.0034

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A25
Effects of Category Characteristics: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Purchase Frequency	-0.7085	0.9907	0.0140	-2.4999 ***	0.6878
Stockpileable	NA	NA	NA	0.0885 **	-0.0371
Volume Premium					
Purchase Frequency	0.1461	0.0536	-0.3309	2.3841 *	-2.2825 **
Stockpileable	NA	NA	NA	-0.9909 *	0.0426
Revenue Premium					
Purchase Frequency	-0.5624	1.0443	-0.3169	-0.1158	-1.5948
Stockpileable	NA	NA	NA	-0.9023	0.0055

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A26
Effects of Category Characteristics: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Purchase Frequency	1.9192	-0.3123	0.2338	0.3630	0.6878
Stockpileable	0.0372	-0.1068 **	-0.0558	0.0370	-0.0371
Volume Premium					
Purchase Frequency	-0.8583	0.5205	0.1627	-2.0778	-2.2825 **
Stockpileable	2.0128 ***	0.0825	-0.1646	-0.9399 *	0.0426
Revenue Premium					
Purchase Frequency	1.0610	0.2081	0.3965	-1.7148	-1.5948
Stockpileable	2.0500	-0.0243	-0.2204	-0.9029	0.0055

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A27
Effects of Category Characteristics: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Purchase Frequency	-0.0207	1.6783	0.7018	-1.8122 ***	0.6878
Stockpileable	NA	NA	NA	0.0514 ***	-0.0371
Volume Premium					
Purchase Frequency	-2.1364	-2.2289	-2.6135	0.1016	-2.2825 **
Stockpileable	NA	NA	NA	-0.9483 ***	0.0426
Revenue Premium					
Purchase Frequency	-2.1571	-0.5506	-1.9117	-1.7106	-1.5948
Stockpileable	NA	NA	NA	-0.8969	0.0055

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A28
Effects of Category Characteristics: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Purchase Frequency	2.6068 *	0.3754	0.9216 ***	1.0508 ***	0.6878
Stockpileable	0.0001	-0.1439 ***	-0.0929 ***	-0.0001	-0.0371
Volume Premium					
Purchase Frequency	-3.1408	-1.7621 **	-2.1199 **	-4.3603 ***	-2.2825 **
Stockpileable	2.0554 ***	0.1251	-0.1220 *	-0.8973 ***	0.0426
Revenue Premium					
Purchase Frequency	-0.5340	-1.3867	-1.1983	-3.3095	-1.5948
Stockpileable	2.0555	-0.0188	-0.2149	-0.8974	0.0055

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A29
Effects of Marketing Mix: Departmental Variation
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Deal Depth	0.0481	0.0185	0.0262	0.3610 ***	-0.2381 **
Deal Sales	-0.1542	-0.0493	0.1135	-0.3214 *	0.5219 ***
Display Sales	0.0908	-0.2682	0.2156	0.3693 **	-0.5860 ***
Feature Sales	-0.0480	0.3965 **	0.2590	0.1866	-0.7874 ***
Coupon Sales	0.2600	0.2679	-0.6162	-0.5302	1.0416 **
Price Reduction Sales	0.2325	-0.1077	-0.5599 **	0.1588	-0.5703 ***
Volume Premium					
Deal Depth	0.0486	-0.8309 *	-0.5757	0.1523	0.7616 **
Deal Sales	-0.3593	0.1009	-0.0869	-0.2704	0.7426
Display Sales	-0.9310	-1.5806 **	-0.3582	-0.5222	0.3742
Feature Sales	-0.4539	-0.0942	-0.7849	0.8871	1.7637 ***
Coupon Sales	2.0536	-2.8494 **	1.0895	-1.2198	5.9176 ***
Price Reduction Sales	2.4861 **	0.1273	1.7216	-0.0722	-1.8476 *
Revenue Premium					
Deal Depth	0.0966	-0.8124	-0.5495	0.5133	0.5235
Deal Sales	-0.5135	0.0516	0.0266	-0.5917	1.2645
Display Sales	-0.8402	-1.8488	-0.1426	-0.1529	-0.2118
Feature Sales	-0.5019	0.3023	-0.5258	1.0737	0.9763
Coupon Sales	2.3136	-2.5815	0.4733	-1.7500	6.9592
Price Reduction Sales	2.7186	0.0195	1.1616	0.0867	-2.4178

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A30
Effects of Marketing Mix: Departmental Variation
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Deal Depth	-0.4760 ***	0.1450	-0.4266 ***	0.3038 **	-0.2381 **
Deal Sales	0.3450 *	-0.3012	0.3800 **	-0.0124	0.5219 ***
Display Sales	-0.0417	-0.4268 *	-0.0004	0.0615	-0.5860 ***
Feature Sales	0.1822	-0.3654	-0.3481 *	-0.2628	-0.7874 ***
Coupon Sales	-0.6692	2.7083 ***	-1.2969 ***	-0.1237	1.0416 **
Price Reduction Sales	-0.4086 *	0.3040	0.1111	0.2699	-0.5703 ***
Volume Premium					
Deal Depth	1.3542 ***	-0.6419	0.9887 **	-0.4954	0.7616 **
Deal Sales	-0.6612	2.0330 **	-1.5592 **	0.8031	0.7426
Display Sales	-0.2496	0.7044	1.7031 **	1.2341	0.3742
Feature Sales	-0.7586	0.5867	0.8448	-0.2271	1.7637 ***
Coupon Sales	1.3785	-0.4869	-0.4130	0.4475	5.9176 ***
Price Reduction Sales	1.9179	-0.5470	-0.6282	-5.0055 ***	-1.8476 *
Revenue Premium					
Deal Depth	0.8782	-0.4968	0.5622	-0.1916	0.5235
Deal Sales	-0.3163	1.7319	-1.1792	0.7907	1.2645
Display Sales	-0.2913	0.2776	1.7026	1.2956	-0.2118
Feature Sales	-0.5765	0.2214	0.4967	-0.4899	0.9763
Coupon Sales	0.7093	2.2214	-1.7099	0.3238	6.9592
Price Reduction Sales	1.5093	-0.2430	-0.5171	-4.7356	-2.4178

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A31
Effects of Marketing Mix: Departmental Estimates
(Bakery, Dairy, Deli and Edible Grocery)

Department	Bakery	Dairy	Deli	Edible Grocery	Overall
Price Premium					
Deal Depth	-0.1900	-0.2196 *	-0.2119	0.1229 **	-0.2381 **
Deal Sales	0.3677	0.4726 **	0.6354 ***	0.2005	0.5219 ***
Display Sales	-0.4952 **	-0.8542 ***	-0.3704 *	-0.2167 *	-0.5860 ***
Feature Sales	-0.8355 ***	-0.3909 *	-0.5284 **	-0.6008 ***	-0.7874 ***
Coupon Sales	1.3016 **	1.3095 ***	0.4254	0.5114 ***	1.0416 **
Price Reduction Sales	-0.3378	-0.6780 ***	-1.1302 ***	-0.4115 ***	-0.5703 ***
Volume Premium					
Deal Depth	0.8102	-0.0693	0.1859	0.9139 ***	0.7616 **
Deal Sales	0.3833	0.8435	0.6557	0.4722	0.7426
Display Sales	-0.5568	-1.2064 *	0.0160	-0.1480	0.3742
Feature Sales	1.3099	1.6695 **	0.9789	2.6509 ***	1.7637 ***
Coupon Sales	7.9712 ***	3.0682 ***	7.0071 ***	4.6977 ***	5.9176 ***
Price Reduction Sales	0.6386	-1.7203 *	-0.1260	-1.9197 ***	-1.8476 *
Revenue Premium					
Deal Depth	0.6202	-0.2889	-0.0260	1.0368	0.5235
Deal Sales	0.7510	1.3161	1.2911	0.6727	1.2645
Display Sales	-1.0520	-2.0606	-0.3544	-0.3647	-0.2118
Feature Sales	0.4744	1.2786	0.4505	2.0501	0.9763
Coupon Sales	9.2728	4.3777	7.4325	5.2091	6.9592
Price Reduction Sales	0.3008	-2.3983	-1.2562	-2.3312	-2.4178

Note: For the first two sections: * p<.10; ** p<.05; *** p<.01.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A32
Effects of Marketing Mix: Departmental Estimates
(Frozen Food, G. Merchandise, Health & Beauty, and Non-Edible)

Department	Frozen Food	General Merchandise	Health & Beauty	Non-Edible	Overall
Price Premium					
Deal Depth	-0.7140 ***	-0.0930	-0.6646 ***	0.0657	-0.2381 **
Deal Sales	0.8669 ***	0.2207	0.9019 ***	0.5095 **	0.5219 ***
Display Sales	-0.6278 ***	-1.0128 ***	-0.5864 ***	-0.5245 **	-0.5860 ***
Feature Sales	-0.6053 ***	-1.1528 ***	-1.1355 ***	-1.0503 ***	-0.7874 ***
Coupon Sales	0.3724	3.7499 ***	-0.2553	0.9179 ***	1.0416 **
Price Reduction Sales	-0.9789 ***	-0.2663	-0.4592 *	-0.3004	-0.5703 ***
Volume Premium					
Deal Depth	2.1158 ***	0.1197	1.7503 ***	0.2662	0.7616 **
Deal Sales	0.0814	2.7756 ***	-0.8165	1.5457 *	0.7426
Display Sales	0.1246	1.0786	2.0773 ***	1.6083 **	0.3742
Feature Sales	1.0051	2.3505 ***	2.6085 ***	1.5367 **	1.7637 ***
Coupon Sales	7.2961 ***	5.4307 ***	5.5046 ***	6.3651 ***	5.9176 ***
Price Reduction Sales	0.0703	-2.3946 **	-2.4757 ***	-6.8531 ***	-1.8476 *
Revenue Premium					
Deal Depth	1.4018	0.0267	1.0857	0.3319	0.5235
Deal Sales	0.9483	2.9963	0.0854	2.0552	1.2645
Display Sales	-0.5032	0.0658	1.4909	1.0838	-0.2118
Feature Sales	0.3998	1.1977	1.4730	0.4864	0.9763
Coupon Sales	7.6685	9.1806	5.2493	7.2830	6.9592
Price Reduction Sales	-0.9086	-2.6609	-2.9349	-7.1535	-2.4178

Note: For the first two sections: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: The last section is the calculated effect of independent variables on the log transformed revenue premium.

Table A33
Importance of Brand Equity Drivers: Price Premium (by Individual Set)

Model	Intercept Model	Base Model	M1	M2	M3	M4
Category Control		√	√	√	√	√
Marketing Mix			√			
Brand Structure				√		
Brand Strategy					√	
Customer Characteristics						√
Brand Positioning						
BIC	24426	23636	22950	23486	23350	20120
Residual	0.242	0.227	0.217	0.225	0.223	0.184
Compared To Base Model	0.0149	0.0000	-0.0103	-0.0019	-0.0045	-0.0432
Residual % Change	6.56%	0.00%	-4.53%	-0.84%	-1.98%	-19.01%

Table A34
Importance of Brand Equity Drivers: Volume Premium (by Individual Set)

Model	Intercept Model	Base Model	M1	M2	M3	M4	M5
Category Control		√	√	√	√	√	√
Marketing Mix			√				
Brand Structure				√			
Brand Strategy					√		
Customer Characteristics						√	
Brand Positioning							√
BIC	71674	69487	67366	65160	67874	69265	68852
Residual	3.790	3.255	2.862	2.529	2.953	3.187	3.113
Compared To Base Model	0.5350	0.0000	-0.3934	-0.7259	-0.3022	-0.0684	-0.1421
Residual % Change	16.44%	0.00%	-12.09%	-22.30%	-9.28%	-2.10%	-4.37%

Table A35
Importance of Brand Equity Drivers: Price Premium (Incremental)

Model	Intercept Model	Base Model	M1	M6	M7	M8
Category Control		√	√	√	√	√
Marketing Mix			√	√	√	√
Brand Structure				√	√	√
Brand Strategy					√	√
Customer Characteristics						√
Brand Positioning						
BIC	24426	23636	22950	22848	22692	19456
Residual	0.242	0.227	0.217	0.216	0.213	0.175
Compared To Base Model	0.0149	0.0000	-0.0103	-0.0117	-0.0142	-0.0519
Residual % Change	6.56%	0.00%	-4.53%	-5.15%	-6.25%	-22.83%

Table A36
Importance of Brand Equity Drivers: Volume Premium (Incremental)

Model	Intercept Model	Base Model	M1	M6	M7	M8	M9
Category Control		√	√	√	√	√	√
Marketing Mix			√	√	√	√	√
Brand Structure				√	√	√	√
Brand Strategy					√	√	√
Customer Characteristics						√	√
Brand Positioning							√
BIC	71674	69487	67366	63508	62794	62682	61996
Residual	3.790	3.255	2.862	2.286	2.184	2.153	2.053
Compared To Base Model	0.5350	0.0000	-0.3934	-0.9687	-1.0706	-1.1018	-1.2015
Residual % Change	16.44%	0.00%	-12.09%	-29.76%	-32.89%	-33.85%	-36.91%

Table A37
Summary Statistics (Essay Two)

Description	N	Miss	Mean	Std Dev	Minimum	Median	Maximum
% Buy	1402	0	-2.981	1.690	-5.934	-3.084	5.534
Share Of Requirement	1402	0	-0.657	1.033	-4.550	-0.693	4.142
Market Share	1402	0	-2.766	1.720	-7.789	-2.803	5.361
Price Premium	1402	0	0.542	0.612	-1.825	0.464	4.843
Revenue Premium	1402	0	-0.304	1.869	-6.883	-0.192	5.403
Equity	1402	0	58.312	11.625	17.637	60.794	74.023
Year 2002	1402	0	0.315	0.465	0.000	0.000	1.000
Year 2003	1402	0	0.407	0.492	0.000	0.000	1.000
Bakery Dummy	1402	0	0.012	0.109	0.000	0.000	1.000
Dairy Dummy	1402	0	0.067	0.250	0.000	0.000	1.000
Deli Dummy	1402	0	0.041	0.199	0.000	0.000	1.000
Edible Grocery Dummy	1402	0	0.362	0.481	0.000	0.000	1.000
Frozen Food Dummy	1402	0	0.040	0.196	0.000	0.000	1.000
Health & Beauty Dummy	1402	0	0.086	0.281	0.000	0.000	1.000
General Merchandise Dummy	1402	0	0.226	0.418	0.000	0.000	1.000
Non-edible Grocery Dummy	1402	0	0.165	0.372	0.000	0.000	1.000
2T1T	1402	0	0.016	0.127	0.000	0.000	1.000
2T4T	1402	0	0.036	0.186	0.000	0.000	1.000
3T1T	1402	0	0.057	0.232	0.000	0.000	1.000
3T2T	1402	0	0.016	0.127	0.000	0.000	1.000
3T3T	1402	0	0.056	0.231	0.000	0.000	1.000
3T4T	1402	0	0.133	0.340	0.000	0.000	1.000
4T1T	1402	0	0.100	0.300	0.000	0.000	1.000
4T2T	1402	0	0.156	0.363	0.000	0.000	1.000
4T3T	1402	0	0.193	0.394	0.000	0.000	1.000
4T4T	1402	0	0.236	0.425	0.000	0.000	1.000
Log(Portforlio Size)	1402	0	2.980	1.513	0.000	3.434	4.787
Multi-Sub-Caterogory Offer	1402	0	0.094	0.292	0.000	0.000	1.000
Multi-Category Offer	1402	0	0.317	0.465	0.000	0.000	1.000
Multi-Department Offer	1402	0	0.523	0.500	0.000	1.000	1.000
Price (Over the Minimum)	1402	0	2.848	12.035	0.000	1.278	290.412
Deal Depth	1402	0	0.232	0.076	0.000	0.228	0.630
Deal Sales	1402	0	0.268	0.153	0.000	0.257	0.763
Display Sales	1402	0	0.040	0.045	0.000	0.025	0.468
Feature Sales	1402	0	0.128	0.115	0.000	0.102	0.708
Coupon Sales	1402	0	0.027	0.034	0.000	0.014	0.320

Table A37-continued

Price Reduction Sales	1402	0	0.092	0.055	0.000	0.086	0.370
Young	1402	0	101.602	52.288	0.000	94.726	473.591
Old	1402	0	105.550	18.247	26.904	105.527	177.663
Just Educated	1402	0	87.546	42.587	0.000	82.995	438.497
Well Educated	1402	0	102.156	20.058	30.677	101.306	188.828
Getting By	1402	0	89.479	18.014	35.662	87.888	169.403
Affluent	1402	0	111.273	19.768	36.469	111.330	177.595
Single Family	1402	0	87.340	16.424	24.653	88.531	146.952
Large Family	1402	0	124.564	40.218	5.921	120.850	285.517
Young (Cat)	1402	0	100.410	35.623	10.118	95.220	331.018
Old (Cat)	1402	0	104.180	11.303	35.994	105.026	145.041
Just Educated (Cat)	1402	0	91.805	22.772	25.124	89.913	190.772
Well Educated	1402	0	99.735	12.944	46.598	99.458	143.243
Getting By (Cat)	1402	0	91.540	11.078	50.320	91.152	145.256
Affluent (Cat)	1402	0	108.786	11.964	57.532	108.179	162.962
Single Family (Cat)	1402	0	87.539	11.775	39.167	88.304	136.302
Large Family (Cat)	1402	0	125.110	27.906	23.973	121.748	251.139
Purchase Frequency	1402	0	0.014	0.016	0.006	0.012	0.500
Stockpileable	1402	0	0.387	0.487	0.000	0.000	1.000
Category Assortment	1402	0	23.526	19.212	5.000	17.000	100.000

Table A38
Comparison of Weight Schemes

Weight Scheme	W0	W1	W2	W3
Description	Unweighted	Equal Weight Among Versions Of A Brand	Weight On Sales Among Versions of a Brand	Proposed Weight On Sales-Square Among Versions of a Brand
Control Balance Cross Brands	No	Yes	Yes	Yes
Control Version Importance	No	No	Yes	Yes
% Buy				
M0	0.3174	0.4339	0.4749	0.5165
M2	0.3567	0.4784	0.5605	0.6103
%Change	12.38%	10.26%	18.02%	18.16%
Share of Requirements				
M0	0.4655	0.4598	0.5102	0.5409
M2	0.4823	0.5053	0.5558	0.5867
%Change	3.61%	9.90%	8.94%	8.47%
Market Share				
M0	0.2809	0.3519	0.4286	0.4798
M2	0.3038	0.3792	0.4766	0.5258
%Change	8.15%	7.76%	11.20%	9.59%
Price Premium				
M0	0.1579	0.1823	0.2253	0.2472
M2	0.1873	0.2198	0.2632	0.2833
%Change	18.62%	20.57%	16.82%	14.60%
Revenue Premium				
M0	0.2869	0.3804	0.4618	0.5013
M2	0.2936	0.386	0.4875	0.5348
%Change	2.34%	1.47%	5.57%	6.68%

Note: M0 is the base model without equity variable.

Note: M2 is the full model with equity variable and all hypothesized moderators.

Table A39
Fit Statistics (Essay Two)

Model	Adj R-Sq	% Change Compare to M0	% Change Compare to M1	Root MSE	% Change Compare to M0	% Change Compare to M1
% Buy						
M0	0.5165			0.71562		
M1	0.5961	15.41%		0.6541	-8.60%	
M3	0.6284	21.67%	5.42%	0.62738	-12.33%	-4.09%
Share Of Requirements						
M0	0.5409			0.36186		
M1	0.5429	0.37%		0.36109	-0.21%	
M3	0.5855	8.25%	7.85%	0.34383	-4.98%	-4.78%
Market Share						
M0	0.4798			0.69218		
M1	0.5216	8.71%		0.66378	-4.10%	
M3	0.5376	12.05%	3.07%	0.6526	-5.72%	-1.68%
Price Premium						
M0	0.2472			0.34106		
M1	0.2533	2.47%		0.33967	-0.41%	
M3	0.2859	15.66%	12.87%	0.33217	-2.61%	-2.21%
Revenue Premium						
M0	0.5013			0.73638		
M1	0.5129	2.31%		0.72781	-1.16%	
M3	0.5389	7.50%	5.07%	0.70811	-3.84%	-2.71%

Note: M0 is the base model without equity variable.

Note: M1 is the model with only equity variable.

Note: M3 is the proposed model with equity variable and all identified moderators.

Table A40
Estimates for Equity Related Parameters

Model	% Buy	Share Of Requirements	Market Share	Price Premium	Revenue Premium
Main Effect					
Equity	0.086 ***	0.017 ***	0.060 ***	-0.009	0.050 ***
Moderator					
Equity*Price(Over Min)		-0.001 ***	0.000 *		
Equity*Frequence	-2.104 ***		-1.018 **	-0.987 ***	-1.962 ***
Equity*Stockpiling				0.011 ***	
Equity*Assortment				0.000 ***	0.001 ***
Equity*Size		-0.002 *	-0.004 **	0.003 ***	-0.014 ***
Equity*MultiSubCategory	0.000	0.010 *	0.010	0.021 ***	0.032 ***
Equity*MultiCatigory	-0.008	-0.005	0.001	0.002	0.019 **
Equity*MultiDepartment	0.028 ***	-0.002	0.016 *	0.018 ***	0.039 ***

Note: * p<.10; ** p<.05; *** p<.01.

Note: Price (Over Minimum) is not included in Price Premium model because it by definition directly represents absolute price. Therefore the interaction term is excluded in the model.

Table A41
Standard Estimates For Equity Related Parameters

Model	% Buy	Share Of Requirements	Market Share	Price Premium	Revenue Premium
Main Effect					
Equity	0.585 ***	0.220 ***	0.437 ***	-0.157	0.335 ***
Moderator					
Equity*Price(Over Min)		-1.063 ***	0.191 *		
Equity*Frequence	-0.426 ***		-0.221 **	-0.523 ***	-0.392 ***
Equity*Stockpiling				0.460 ***	
Equity*Assortment				0.399 ***	0.454 ***
Equity*Size		-0.203 *	-0.251 **	0.417 ***	-0.726 ***
Equity*MultiSubCategory	0.002	0.199 *	0.114	0.590 ***	0.335 ***
Equity*MultiCatigory	-0.120	-0.138	0.019	0.089	0.285 **
Equity*MultiDepartment	0.425 ***	-0.061	0.262 *	0.705 ***	0.585 ***

Note: * p<.10;   ** p<.05;   *** p<.01.

Note: Price (Over Minimum) is not included in Price Premium model because it by definition directly represents absolute price. Therefore the interaction term is excluded in the model.

Table A42
Estimates for Control Variables (Essay Two)

Model	% Buy	Share Of Requirements	Market Share	Price Premium	Revenue Premium
Control Dummies					
Year 2002	0.221 **	-0.028	0.153 *	0.159 ***	0.554 ***
Year 2003	0.295 ***	-0.137 ***	0.126	0.195 ***	0.597 ***
Bakery Dummy	-1.616 ***	0.990 ***	-0.775 *	0.172	-2.610 ***
Dairy Dummy	0.972 ***	-0.179 *	0.694 ***	-0.184 *	-1.276 ***
Deli Dummy	0.278	0.535 ***	0.867 ***	-0.253 *	-0.476 *
Edible Grocery Dummy	0.016	0.014	0.500 ***	-0.209 ***	-0.629 ***
Frozen Food Dummy	0.315	-0.328 **	0.854 ***	0.146	-1.544 ***
Health & Beauty Dummy	-0.952 ***	0.046	-0.465 ***	-0.245 ***	-0.382 **
General Merchandise Dummy	-0.189 *	-0.083	-0.042	0.087	-0.029
Brand Strategy					
2T1T	-1.003 ***	0.312 *	0.256		-1.107 ***
2T4T	0.034	0.432 ***	0.880 ***		0.545 **
3T1T	-0.267	-0.297 ***	0.648 ***		0.033
3T2T	-0.513	-0.662 ***	-0.493		-0.516
3T3T	0.145	-0.244 ***	0.106		-0.217
3T4T	0.174	0.023	0.321 ***		0.420 ***
4T1T	-0.498 ***	-0.232 ***	-0.136		-0.643 ***
4T2T	-0.056	-0.251 ***	0.198 *		-0.098
4T3T	-0.191 *	-0.141 ***	-0.210 **		-0.217 *
Portfolio Size	0.037	0.211 ***	0.294 **	-0.223 ***	1.015 ***
Multi-Sub-Category Offer	0.090	-0.310	-0.219	-1.297 ***	-1.149 *
Multi-Category Offer	0.683	0.488 *	0.205	-0.389	-0.837
Multi-Department Offer	-1.052 **	0.521 *	-0.152	-1.316 ***	-1.618 ***
Marketing Mix					
Price (Over Minimum)	-0.004 **	0.043 ***	-0.015 *		0.003
Deal Depth	0.097	0.095	-1.062	-0.974 ***	-0.135
Deal Sales	-0.936	4.273 ***	5.234 *	-4.867 ***	-2.374
Display Sales	5.718 **	-1.576	0.467	3.122 ***	4.366 *

Table A42-continued

Feature Sales	3.798	-4.236 ***	-3.431	3.634 ***	3.833
Coupon Sales	6.837 ***	-9.256 ***	-3.284	4.506 ***	2.656
Price Reduction Sales	2.951	-7.701 ***	-5.720 *	5.624 ***	2.571
Customer Characteristics					
Young	-0.005 ***	-0.002 ***	-0.008 ***	0.002 ***	-0.004 ***
Old	0.000	-0.006 ***	-0.014 ***	0.001	-0.005
Just Educated	0.001	-0.002 **	0.001	0.000	-0.003 **
Well Educated	0.014 ***	0.007 ***	0.014 ***	-0.008 ***	0.002
Getting By	0.018 ***	0.005	0.015 **	-0.007 **	0.017 ***
Affluent	0.004	0.001	0.007	0.009 ***	0.009
Single Family	-0.017 **	0.005	-0.022 ***	-0.005	-0.006
Large Family	0.002	0.003 *	0.003	-0.004 ***	0.008 **
Young (Cat)	0.006 ***	0.002 *	0.017 ***	-0.004 ***	0.023 ***
Old (Cat)	-0.007	0.011 ***	0.012 *	-0.002	0.084 ***
Just Educated (Cat)	0.006	0.005 **	0.010 ***	-0.006 ***	-0.014 ***
Well Educated	0.006	-0.016 ***	-0.012	0.013 ***	0.037 ***
Getting By (Cat)	-0.046 **	-0.007	-0.010	0.027 ***	0.002
Affluent (Cat)	-0.035 *	0.004	0.014	-0.003	-0.051 **
Single Family (Cat)	-0.029 *	-0.012	-0.031 **	-0.023 ***	0.018
Large Family (Cat)	-0.023 ***	-0.011 ***	-0.035 ***	-0.006 **	-0.021 ***
Category Characteristics					
Purchase Frequency	71.466 ***	-14.807 ***	20.091	69.207 ***	112.306 ***
Stockpileable	0.252 ***	-0.107 **	0.055	-0.593 ***	-0.905 ***
Category Assortment	-0.009 ***	-0.031 ***	-0.037 ***	-0.011 **	-0.073 ***

Note: * $p<.10$; ** $p<.05$; *** $p<.01$.

Note: Brand Tier Positioning Variables and Price (Over Minimum) are not included in Price Premium model because they by definition directly represent absolute price.

Table A43
Standardized Estimates for Control Variables (Essay Two)

Model	% Buy	Share Of Requirements	Market Share	Price Premium	Revenue Premium
Control Dummies					
Year 2002	0.058 **	-0.014	0.043 *	0.110 ***	0.144 ***
Year 2003	0.079 ***	-0.071 ***	0.036	0.138 ***	0.159 ***
Bakery Dummy	-0.098 ***	0.116 ***	-0.050 *	0.027	-0.156 ***
Dairy Dummy	0.117 ***	-0.041 *	0.089 ***	-0.058 *	-0.151 ***
Deli Dummy	0.025	0.091 ***	0.082 ***	-0.058 *	-0.041 *
Edible Grocery Dummy	0.004	0.007	0.138 ***	-0.141 ***	-0.159 ***
Frozen Food Dummy	0.028	-0.057 **	0.082 ***	0.034	-0.136 ***
Health & Beauty Dummy	-0.165 ***	0.015	-0.086 ***	-0.111 ***	-0.065 **
General Merchandise Dummy	-0.045 *	-0.038	-0.011	0.055	-0.007
Brand Strategy					
2T1T	-0.058 ***	0.035 *	0.016		-0.063 ***
2T4T	0.003	0.075 ***	0.085 ***		0.049 **
3T1T	-0.031	-0.067 ***	0.081 ***		0.004
3T2T	-0.023	-0.056 ***	-0.023		-0.022
3T3T	0.017	-0.056 ***	0.014		-0.025
3T4T	0.031	0.008	0.061 ***		0.073 ***
4T1T	-0.080 ***	-0.072 ***	-0.023		-0.102 ***
4T2T	-0.012	-0.100 ***	0.044 *		-0.020
4T3T	-0.041 *	-0.058 ***	-0.048 **		-0.046 *
Portfolio Size	0.033	0.355 ***	0.275 **	-0.510 ***	0.874 ***
Multi-Sub-Category Offer	0.018	-0.120	-0.047	-0.683 ***	-0.228 *
Multi-Category Offer	0.181	0.249 *	0.058	-0.270	-0.219
Multi-Department Offer	-0.268 **	0.256 *	-0.042	-0.880 ***	-0.408 ***
Marketing Mix					
Price (Over Minimum)	-0.047 **	0.931 ***	-0.186 *		0.031
Deal Depth	0.004	0.007	-0.043	-0.096 ***	-0.005
Deal Sales	-0.082	0.724 ***	0.494 *	-1.121 ***	-0.206
Display Sales	0.175 **	-0.093	0.015	0.250 ***	0.132 *

Table A43-continued

Feature Sales	0.268	-0.575 ***	-0.259	0.670 ***	0.267
Coupon Sales	0.120 ***	-0.312 ***	-0.062	0.206 ***	0.046
Price Reduction Sales	0.075	-0.376 ***	-0.155 *	0.373 ***	0.064
Customer Characteristics					
Young	-0.136 ***	-0.103 ***	-0.222 ***	0.161 ***	-0.113 ***
Old	0.001	-0.105 ***	-0.132 ***	0.014	-0.042
Just Educated	0.016	-0.064 **	0.013	-0.016	-0.067 **
Well Educated	0.144 ***	0.133 ***	0.152 ***	-0.214 ***	0.021
Getting By	0.160 ***	0.078	0.144 **	-0.166 **	0.151 ***
Affluent	0.042	0.020	0.076	0.233 ***	0.094
Single Family	-0.136 **	0.073	-0.183 ***	-0.112	-0.047
Large Family	0.029	0.095 *	0.055	-0.221 ***	0.143 **
Young (Cat)	0.117 ***	0.077 *	0.344 ***	-0.210 ***	0.433 ***
Old (Cat)	-0.037	0.120 ***	0.071 *	-0.032	0.465 ***
Just Educated (Cat)	0.077	0.124 **	0.145 ***	-0.209 ***	-0.177 ***
Well Educated	0.042	-0.220 ***	-0.091	0.243 ***	0.270 ***
Getting By (Cat)	-0.269 **	-0.077	-0.063	0.410 ***	0.011
Affluent (Cat)	-0.218 *	0.052	0.092	-0.045	-0.317 **
Single Family (Cat)	-0.180 *	-0.149	-0.213 **	-0.386 ***	0.115
Large Family (Cat)	-0.350 ***	-0.321 ***	-0.577 ***	-0.248 **	-0.312 ***
Category Characteristics					
Purchase Frequency	0.237 ***	-0.095 ***	0.071	0.601 ***	0.367 ***
Stockpileable	0.070 ***	-0.057 **	0.017	-0.432 ***	-0.249 ***
Category Assortment	-0.102 ***	-0.711 ***	-0.476 ***	-0.336 **	-0.856 ***

Note: * p<.10;   ** p<.05;   *** p<.01.

Note: Brand Tier Positioning Variables and Price (Over Minimum) are not included in Price Premium model because they by definition directly represent absolute price.

Table A44
Comparison Between Food and Non-Food Brands

Measure	Product Type	Food			Non-Food		
	Model	M0	M1	Diff.	M0	M1	Diff.
% Buy							
Fit Statistics	R-Square	0.629	0.706	12.09%	0.590	0.682	15.71%
	Adj R-Sq	0.605	0.686	13.32%	0.561	0.660	17.53%
	Root MSE	0.631	0.563	-10.78%	0.662	0.583	-11.93%
Equity Estimates			0.394***			0.468***	
Share Of Requirements							
Fit Statistics	R-Square	0.727	0.731	0.58%	0.489	0.491	0.45%
	Adj R-Sq	0.709	0.713	0.58%	0.454	0.455	0.33%
	Root MSE	0.276	0.274	-0.70%	0.385	0.385	-0.14%
Equity Estimates			0.093***			0.072	
Market Share							
Fit Statistics	R-Square	0.579	0.623	7.59%	0.599	0.655	9.24%
	Adj R-Sq	0.552	0.598	8.37%	0.572	0.630	10.25%
	Root MSE	0.692	0.656	-5.30%	0.570	0.530	-7.09%
Equity Estimates			0.300***			0.362***	
Price Premium							
Fit Statistics	R-Square	0.516	0.516	0.02%	0.383	0.392	2.48%
	Adj R-Sq	0.491	0.491	-0.14%	0.351	0.360	2.54%
	Root MSE	0.128	0.128	0.06%	0.420	0.417	-0.69%
Equity Estimates			0.014			0.145***	
Revenue Premium							
Fit Statistics	R-Square	0.675	0.710	5.20%	0.525	0.531	1.22%
	Adj R-Sq	0.653	0.690	5.65%	0.492	0.498	1.22%
	Root MSE	0.571	0.539	-5.48%	0.780	0.776	-0.60%
Equity Estimates			0.268***			0.123***	

Note: * $p < .10$;   ** $p < .05$;   *** $p < .01$.

Note: M0 is the base model without equity variable.

Note: M1 is the model with only equity variable, but not interaction terms.

Table A45
Distribution of Portfolio Size

Number of Brands	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	189	53.24	189	53.24
3	69	19.44	258	72.68
4	26	7.32	284	80
5	20	5.63	304	85.63
6	9	2.54	313	88.17
7	10	2.82	323	90.99
8	2	0.56	325	91.55
9	4	1.13	329	92.68
10	2	0.56	331	93.24
11	1	0.28	332	93.52
12	3	0.85	335	94.37
13	1	0.28	336	94.65
14	1	0.28	337	94.93
16	1	0.28	338	95.21
18	2	0.56	340	95.77
20	2	0.56	342	96.34
21	1	0.28	343	96.62
25	1	0.28	344	96.9
28	2	0.56	346	97.46
31	1	0.28	347	97.75
33	1	0.28	348	98.03
47	2	0.56	350	98.59
48	1	0.28	351	98.87
50	1	0.28	352	99.15
55	1	0.28	353	99.44
66	1	0.28	354	99.72
103	1	0.28	355	100

Table A46
Summary Statistics (Essay Three)

Description	N	Miss	Mean	Std Dev	Minimum	Median	Maximum
% Buy	4343	0	-3.529	1.337	-5.594	-3.703	4.595
Share of Requirement	4343	0	-1.095	0.982	-5.304	-1.081	2.542
Market Share	4343	0	-3.883	1.593	-9.098	-3.893	1.206
Price Premium	4343	0	0.430	0.614	-2.378	0.377	4.805
Revenue Premium	4343	0	-1.363	1.953	-6.970	-1.267	4.079
Within-Category Size	4343	0	2.245	3.766	0.000	1.000	21.000
Cross-Category Size	4343	0	8.298	12.974	0.000	2.000	69.000
Cross-Department Size	4343	0	3.860	7.703	0.000	0.000	66.000
Cross-Segment Size	4343	0	5.897	12.100	0.000	1.000	92.000
Quality Variation	4343	0	1.077	0.641	0.000	1.198	4.500
Dummy Y99	4343	0	0.311	0.463	0.000	0.000	1.000
Dummy Y00	4343	0	0.372	0.483	0.000	0.000	1.000
2T1T	4343	0	0.011	0.096	0.000	0.000	1.000
2T4T	4343	0	0.031	0.154	0.000	0.000	1.000
3T1T	4343	0	0.037	0.170	0.000	0.000	1.000
3T2T	4343	0	0.013	0.097	0.000	0.000	1.000
3T3T	4343	0	0.041	0.179	0.000	0.000	1.000
3T4T	4343	0	0.142	0.313	0.000	0.000	1.000
4T1T	4343	0	0.084	0.251	0.000	0.000	1.000
4T2T	4343	0	0.122	0.294	0.000	0.000	1.000
4T3T	4343	0	0.210	0.366	0.000	0.000	1.000
Inter-SubCategory Offer	4343	0	0.694	0.461	0.000	1.000	1.000
Inter-Category Offer	4343	0	0.557	0.497	0.000	1.000	1.000
Inter-Department Offer	4343	0	0.235	0.424	0.000	0.000	1.000
Young	4343	0	93.806	43.792	0.000	91.847	456.905
Old	4343	0	107.474	23.266	2.000	106.267	270.030
Just Educated	4343	0	101.378	67.000	0.000	89.366	1034.000

Table A46-continued

Well Educated	4343	0	96.136	22.555	9.000	96.000	216.901
Getting By	4343	0	96.635	21.752	25.076	94.212	223.352
Affluent	4343	0	103.188	26.117	6.681	103.900	224.811
Single Family	4343	0	87.242	18.198	8.000	87.768	153.900
Large Family	4343	0	126.918	45.471	3.000	122.183	403.363
Young (Cat)	4343	0	97.090	25.697	13.453	95.820	260.723
Old (Cat)	4343	0	106.349	9.189	43.862	105.714	146.760
Just Educated (Category)	4343	0	96.696	21.009	26.189	95.577	268.585
Well Educated (Category)	4343	0	97.576	10.170	45.103	97.899	144.427
Getting By (Category)	4343	0	93.951	8.942	53.219	93.694	138.804
Affluent (Category)	4343	0	105.929	10.920	54.567	105.885	180.415
Single Family (Category)	4343	0	86.902	11.711	20.606	87.503	133.754
Large Family (Category)	4343	0	125.328	26.326	35.487	123.391	265.688
Deal Depth	4343	0	0.224	0.078	0.000	0.220	0.630
Deal Sales	4343	0	0.247	0.160	0.000	0.234	0.849
Display Sales	4343	0	0.053	0.071	0.000	0.027	0.519
Feature Sales	4343	0	0.105	0.110	0.000	0.071	0.831
Coupon Sales	4343	0	0.027	0.041	0.000	0.005	0.300
Price Reduction Sales	4343	0	0.090	0.060	0.000	0.084	0.564
Purchase Frequency	4343	0	0.014	0.023	0.005	0.012	1.000
Stockpileable	4343	0	0.309	0.444	0.000	0.000	1.000
Category Assortment	4343	0	28.610	23.575	3.000	21.618	123.000

Table A47
Fit Statistics (Essay Three)

Model	Adj R-Sq	Root MSE
% Buy		
M0	0.2902	1.1262
M1	0.3482	1.07925
%Change	19.99%	-4.17%
Share of Requirements		
M0	0.439	0.7351
M1	0.4651	0.7178
%Change	5.95%	-2.35%
Market Share		
M0	0.4237	1.2091
M1	0.4469	1.1845
%Change	5.48%	-2.03%
Price Premium		
M0	0.1771	0.5568
M1	0.2702	0.5243
%Change	52.57%	-5.83%
Revenue Premium		
M0	0.4172	1.4907
M1	0.5306	1.3379
%Change	27.18%	-10.25%

Note: M0 is base model without brand portfolio information.

Note: M1 is the proposed model with brand portfolio information.

Table A48
Effects of Brand Portfolio Strategy (Raw Estimates)

Performance Measure	% Buy	Share of Requirements	Market Share	Price Premium	Revenue Premium
Brand Portforlio Size					
Within-Category	0.049 ***	0.014 ***	0.038 ***	-0.006 **	0.068 ***
Cross-Category	0.009 ***	0.002 *	0.010 ***	0.002 **	0.010 ***
Cross-Department	0.012 ***	0.008 ***	0.011 ***	-0.003 **	0.018 ***
Cross-Segment	0.007 ***	-0.002 **	0.002	0.000	-0.005 ***
Performance Spillover					
Within-Category	0.059 ***	0.216 ***	0.035 ***	0.402 ***	0.337 ***
Cross-Category	0.061 ***	0.043 ***	0.052 ***	0.058 ***	0.186 ***
Cross-Department	-0.026 **	0.019	-0.012	-0.006	0.024
Cross-Segment	0.017	0.019	0.023 **	0.007	0.130 ***
Quality Variation	0.091 ***	-0.040 **	0.086 ***	0.083 ***	0.076 **

Note: * $p<.10$; ** $p<.05$; *** $p<.01$.

Table A49
Effects of Brand Portfolio Strategy (Standardized Estimates)

Perfromance Measure	% Buy	Share of Requirement	Market Share	Price Premium	Revenue Premium
Brand Portforlio Size					
Within-Category	0.137 ***	0.053 ***	0.089 ***	-0.035 **	0.130 ***
Cross-Category	0.086 ***	0.028 *	0.084 ***	0.039 **	0.063 ***
Cross-Department	0.066 ***	0.060 ***	0.053 ***	-0.037 **	0.073 ***
Cross-Segment	0.065 ***	-0.029 **	0.015	-0.006	-0.033 ***
Prerformance Spillover					
Within-Category	0.078 ***	0.190 ***	0.044 ***	0.285 ***	0.266 ***
Cross-Category	0.074 ***	0.035 ***	0.060 ***	0.039 ***	0.133 ***
Cross-Department	-0.032 **	0.015	-0.014	-0.004	0.013
Cross-Segment	0.022	0.016	0.030 **	0.004	0.089 ***
Quality Variation	0.044 ***	-0.026 **	0.035 ***	0.087 ***	0.025 **

Note: * p<.10;   ** p<.05;   *** p<.01.

Table A50
Estimates for Control Variables (Essay Three)

Performance Measure	% Buy	Share of Requirements	Market Share	Price Premium	Revenue Premium
Year Dummy					
Dummy Y99	0.077	0.002	0.082	-0.028	0.094
Dummy Y00	-0.025	0.075 **	0.165 ***	-0.032	0.229 ***
Brand Strategy					
2T1T	-0.256	-0.598 ***	0.778 ***		0.320
2T4T	0.311 ***	0.490 ***	1.175 ***		0.604 ***
3T1T	-0.194 *	-0.297 ***	0.652 ***		0.218 *
3T2T	-0.046	0.133	0.768 ***		0.465 **
3T3T	-0.062	-0.163 **	0.462 ***		0.251 **
3T4T	0.046	0.132 ***	0.357 ***		0.372 ***
4T1T	-0.298 ***	-0.375 ***	0.247 ***		0.117
4T2T	-0.044	-0.253 ***	0.368 ***		0.272 ***
4T3T	-0.005	-0.122 ***	0.316 ***		0.189 ***
Inter-SubCategory Offer	0.270 ***	0.049	0.376 ***	0.023	0.419 ***
Inter-Category Offer	0.060	0.040	-0.058	-0.055 **	-0.064
Inter-Department Offer	0.079	-0.011	0.168 ***	0.009	0.110 *
Customer Characteristics					
Young	0.002 ***	0.001	0.002 ***	0.000	0.002 ***
Old	-0.002 **	-0.001 ***	-0.003 ***	-0.001 **	-0.002 **
Just Educated	0.000	-0.001 ***	0.000	0.000	-0.001 *
Well Educated	-0.002	-0.002 **	-0.005 ***	0.001	-0.008 ***
Getting By	-0.005 ***	-0.001	-0.009 ***	-0.002 *	-0.008 ***
Affluent	-0.003 *	-0.001	-0.001	0.006 ***	0.001
Single Family	-0.004 **	0.000	-0.006 **	0.002 **	-0.005 **
Large Family	-0.002 ***	-0.001 ***	-0.004 ***	-0.002 ***	-0.004 ***
Young (Category)	-0.003 *	-0.003 ***	-0.003 *	0.000	0.002
Old (Category)	0.007 ***	-0.004 ***	0.013 ***	0.001	0.040 ***
Just Educated (Category)	-0.002	0.002 ***	0.004 ***	-0.001	0.003 **
Well Educated (Category)	0.009 **	-0.013 ***	0.005	0.000	0.004
Getting By (Category)	-0.013	0.021 ***	0.030 ***	0.011 ***	0.029 ***
Affluent (Category)	-0.019 ***	0.031 ***	0.021 ***	0.003	0.012
Single Family (Category)	0.000	-0.011 **	-0.018 **	-0.006 *	-0.021 **

Table A50-continued

Large Family (Category)	0.004	-0.006 ***	-0.006 **	-0.001	-0.001
Marketing Mix					
Deal Depth	0.138	-0.073	-0.277	-0.392 ***	-0.045
Deal Sales	0.253	-1.466 ***	-0.008	-0.190	1.316
Display Sales	1.494 **	1.170 ***	1.644 **	-0.305	0.935
Feature Sales	2.246 ***	1.230 ***	1.580 **	-0.070	0.098
Coupon Sales	9.552 ***	1.245 **	8.987 ***	1.126 ***	8.464 ***
Price Reduction Sales	0.160	0.460	-0.485	-0.293	-1.736
Category Characteristics					
Purchase Frequency	-2.872 ***	-2.018 ***	-3.022 ***	1.020 ***	-1.701 *
Stockpileable	0.123 ***	-0.334 ***	-0.193 ***	0.075 ***	-0.412 ***

Note: * p<.10;   ** p<.05;   *** p<.01.

Note: Brand Tier Positioning Variables are not included in Price Premium model because they by definition directly represent absolute price.

Table A51
Standardized Estimates for Control Variables (Essay Three)

Performance Measure	% Buy	Share of Requirement	Market Share	Price Premium	Revenue Premium
Year Dummy					
Dummy Y99	0.027	0.001	0.024	-0.021	0.022
Dummy Y00	-0.009	0.037 **	0.050 ***	-0.025	0.057 ***
Brand Strategy					
2T1T	-0.018	-0.059 ***	0.047 ***		0.016
2T4T	0.036 ***	0.077 ***	0.114 ***		0.048 ***
3T1T	-0.025 *	-0.051 ***	0.069 ***		0.019 *
3T2T	-0.003	0.013	0.047 ***		0.023 **
3T3T	-0.008	-0.030 **	0.052 ***		0.023 **
3T4T	0.011	0.042 ***	0.070 ***		0.060 ***
4T1T	-0.056 ***	-0.096 ***	0.039 ***		0.015
4T2T	-0.010	-0.076 ***	0.068 ***		0.041 ***
4T3T	-0.001	-0.045 ***	0.073 ***		0.035 ***
Inter-SubCategory Offer	0.093 ***	0.023	0.109 ***	0.017	0.099 ***
Inter-Category Offer	0.022	0.020	-0.018	-0.044 **	-0.016
Inter-Department Offer	0.025	-0.005	0.045 ***	0.006	0.024 *
Customer Characteristics					
Young	0.056 ***	0.025	0.062 ***	0.008	0.048 ***
Old	-0.032 **	-0.035 ***	-0.045 ***	-0.033 **	-0.029 **
Just Educated	-0.005	-0.042 ***	-0.014	0.007	-0.025 *
Well Educated	-0.030	-0.043 **	-0.076 ***	0.021	-0.089 ***
Getting By	-0.083 ***	-0.033	-0.126 ***	-0.060 *	-0.093 ***
Affluent	-0.058 *	-0.028	-0.013	0.235 ***	0.011
Single Family	-0.061 **	0.000	-0.063 **	0.068 **	-0.046 **
Large Family	-0.083 ***	-0.068 ***	-0.110 ***	-0.121 ***	-0.095 ***
Young (Category)	-0.050 *	-0.070 ***	-0.044 *	-0.010	0.021
Old (Category)	0.048 ***	-0.041 ***	0.075 ***	0.014	0.186 ***
Just Educated (Category)	-0.027	0.052 ***	0.059 ***	-0.020	0.037 **
Well Educated (Category)	0.071 **	-0.138 ***	0.032	-0.008	0.019
Getting By (Category)	-0.087	0.195 ***	0.166 ***	0.153 ***	0.132 ***
Affluent (Category)	-0.153 ***	0.346 ***	0.146 ***	0.060	0.066
Single Family (Category)	0.003	-0.132 **	-0.132 **	-0.123 *	-0.128 **

Table A51-continued

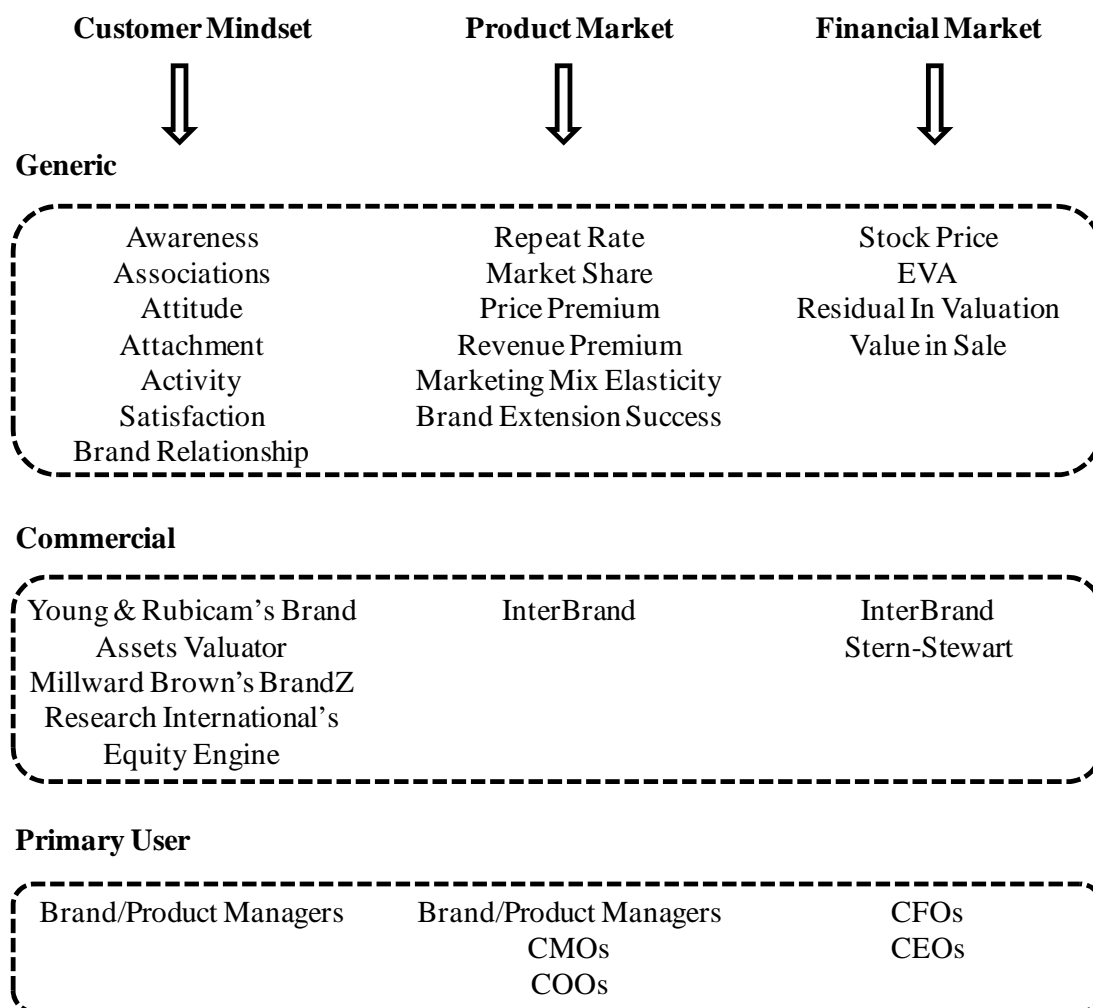|					
Large Family (Category)	0.073	-0.154 ***	-0.093 **	-0.038	-0.008
Marketing Mix					
Deal Depth	0.008	-0.006	-0.014	-0.050 ***	-0.002
Deal Sales	0.030	-0.240 ***	-0.001	-0.050	0.108
Display Sales	0.079 **	0.085 ***	0.073 **	-0.035	0.034
Feature Sales	0.185 ***	0.138 ***	0.109 **	-0.013	0.006
Coupon Sales	0.294 ***	0.052 **	0.232 ***	0.075 ***	0.178 ***
Price Reduction Sales	0.007	0.028	-0.018	-0.029	-0.053
Category Characteristics					
Purchase Frequency	-0.048 ***	-0.046 ***	-0.043 ***	0.037 ***	-0.020 *
Stockpileable	0.041 ***	-0.151 ***	-0.054 ***	0.054 ***	-0.094 ***

Note: * p<.10;   ** p<.05;   *** p<.01.

Note: Brand Tier Positioning Variables are not included in Price Premium model because they by definition directly represent absolute price.

Table A52
Summary of Three Studies

Variable\Models	Essay One	Essay Two	Essay Three
Brand Market Performance (Dependent Variable)			
Revenue Premium	x	x	x
Price Premium	x	x	x
Volume Premium	x		
Penetration		x	x
Loyalty		x	x
Market Share		x	x
Consumer Based Brand Equity			
Awareness and Perceived Quality		x	
Brand Equity Drivers			
Brand Related Strategy			
Brand Structure	x	x	x
Brand Positioning	x	x	x
Cross Offering	x	x	x
Brand Portfolio Decision			x
Other Drivers			
Customer Characteristics	x	x	x
Marketing Mix	x	x	x
Category Characteristics	x	x	x

Figure A1
Brand Value Chain Measurement Approaches

Customer Mindset	Product Market	Financial Market
⬇	⬇	⬇

Generic

Awareness	Repeat Rate	Stock Price
Associations	Market Share	EVA
Attitude	Price Premium	Residual In Valuation
Attachment	Revenue Premium	Value in Sale
Activity	Marketing Mix Elasticity	
Satisfaction	Brand Extension Success	
Brand Relationship		

Commercial

Young & Rubicam's Brand Assets Valuator	InterBrand	InterBrand
Millward Brown's BrandZ		Stern-Stewart
Research International's Equity Engine		

Primary User

Brand/Product Managers	Brand/Product Managers	CFOs
	CMOs	CEOs
	COOs	

Note: This diagram is based on and adapted from Keller and Lehman (2003)

Figure A2
Conceptual Framework (Essay One)
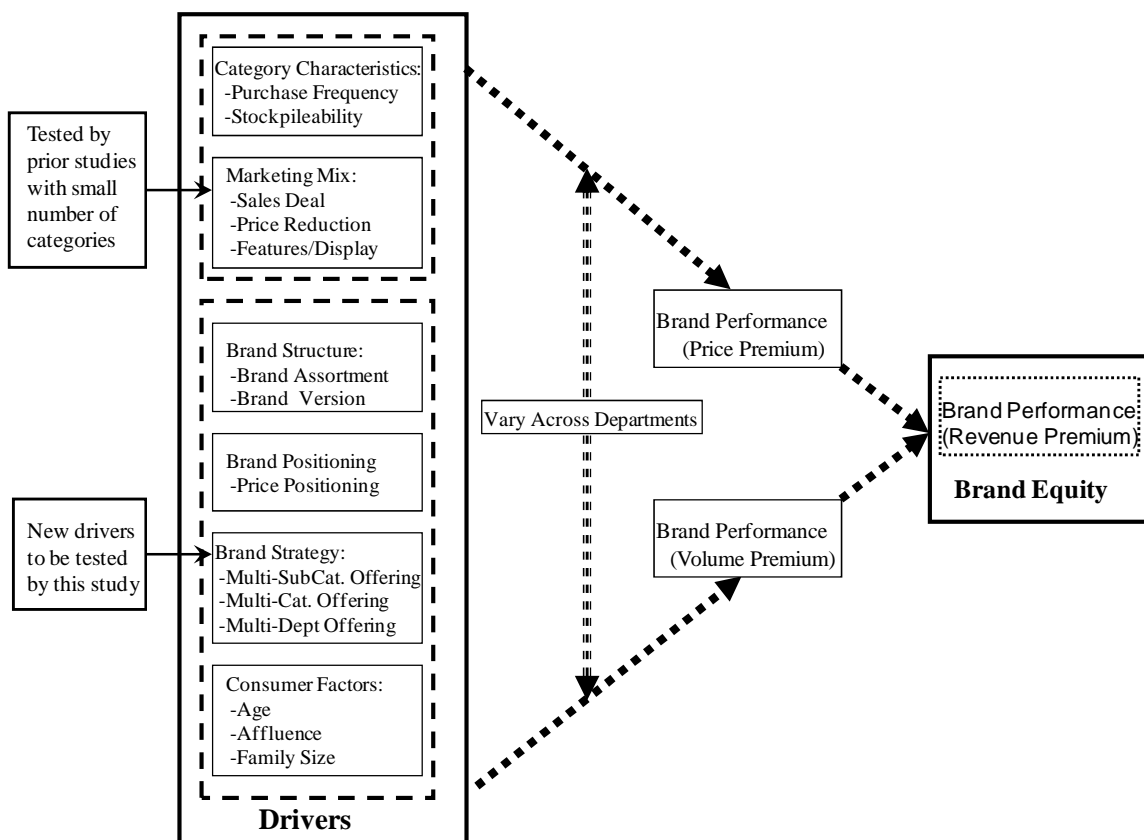
Figure A3
Multi-Subcategory Offering (Dial)

Grocery Store

Department
- Health and Beauty
- Other Departments

Category
- Other Categories
- Soap
- Other Categories

Sub-Category
- Liquid Soap
- Bar Soap
- Heavy Duty Hand Cleaner

Brand
- **Dial**
- **Dial**
- **Dial**
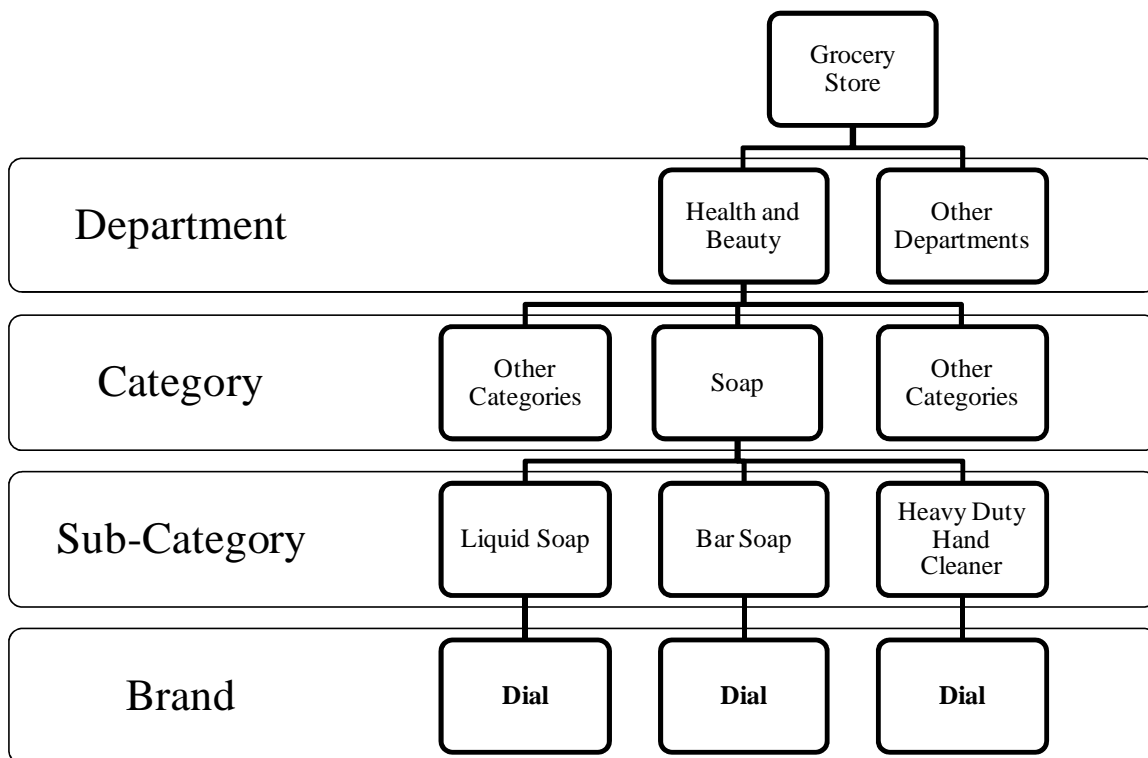
Figure A4
Multi-Category Offering (Gain)
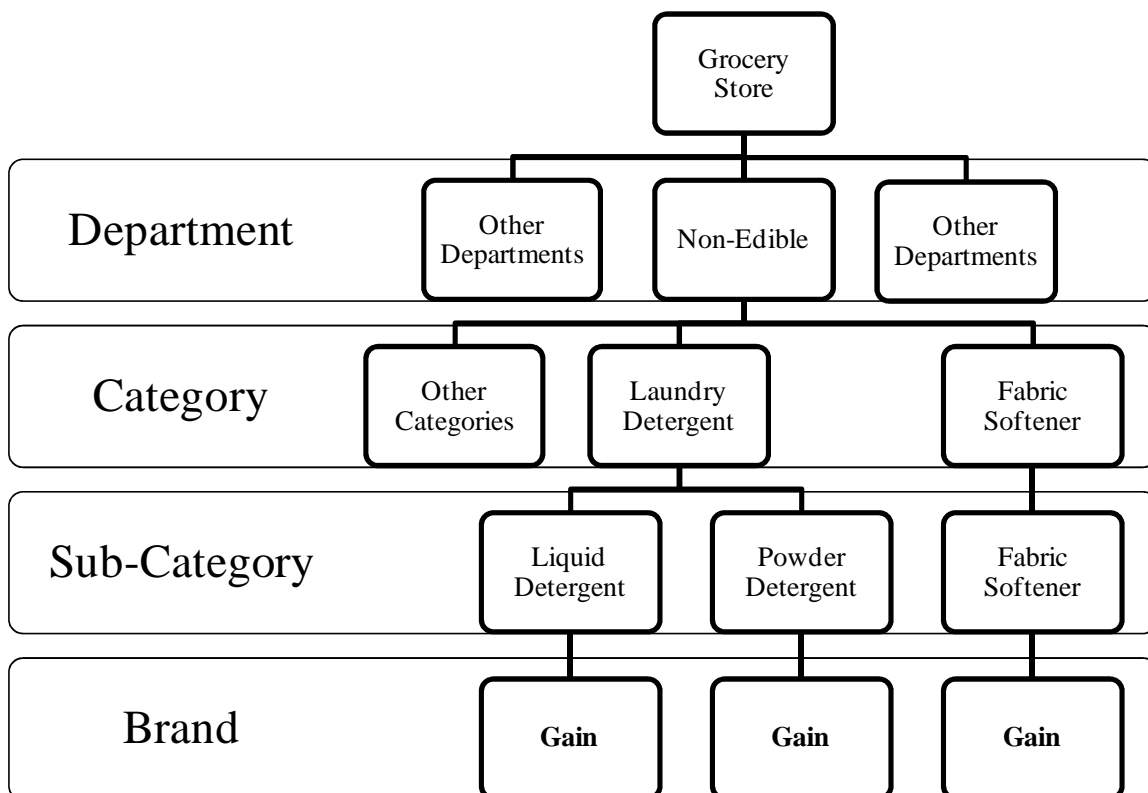
Figure A5
Multi-Department Offering (Pillsbury)
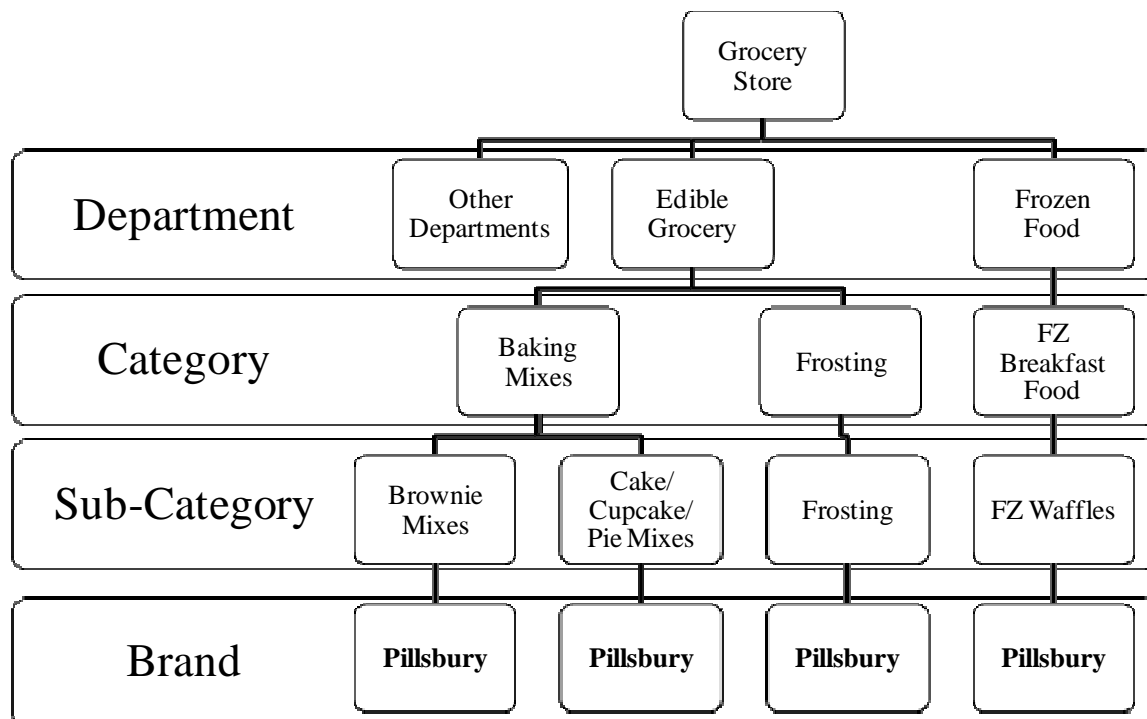
Figure A6
Cross-Offering Coding

	Dummy Multi-SubCategory	Dummy Multi-Category	Dummy Multi-Department		
Intra-SubCategory Offering	0	0	0	⇐	Mondo
Multi-SubCategory Offering	1	0	0	⇐	Dial
Multi-Category Offering	1	1	0	⇐	Gain
Multi-Department Offering	1	1	1	⇐	Pillsbury

Figure A7
Category Level Price Premium versus Volume Premium
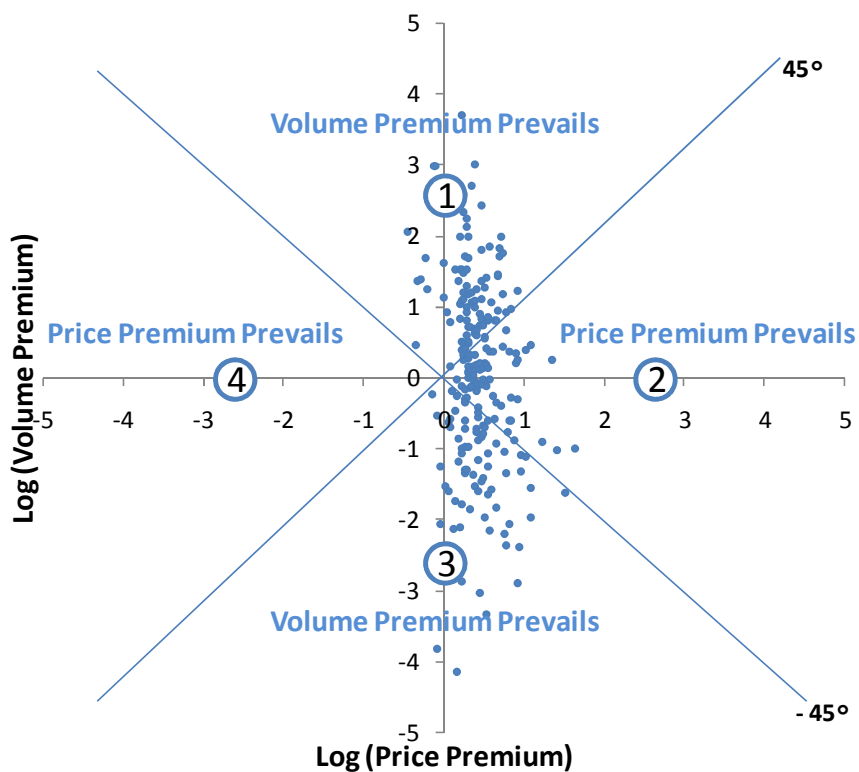
Note: Each dot represents a category level average of log-transformed price and volume premiums

Note: The two lines are with 45 degrees so that on the line absolute value of log(price premium) equals log(volume premium)

Note: Due to the fact that the addition of log (price premium) and log (volume premium) is log(revenue) premium. Category average log (revenue premium) is predominantly determined by log (volume premium) in section 1 and 3, and by log (price premium) in section 2 and 4

Note: 168 out of the 227 (74%) category average log (revenue premium) is predominately determined by category average log (volume premium)

**Figure A8**
Brand Portfolio of Procter & Gamble (Partial)

	Grocery Store			
Segment	Shelf-Stable Food		Non-Food	
Department	Edible Grocery	Non-Edible Grocery		Health & Beauty
Category	Coffee	Laundry Detergent	Dish Detergent	Shampoo
Brand	Folgers Millstone	Cheer, Era, Gain, Tide	Cascade, Joy, Dawn, Ivory	Aussie, Clairol, Pantene
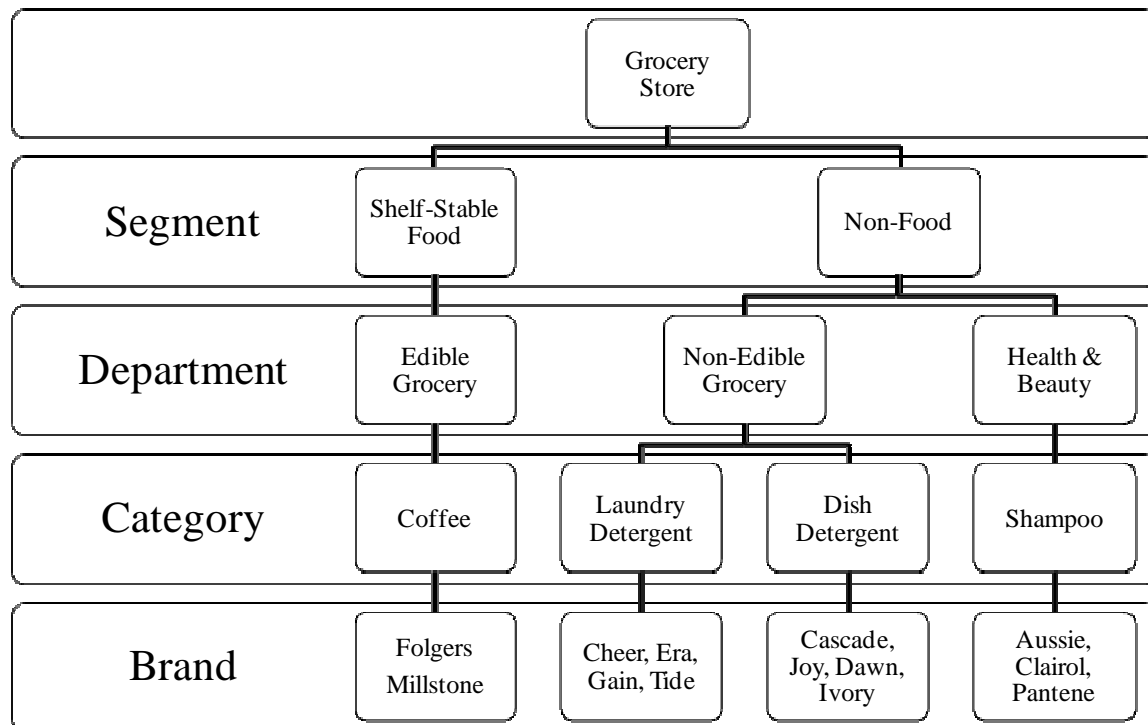
Note: There are several product versions of Ivory sold in different categories

Figure A9
Brand Relationship within the Portfolio of Procter & Gamble (Partial)

	Non-Food				Shelf-Stable Food
Segment ⟹	Non-Food				Shelf-Stable Food
Department ⟹	Non-Edible Grocery		Health & Beauty		Edible Grocery
Category ⟹	Laundry Detergent	Dish Detergent	Soap	Shampoo	Coffee
Brands ⟹	Ivory	Ivory	Ivory		
	Cheer	Dawn	Olay	Aussie	Folger
	Gain	Cascade	Safeguard	Clairol	Millstone
	Tide	Joy		Pantene	
	- - -	- - -	- - -	- - -	- - -

Note: There are several product versions of Ivory sold in different categories

Figure A10
Determination of Brand Market Performance
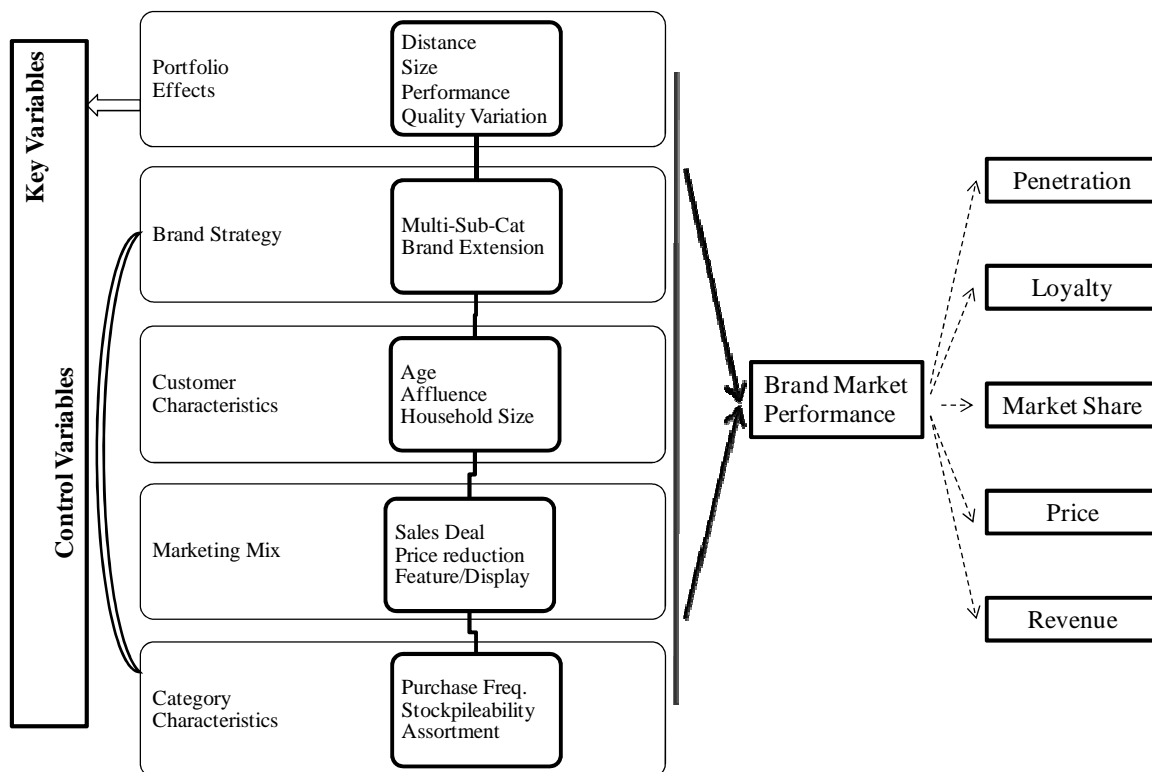
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