IMPACT OF MARKETING INVESTMENTS ON FIRM VALUE

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ABSTRACT

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Firms engage in marketing communication mix such as sales promotions and advertisements primarily to boost sales, attract potential customers while retaining their existing customer base. Marketing communications are therefore critical marketing strategies that are intended to increase the visibility of the firm's offerings. Despite the rich body of research on sales promotions in the marketing literature, there still remains limited insight into the differential impacts of various marketing efforts as well as the conditions under which they are most effective.

My first essay seeks to address these gaps by demonstrating the effects of two types of sales promotions (cash rebates and financing offers) on consumer perceptions of quality and unit sales across both luxury and mass goods. The results reveal that offering financing incentives can effectively drive sales irrespective of product class, but rebates only impact sales in the mass market. Interestingly, rebates negatively affect perceptions of quality across both product classes, demonstrating a more complex path to sales than traditional promotion models may suggest. My second dissertation essay examines the downside of marketing communication mix by U.S. pharmaceutical firms in the post-patent period. Findings suggest that incumbent's marketing activities in the post patent period is a signal that is interpreted differentially by the waves of generic manufacturers who are planning to enter the market. Specifically, the first wave of generic entry may consider incumbent's marketing effort as a threat and hence it may act as an entry deterrent strategy. Interestingly, continuance of incumbent's marketing communication

even after the first wave of generics have entered the market may be interpreted by the second wave of generics as signals of unexplored market potential, thereby attracting competition.

My third essay analyzes the impact of firm's adoption of loyalty program on risk and valuation. Results indicate that firm's adoption of LP alleviates firm-specific risk. Next, we demonstrate that market share moderates the relation between firm's adoption of loyalty program and sales. In particular, adoption of loyalty program by firms with high market share depletes sales. On the other hand, adoption of loyalty programs by small firms boost sales, thereby improving firms' market share.

To my family, who offered me unconditional love and support throughout this journey.

ACKNOWLEDGMENTS

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Impact of Promotion Mix on Firm Performance: The Mediating Role of Perceived Quality

1. ABSTRACT

The typical firm invests 20% of its promotional budget on sales promotions in an effort to drive short-term sales. Given this heavy investment, academic researchers have modeled the effectiveness of such promotions for decades. Despite the rich body of research on sales promotions in the marketing literature, there still remains limited insight into the differential impacts of various sales promotions as well as the conditions under which they are most effective. This research seeks to address these gaps by demonstrating the effects of two types of sales promotions (cash rebates and financing offers) on consumer perceptions of quality and unit sales across both luxury and mass goods. The authors test these effects by leveraging data across 16 major auto manufacturers operating in the U.S. auto industry between 2003 and 2012. The results reveal that financing incentives positively affect perceptions of quality irrespective of the product class. However, cash rebates have positive impact on consumer perceive value in the mass market with no impact in the luxury market. Moreover, financing incentives limit their effectiveness as a driver of sales in the luxury product market whereas rebates impact sales exclusively in the mass market, demonstrating a more complex path to sales than traditional promotion models may suggest. Based on the findings, marketing managers in mass markets can effectively leverage rebates to increase sales and improve consumer perception. On the contrary, managers in the luxury market should focus promotional investments solely on financing offers

because it not only enhances consumer attitude but also offers significant sales benefit. Next, we conduct post-hoc analysis to determine whether firm's offering of promotional incentives are exogenously determined. Granger causality estimates indicate that promotional strategies adopted by firms are endogenously determined corporate strategies, dependent on the firm's internal factors, such as inventory and sales and history of promotional offerings.

Keywords: sales promotion, finance rates, rebates, perceived quality, product class

1.1 Introduction

Manufacturers often utilize sales promotion tactics to boost sales and influence customers' purchase behavior (Blattberg and Neslin, 1989; Neslin, 2002). These promotions are universally focused on driving purchase behavior, getting customers out of a holding pattern by offering them incentives to take action before the promotional offers expire (Blattberg, Briesch and Fox, 1995; Nijs et al., 2001). Given evidence of their effectiveness, firms continue to invest heavily in sales promotions to a tune of $70 billion annually, which accounts for nearly 20 percent of total promotional spending (ZenithOptimedia, 2013), and they have remained an area of focus in the marketing literature. For more than 30 years, scholars have investigated the effect of promotions on various aspects of firm performance (see Table 1 for a review), which has provided great insights into how and why promotions drive consumer demand. Despite this progress, less is known about how simultaneous promotions may impact consumer demand and firm performance, which is becoming an increasingly important issue for industries like automotive, where firms have large promotional budgets and must allocate this budget across mass and luxury brands.

While the desired outcome of promotional investments is invariant across industries, the composition of the promotion mix can vary significantly across industries. For example, consumer packaged goods manufacturers invest heavily in trade promotions as well as in rebates and coupons to drive consumer purchase. In automotive industries, promotions often focus on financing offers from manufacturers or cash rebates. Considerable research has been conducted to understand how promotions can be structured to drive conversion (Silk and Janiszewski, 2008) and leveraged for success in the presence of price competition and price discrimination (Demirag, Keskinocak and Swann, 2011) as two exemplars. Throughout these investigations,

when scholars focus on analyzing the impact of the promotion mix on firm performance, the level of granularity in the data begins to disappear. With few exceptions, researchers often aggregate promotion strategies into a single variable, such as, 'promotion incentives' (Pauwels et al. 2004; Leeflang and Parreño-Selva, 2012; Gangwar, Kumar and Rao, 2013). Even though this approach provides some evidence of the impact of promotions, in general, but offers little actionable guidance to managers who need to manage a promotional budget across an array of investment areas. One notable exception to this tendency to aggregate promotional types into a single bucket is the study by Lu and Moorthy (2007), which demonstrates the differential effectiveness of coupons and rebates as promotional strategies, conditional on consumers' reservation price and redemption costs.

Failing to disaggregate sales promotions into their respective tactical investment areas results in considerable information loss, and provide us with erroneous conclusions. For example, in industries like automotive, the two most common promotions are cash rebates and financing offers. While both result in cost savings for consumers, they could have differential effects on customer attitudes (i.e., perceptions of quality) and sales. As a result, aggregating these investments into a global "promotion incentives" bucket will, at best, result in a lack of actionable guidance for managers and, at worst, lead to incorrect conclusions regarding the effectiveness of promotions in driving attitude change and firm performance. Building on this issue, most prior research conducts analysis at either the industry level or within a focal product category with little variance in the brands under investigation. This narrow lens limits the ability to assess product class contingencies that could alter the nature of the relationship between promotions and sales. One notable factor missing in prior research is product class (luxury

versus mass). The very nature of promotions and customer mix for these classes of goods could result in substantial swings in the effectiveness of sales promotions.

The current study seeks to provide advance research on the impact of the promotion mix on firm sales by addressing these two shortcomings of the extant literature. Specifically, our first contribution focuses on disaggregating promotion incentives into tactical level, operationalizations of finance rates and cash rebate offers in the U.S. automotive industry. As a first step, we focus on the single industry to tease out the effects of the two categories of promotional tactics particularly relevant in the consumer durable industry. In doing so, we provide new insight into the effectiveness of two unique promotional investments in driving consumers' perceptions of quality and firm sales. Second, we examine the effects of these promotions across luxury and mass product classes, thus offering an improved understanding of promotion types that can offer the biggest return for the various product classes. Finally, when testing these effects, we introduce a new method to the marketing literature to handle the frequency mismatch data issue by applying mixed data sampling regression (MIDAS) as pioneered by Ghysels, Santa-Clara, and Valkanov (2004).

Our results demonstrate considerable value in disaggregating promotional incentives and modeling their impact separately for luxury and mass goods. For example, our findings reveal that finance rates are universally effective in driving consumers' quality perception, irrespective of product class. However, they are effective demand boosters exclusively in the luxury product market. On the contrary, cash rebates trigger sales increases exclusively for mass brands. Estimates also indicate that after controlling for firm's history of bankruptcy filing and firm characteristics, cash rebate offerings actually improve consumer perceive value in the mass product market. Empirical estimates suggest that managers may employ perceived quality as a

strategic asset that can effectively boost sales, irrespective of product class. As a result, our findings identify critical contingencies regarding the promotions-performance relationship and in doing so has considerable implications for both researchers and practitioners. In the following sections, we introduce the conceptual basis for our model, describe the MIDAS method, and discuss the results.

1.2 Conceptual Background

1.2.1 Defining Sales Promotions

Sales promotion is a critical component of a firm's marketing mix plan. These promotional tactics operationalize short-term techniques to generate almost immediate impact on sales volume and influence customers' purchase pattern (Belch et al. 2008). In the current study, we focus on finance rates and rebates - the two critical consumer oriented promotional strategies frequently employed in the high-value consumer durable goods industries (Attanasio, Koujianou, and Kyriazidou 2008). This study focuses on the U.S. automobile industry, a particularly appropriate product category where both types of promotional strategies mentioned above are critical demand boosters. In particular, automobiles are typical examples of consumer durables where median product price exceeds median household income (Ohta and Griliches, 1986). Consumers may lack the liquid assets necessary to make down payments towards the purchase of these consumer durables. They may instead seek loans from banks or other financial institutions to finance their product purchase (Stango and Zinman 2011). Additionally, rebates discount product price. Thus, consumer-oriented sales promotions, such as finance rate deals and rebates, may partially solve consumers' liquidity problem, making the product relatively affordable and consequently, increasing consumers' likelihood of purchase.

1.2.2 Finance Rates

These are promotional strategies especially utilized by firms to stimulate purchase of big-ticket items (i.e., automobiles etc.). An auto loan is a contractual agreement between the lender

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and the borrower where the borrower pledges to repay the loan at a predetermined rate over a fixed time period. Additionally, it is a secured loan where the financed vehicle is used as the collateral (Forbes 2000). The annual percentage rate (APR), also referred to as finance rate, is a function of the prevailing market interest rates and business environmental conditions (Gambacorta 2004). A typical example of 'finance rates' may be financing purchase of Chrysler/GM/Ford cars at an interest rate that is significantly less than the ongoing market interest rate (e.g., 1.9% annual rate) (Varadarajan and Clark 1994).

In efforts to boost sales, auto manufacturers typically offer incentives to customers through interest rate reductions from their captive finance subsidiaries (Barron, Chong, and Staten 2008). These finance rate deals significantly lower the interest rates on the loans relative to prevailing market interest rate, thereby drastically reducing the monthly payments customers are required to make towards their loan. Such promotional incentives either make the car more affordable to the customer by deducting smaller dollar amount from the customer's disposable income or allow the customer to purchase higher quality product by lowering the monthly loan payments required. Interestingly, auto loans carrying zero percent interest rate is not uncommon in the U.S. auto industry. Thus, finance rate deals do not have any explicit discount on the product price. However, they are implicit promotional strategies that decrease the present value of customers' future stream of payments made towards the loan repayment. Additionally, redemption period of the promotion coincides with the consumers' loan repayment period. Moreover, since the manufacturing firm that sells the product and the financing firm that extends the loan are usually independent entities, consumers tend not to associate incidence of attractive finance rates with erosion of quality.

1.2.3 Rebates

Rebates are monetary inducements in the form of price subsidies offered by manufacturers to potential consumers to stimulate purchase (Blattberg and Neslin 1990; Neslin 2002). Traditionally, this category of inducement involves reducing the sales price of the product equal to the dollar amount of the rebate (Varadarajan and Clark 1994). These are explicit promotional tactics such that the price discount can be redeemed after purchase of the product. Interestingly, during purchase of big ticket items, customers are often given the option to apply the rebate towards their down payment or receive cash (Ault et al., 2000).

Thompson and Noordeweir (1992) analyzes declining impact of continuous incidence of rebates for three successive years in the U.S. automobile industry. Results indicate that these promotional strategies accelerate consumers' likelihood of purchase. Lu and Moorthy (2007) investigate whether coupons and rebates, two critical promotional incentives, have identical implications on consumers' buying behavior. The authors posit that consumers differ in redemption costs since they inherently differ in opportunity cost of time. Specifically, with coupons, the uncertainty about redemption costs is resolved even before product purchase. However, with rebates, the uncertainty is resolved post product-purchase. Findings also suggest that consumers' 'risk aversity' and 'delay between rebate redemption and rebate payment' alleviates rebate attractiveness (Lu and Moorthy, 2007).

1.2.4 Promotions and Price Structure

Perceived quality represents consumers' critical attitudinal evaluation of products and these perceptions are often driven by brand reputation, price, and advertising efforts (Zeithaml, 1988; Dodds, Monroe and Grewal, 1991; Mitra and Golder, 2006). Quality perceptions serve as

an "attitude-like" assessment of the overall reliability of a product (Bitner, 1990) and can serve as a primary driver of purchase intentions (Zeithaml, Berry, and Parasuraman, 1996) and brand preference (Yoo, Donthu, and Lee, 2000).

Given the importance of perceived quality, it is widely regarded as a key strategic asset despite its intangible nature (Aaker and Jacobson, 1994). The literature indicates that managers need to complement delivery of quality product with high consumer perceptions regarding product quality to realize the firm's competitive advantage and to improve its financial value (Aaker, 1991; Aaker and Jacobson, 1994). Thus, firms often leverage extrinsic cues to communicate with their customer base and to build positive quality perceptions as consumers interpret these cues when evaluating competing product options and forming quality evaluations (Olson, 1978). This is most commonly done directly through product pricing to the extent that a higher price reflects higher quality (Zeithaml, 1988) or through advertising where higher levels of advertising can result in higher perceptions of product quality (Milgrom and Robers, 1995). Given the rich literature base on these effects, we simply control for these quality drivers in the current study and focus on the potential role of promotions as signals of quality.

In a similar vein to price, promotions provide extrinsic cues to customers about the quality of the product. So while promotions are traditionally targeted at changing short-term behavior, they can also be manifested in quality evaluations. In the context of our current research, we consider two types of promotions. At the basic level, cash rebates function as price reduction offers to consumers, thus eroding quality evaluations under the same mechanism as price. However, when evaluating rebates, consumers may also engage in another layer of processing in which they potentially perceive rebate offers as a signal of desperation by manufacturers, which can result in a further reduction in quality perceptions (Darke and Chung,

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2005). As a result, we propose that higher rebates erode perceptions of quality. Stated more formally (figure 1):

H₁: The magnitude of rebates has a negative impact on consumers' perceived quality.

The mechanism underlying the effects of cash rebates is relatively straightforward, but the manner in which financing offers can impact quality evaluations is not explicitly addressed in the literature because a firm's extension of attractive finances rates are implicit promotional strategies with no direct discount on product price. Instead, these promotional tactics decrease consumers' monthly payment toward the product purchase loan, rendering an otherwise high-priced product affordable. As a result, the "price" of the product remains unchanged when consumers are offered financing incentives, but the overall cost to the consumer who finances a vehicle can be greatly reduced. While it has been suggested that consumers account for financing rates in determining the overall cost of a vehicle (Gale, 1994) and class economic investigations have demonstrated a relationship between interest rates and demand for durables (e.g., Hamburger, 1967), little empirical evidence has been provided to model the impact of finance rates on perceptions of product quality. However, in line with the same logic on the well documented price-quality relationship, we expect that a higher finance rate, that increases the cost of a product, will result in increased perceptions of quality. Thus, we propose that:

H₂: Finance rates have a positive impact on consumers' perceived quality to the extent that higher finance rates result in higher perceptions of quality.

1.2.5 Perceived Quality and Firm Sales

Perceived quality, in association with brand awareness and brand associations, strengthens brand loyalty by increasing customer satisfaction and by providing consumers with reasons to buy the product (Aaker, 1992). This gets reflected through increased sales and enhanced firm value in the long run. Aaker and Jacobson (1994) examine the financial information contained in perceived quality measures and analyze the relationship between firm value, measured by movement in a firm's stock prices and customers' perceived quality. Findings of the study indicate a positive relationship between changes in consumer's perception of quality and stock returns, thereby impacting firm performance. In particular, improved perceived quality strengthens customers' brand loyalty, which translates into higher consumer switching costs. The firm may effectively exploit such high switching costs to increase its cash flow and revenue generation (Srinivasan et al., 2009). Tellis and Johnson (2007) investigate whether publication of product quality information in *The Wall Street Journal* generates abnormal return in stock prices. Findings indicate that a firm's signal of high product quality generates investor enthusiasm as reflected by abnormal returns in stock prices. Additionally, such signals improve consumer confidence in the firm's product offerings and enhance their willingness to buy (Oh, 1999). We hypothesize that 'perceived quality' has positive impact on sales.

H$_3$: Perceived quality has positive impact on sales.

1.2.6 Impact of Promotions on Sales

As we proposed in prior hypotheses, the indirect effect of financing incentives is proposed to by positive; however, the indirect effect of rebates on sales via quality is proposed to be negative. As a result, for cash rebates to offer positive return for firms in either the short or long run, they must have a significant direct effect on the quantity purchased. In line with this necessity, the marketing literature does provide solid evidence of the impact of price reductions like those offered by rebates on short-term sales spikes (for a review see Blattberg, Briesch, and Fox, 1995).

More recent investigations have provided an even more nuanced view of this relationship. Specifically, Gangwar, Kumar and Rao (2013) demonstrate that following a firm's adoption of promotional strategies consumers significantly increase their purchase quantities in an effort to stockpile. Similarly, Joshi and Hanssens (2010) suggest that rebates reduce sales price and stimulate product demand. As a result, large rebates should trigger a stronger change in demand. Based on classic investigations into the relationship of price promotions and sales and recent empirical and analytical evidence, we suggest:

H₄: Rebates have a positive impact on sales to the extent that higher magnitude cash rebates result in higher sales.

In addition to rebates, firms can lower the cost of products through effective financing offers. Specifically, finance rate cuts improve consumers' willingness to buy by reducing the

loan payment they are required to make, thereby rendering the product more affordable (Attanasio, Goldberg, and Kyriazidou, 2008). Thus, we propose:

H₅: Finance rates have a negative impact on sales to the extent that higher finance rates result in lower sales.

1.2.7 Moderating Role of Product Class (Luxury vs. Mass)

Luxury brands are designed to be deliberately conspicuous and flamboyant, to emit an aura of exclusivity and quality (Atwal and Williams, 2009; Brown, Kozinets and Sherry, 2003) that distinguishes these brands from mass-market firms by signaling their commitment towards values 'that are above commercial considerations' (Beverland, 2005). Marketing of luxury products has become increasingly multifaceted, being concomitant not only with cuing an aura of quality, performance and legitimacy, 'but also with attempting to sell an experience by relating it to the lifestyle constructs of consumers' (Atwal and Williams, 2009). The extant literature indicates that the inescapable desire for social prestige influences consumers to pay a price premium for products that confer status (Shapiro, 1983). Goldsmith, Flynn, and Kim (2010) posit that 'status consumption' heightens consumers' level of involvement with the product category. It also enhances consumers' brand loyalty toward the product. Consequently, an enhanced level of involvement and brand loyalty make the consumer less price-sensitive. Consumers associate consumption of luxury goods as signal of status and are willing to pay the price premium (Han, Nunes, and Drèze, 2010). Thus, effective marketing strategies for luxury products are those that convey high quality and are less explicit about product pricing structure.

The literature on marketing luxury products indicates that luxury is a social marker and classical marketing rules do not apply for firms considering to 'enter the luxury market, to build

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a successful luxury brand' and to maintain luxury status of their brands (Vigneron and Johnson, 2004; Kapferer and Bastien, 2009). Thus, these firms need to adopt strategies that endow the 'luxury brand' with a halo of superiority with respect to its client. Furthermore, these marketing strategies emit signals that emphasize product excellence and perfection, while maintaining an aura of exclusivity. Even though price communicates quality, marketing strategies for luxury brands typically withhold price information from being publicly advertised (Kapferer and Bastien, 2009). The role of advertising in the luxury sector is to recreate the dream of exclusivity and not to improve sales growth (Kapferer and Bastien, 2009). Thus, firms whose product offerings target the luxury market traditionally avoid extension of explicit sales promotions such as rebates and coupons (Kapferer, 2012a; 2012b).

Interestingly, signals emitted by the luxury marketing mix are often diametrically different from those of classical marketing employed while promoting mass products (Kapferer and Bastien, 2009). In particular, in the mass market, one observes promotional strategies that offer explicit price discounts and provide consumers with monetary relief that effectively enhance product demand. Additionally, advertisements of products are geared toward accelerating sales growth. Often times, advertisements even provide price information to customers. Thus, considering the characteristics of the target customers in the luxury versus the mass market, we posit that finance rates, given their implicit characteristics, have a higher positive impact on perceived quality and sales in the luxury market relative to the mass market. We also theorize that rebates, given their explicit characteristics, erode perceived quality significantly more in the luxury market than in the mass market. Finally, we theorize that rebates are a relatively more effective strategy in boosting sales in the mass market than in the luxury market. We hypothesize:

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H$_{6a}$: The negative effect of rebates on perceived quality is stronger for luxury vis-à-vis mass products.

H$_{6b}$: The positive effect of finance rates on perceived quality is stronger for luxury vis-à-vis mass products.

H$_{7a}$: The positive effect of rebates on sales is weaker for luxury vis-à-vis mass products.

H$_{7b}$: The negative effect of finance rates on sales is stronger for luxury vis-à-vis mass products.

1.3 Methodology

1.3.1 MIDAS

Our analysis uses data with different sampling frequency. Specifically, information on firms' promotions is available weekly, whereas sales and inventory information are sampled monthly. Additionally, information on firm performance, dealership and perceived quality data is available annually. Instances when researchers deal with mixed frequency data, they typically have two alternatives: either to align variables downward by aggregating high frequency data to a lower frequency down or to align variables upward by interpolating lower frequency data to high frequency. Both methods suffer from limitations. On one hand, downward adjustments abandon valuable information in the high frequency data, which consequently reduces its estimation and forecast efficiency (Silvestrini and Veredas, 2008). The other alternative which involves upward alignment based on random mathematical procedures may also be problematic. We address the frequency mismatch data issue by applying mixed data sampling regression (MIDAS) (Ghysels, Santa-Clara, and Valkanov, 2004). MIDAS regression typically projects 'high frequency data onto low frequency data with tightly parameterized weights' (Qian, 2013). In particular, MIDAS helps to project the dependent variable onto a history of lagged observations of the independent variables.

Suppose the sampling frequency of variable y_t is between $t-1$ and t is unity (say, yearly), whereas that of another variable, say $x_t^{(m)}$, is 'm' in that given period (say, monthly or m = 12), then MIDAS aids in understanding the 'dynamic relation between y_t and $x_t^{(m)}$'. In

particular, MIDAS helps to 'project y_t onto a history of lagged observations of $x_{t-j/m}^{(m)}$'(Ghysels,

Sinko and Valkanov, 2007). Note that the 'superscript on $x_{t-j/m}^{(m)}$ denotes the higher sampling

frequency and its exact timing lag is expressed as a fraction of the unit interval between $t-1$ and

t ' (Ghysels, Santa-Clara, and Valkanov, 2004). The MIDAS model may be illustrated as:

$$y_t = \beta_0 + \beta_1 B\left(L^{1/m};\theta\right)x_t^{(m)} + \varepsilon_t^{(m)} \tag{1}$$

for $t = 1,....,T$, where y_t is the regressand, x_t is the regressor, m denotes the frequency of

occurrence of x_t, $B\left(L^{1/m};\theta\right) = \sum_{k=0}^{K} B(k;\theta)L^{k/m}$, $L^{1/m}$ is a lag operator and $\varepsilon_t^{(m)}$ is the disturbance

term. The parameter β_1 indicates the aggregate impact of lagged $x_t^{(m)}$ on y_t and β_0 is the

intercept. Following Ghysels, Sinko and Valkanov (2007), we estimate β_1 'by normalizing the

function $B\left(L^{1/m};\theta\right)$ to sum up to unity'. Also note that the lag coefficients in $B(k;\theta)$

corresponding to $L^{k/m}$ is a vector of parameter θ with a small dimension. In a MIDAS

framework, the $L^{1/m}$ coefficients are characterized by $B\left(L^{1/m};\theta\right)$. While there are several

alternative parametirizations of $B\left(L^{1/m};\theta\right)$, in this study we utilize the "Exponential Almon Lag"

specification of $B(k;\theta)$ (Ghysels, Sinko and Valkanov, 2007).

$$B(k;\theta) = \frac{e^{\theta_1 k + ... + \theta_Q k^Q}}{\sum_{k=1}^{K} e^{\theta_1 k + ... + \theta_Q k^Q}} \tag{2}$$

1.3.2 Empirical Model

We model the relation between promotional strategies, perceived quality, and firm sales as a two-equation simultaneous model (Zellner and Theil, 1962). We use a three-stage least square (3SLS) method to estimate the model—a method traditionally employed to estimate 'simultaneous-equation models in the presence of dynamic random effects' (Arellano, 1990). While considering cross-equation correlation and potential endogeneity issues, the 3SLS method of estimation yields relatively efficient estimates for simultaneous-equation systems as compared to that of two-stage least squares (2SLS) and ordinary least squares (OLS) (Tamirisa and Igan, 2008). Additionally, the 3SLS method of estimation also does not impose restrictions on the autocovariance matrix of errors. Hence, 3SLS is the preferred estimation method in the current study. The variables used in the estimation are as follows (see Appendix 1):

Perceived Quality equation: In the 'Perceived Quality' equation (i.e., equation 3), perceived quality of jth brand of firm i in period t (PQ_{ijt}) is the dependent variable with firm's offerings of finance rates (FR_{ijt}) and rebate ratio (RR_{ijt}) as the key explanatory variables. Additionally, we include bankruptcy ($bankruptcy_{it}$) as "perceived quality shifter" since consumers often form their perception regarding quality of firm's product offerings based on whether the firm has ever declared bankruptcy in the past. We also include product-class ($Luxury_{ijt}$) of jth brand of firm i in period t as additional exogenous variables that may impact consumers' perceived quality. We include the dealer network ($Dealer\_Network_{it}$) and advertising expenditure ($AdExp_{it}$) in the analysis to control for consumers' access to firm specific information.

Sales equation: Logarithmic value of firm $i's$ total sales of jth brand in period t is the dependent variable ($\log(Sale_{ijt})$) (i.e., equation 4) with perceived quality (PQ_{ijt}), firm's extension of finance rates (FR_{ijt}) and rebate ratio (RR_{ijt}) as key explanatory variables. We also include log of total assets ($\log(total\ asset_{ijt})$) as a proxy for firm size, inventory ($Inventory_{ijt}$) and adjusted capital expenditure ($CAPX_{it}$) as "supply-shifters" since these are firm-specific factors that help the firm to adjust its supply function. Additionally, we include product class ($Luxury_{ijt}$) of jth brand of firm i in period t as additional exogenous variables that may impact product sale. We also include the firm's dealer network ($Dealer\_Network_{it}$) and advertising expenditure ($AdExp_{it}$) as firm level control variables. The unit of analysis is brand. We collected data for j^{th} brand for the ith firm at time t from 2003 to 2012. However, since some of the brands were discontinued within this time period, we have an unbalanced panel data.

1. Perceived Quality Equation

$$
\begin{aligned}
PQ_{ijt} = {} & \alpha_0 + \alpha_1 FR_{ijt} + \alpha_2 RR_{ijt} + \alpha_3 Price_{ijt} + \alpha_3 Luxury_{ijt} \\
& + \alpha_4 Luxury_{ijt} * FR_{ijt} + \alpha_5 Luxury_{ijt} * CR_{ijt} + \alpha_6 Bankruptcy_{it} \\
& + \alpha_7 Dealer\_Network_{it} + \alpha_8 AdExp_{it} + \varepsilon_{ijt}^{PQ}
\end{aligned}
\tag{3}
$$

2. Firm Performance equations:

$$
\begin{aligned}
Sale_{ijt} = {} & \beta_0 + \beta_1 PQ_{ijt} + \beta_2 FR_{ijt} + \beta_3 RR_{ijt} + \beta_4 Luxury_{ijt} \\
& + \beta_5 Luxury_{ijt} * FR_{ijt} + \beta_6 Luxury_{ijt} * CR_{ijt} + \beta_7 Dealer\_Network_{it} \\
& + \beta_8 AdExp_{it} + \beta_9 \log(firm\ assets)_{it} + \beta_{10} Inventory_{ijt} + \beta_{11} CAPX_{it} + \varepsilon_{ijt}^{S}
\end{aligned}
\tag{4}
$$

We now provide a definition of the variables used in the analysis:

- Perceived Quality (PQ_{ijt}) represents consumers' perceptions regarding firm $i's$ product quality for j^{th} brand in period t. It is a reflection of the brand's strength, derived directly from consumer responses regarding brand equity, consumer connection, and brand momentum.

- Sales ($Sale_{ijt}$) is the total number of jth brand automobiles sold by i^{th} firm in time t.

- Finance Rate (FR_{ijt}) is the interest rate extended by banks and financial institutions toward their most creditworthy customers. It is the difference in the interest rate the financing division of ith manufacturing firm offers to its customers upon purchase of the j brand vehicle and accepting the loan from the firm to finance his/her product purchase in time t and the prevailing industry prime interest rate. Thus, the difference indicates additional incentives being offered by the financing companies to ensure that customers apply and secure loans from them.

- Rebate Ratio (RR_{ijt}) is the ratio of dollar value of rebate offered by i^{th} manufacturing firm for j^{th} brand in time t to its customers upon purchase of the automobile to product price ($Price_{ijt}$). Since luxury cars are prices much higher than mass or economy cars, a $500 rebate offered towards a luxury car has very different implications compared to that towards a mass car. Thus, rebate ratio is a critical factor driving both firm sales and consumer perceived quality. Note that price ($Price_{ijt}$) is the dollar value of the jth brand automobile manufactured by i^{th} firm in time t.

- Luxury ($Luxury_{ijt}$) is a dummy variable that takes the value of 1 if the j brand of ith firm is a luxury product, otherwise it equals 0.

- Bankruptcy ($Bankruptcy_{it}$) is a time varying indicator variable that assumes the value unity when the firm declared bankruptcy and assumes zero when the firm is not under bankruptcy protection.

- Dealer network ($Dealer\_Network_{it}$) is measured by the number of auto dealers operating in the U.S. for i^{th} firm in time t. They are an important channel of communication between the manufacturer and end customers: the higher the number of auto dealers, the more intense the supply chain network.

- Advertising Expenditure ($AdExp_{it}$) is the ratio of a firm's total advertising expenditure to its total assets.

- Log of Firm Assets ($\log(firm\ assets)_{it}$) is the logarithmic value of firm's total assets and is used in the analysis to control for firm size.

- Inventory ($Inventory_{ijt}$) is the total number of jth brand vehicles the ith auto manufacturer has in its reserve at time t.

- Adjusted Capital Expenditure ($CAPX_{it}$) is the ratio of ith firm's total capital expenditure to its total assets at time t. It represents expenditures incurred by firms to upgrade existing physical assets or to acquire assets with the intention of creating financial benefit for the firm beyond the taxable year.

Note that "perceived quality shifters" appear in the perceived quality equation (i.e., equation 3) but not in the sales equation (i.e., equation 4), while "supply shifters" appear in the sales equation (i.e., equation 4) but not in the perceived quality equation (i.e., equation 3). This makes the model identifiable 'since several exogenous variables are excluded from each equation'

(Verhoef, Neslin and Vroomen, 2007). The error terms ε_{ijt}^{PQ} and ε_{ijt}^{S} are potentially correlated with each other for a given firm and across firms.

1.4 Data and Measurement Variables

In this study, we considered 16 major auto manufacturers that were operating in the U.S. auto industry between 2003 and 2012 and offering either luxury or economy or both brands of products to the customers. Perceived quality information by brand was obtained from Harris Interactive. We obtained weekly brand specific promotional information (i.e. cash rebate and finance rate), monthly sales transaction, inventory and supply information by brand and firm specific dealership network information from Automotive News. Brand specific price information was sourced from Kelly Blue Book and warranty information from Gillis (2007). We obtained advertisement and capital expenditure data from COMPUSTAT and product age and luxury information from respective auto manufacturers' websites (see Appendix 1).

1.5 Results

1.5.1 Descriptive Statistics

Table 2 provides the correlation coefficient estimates of the variables used in the analysis. The estimates indicate that perceived quality has negative correlation with finance rate and rebate ratio, significant at 1 percent level of significance. This indicates that lower is the finance rate being offered by the firm and lower is the rebate ratio, higher is the product's perceived quality. On the contrary, perceived quality has positive correlation with price, significant at 1 percent level of significance. This implies that higher price is associated with higher perceived quality. Rest of the estimates may be interpreted accordingly.

1.5.2 3SLS Estimation

Table 3 provides the 3SLS estimates of the model. In the first column, the dependent variable is perceived quality and the independent variables are sales promotions (i.e., finance rate and rebate ratio), vehicle characteristics (i.e., price, luxury). We include dealer network and advertisement expenditure to control for consumers' access to firm specific information. We also include warranty information to control for brand specific information (Erdem and Swait 1998).

Results indicate that for every 1 percent increase in finance rates, consumer's perceived quality increases by .0646 units (p<.001). Findings suggest that consumers perceive incidence of finance rates as firms' signal of high product quality offering. In particular, higher is the finance rate being offered by the firm, higher is the value of perceived quality. This confirms hypothesis H2 that incidence of finance rates have positive and significant impact on perceived quality. Estimates also indicate that for every 1 unit increase in the rebate ratio increases consumer

perceived value by .0200 units (p<.001). Thus findings contradict hypothesis H1 that cash rebates have negative impact on consumers' perceived quality.

Findings also suggest that when rebates are offered to promote luxury products, it erodes consumer perceived value by .0092 units (p<.1). This confirms hypothesis H6a that incidence of rebates erodes perceived quality significantly more of luxury products relative to that of mass products. However, no such differential impact of incidence of finance rates on perceived quality has been observed across luxury and mass product markets. Thus, hypothesis H6b is not supported.

In the second column, we have logarithmic value of sales of brand j for the ith firm as the dependent variable and perceived quality, sales promotions (i.e., finance rate and rebate ratio), and product class as the independent variables. Consistent with the above analysis, we include dealer network and advertisement expenditure information to control for consumer's access to firm related information. We also include firm size measured by logarithmic value of firm assets, inventory and adjusted capital expenditure as firm level controls.

Results indicate that 1 unit improvement in perceived quality increases log of sales by .5964 units (p<.001). Consistent with the existing literature, estimates confirm hypothesis H3 that perceived quality has positive impact on firm sales. Results also suggest that one unit increase in rebate ratio boosts log of sales by .0232 units (p<.05). This confirms hypothesis H4 that promotional strategies such as cash rebates tend to have positive and significant impact on firm sales. Interestingly, we do not observe any significant impact of finance rates on sales. Thus, findings do not validate hypothesis H5 that incidence of finance rates boosts firm sales.

Findings also indicate that for every one unit increase in dealership network, perceived quality and sales improve by .0007 units (p<.001) and .0005 units (p<.001) respectively.

Dealership network provides effective communication channel between the manufacturer and the consumers and are able to provide authentic information regarding product quality along with information on lucrative promotional deals to their customers. Additionally, higher dealership network corresponds to higher competition amongst the dealers. In such a competitive environment, as survival strategies, dealers would strive to provide better service and offer better deals to customers. This eventually improves perceived quality and enhances sales.

To farther unravel the differential impact of promotional strategies on perceived quality and firm sales across product class, we estimate the model for two subsectors (i.e., luxury and mass automobiles) (Table 4). First two columns provide us with estimates for the mass product whereas third and fourth column provide us with estimates of the luxury product. Additionally, we have perceived quality (log of sales) as the dependent variable in the first and third (second and forth) columns. Consistent with the previous sections, we have promotional strategies (i.e., finance rates and rebate ratio) as the independent variables. Furthermore, we control for consumers' access to information and firm characteristics.

Estimates suggest that in the mass market, one unit increase in finance rates improves consumer perceived value by .0663 units (p<.001). Similarly, in the luxury market, one unit improvement in finance rates drives up perceived quality by .028 units (p<.05). Interestingly, the differential impact of finance rate across the two markets is not statistically significant. Thus, results do not support hypothesis H6b that the positive effect of finance rates on perceived quality is stronger for luxury vis-à-vis mass products. Post-hoc, we conducted one-way analysis of variance to test for difference in means in perceived quality across product class. Findings suggest that mean (standard deviation) of perceived quality of luxury products is higher (lower)

than that of mass products. Hence, consumers targeting the luxury market are less sensitive to perceived quality.

Empirical findings suggest that in the mass market, one unit increase in rebate ratio increased perceived quality by .0203 units (p<.001). Contrary to the findings in the literature, estimates indicate that after controlling for firm's filing for bankruptcy protection and other firm characteristics, rebates have a positive impact on perceived quality. However, rebate ratios may not have any impact on perceived quality in the luxury market.

Empirical estimates indicate that one unit increase in perceived quality in the mass (luxury) market enhances log of sales by .5972 units (.8145 units) both at p<.001. Thus, findings support hypothesis H3 that perceived quality boosts sales, irrespective of the product market characteristics. Results also indicate that one unit drop in finance rates in luxury market improves sales by .0761 units (p<.05), with no significant impact in the mass market. Findings support hypothesis H7b that the negative effect of finance rates on sales is strong in the luxury market compared to the mass market. On the other hand, estimates indicate that one unit increase in rebate ratio in the mass market increases log of sales by .0279 unit (p<.05) with no significant impact on sales in the luxury market. This confirms hypothesis H7a that cash rebates may be an important driver of sales in the mass market relative to that in the luxury market. Thus, findings suggest that attractive finance rates are effective promotional strategies to boost sales in the luxury market whereas rebates drive sales exclusively in the mass market.

1.6 Post-Hoc Analysis

1.6.1 Contingencies in Sales Promotion Strategies

Having established the relation between promotional strategies, perceived quality and firm performance, post-hoc we analyzed whether firm's promotional strategies are indeed driven by lagged values of perceived quality, along with firm characteristics such as sales, inventory and supply functions. Contingency theory is a strand of behavioral theory that proposes that strategic decisions adopted by managers are contingent on its internal needs and the environmental circumstances that the firms needs to adjust to (Morgan 1986). Even though strategy is not a universal concept, its structure must be fitted into its context to enhance organizational performance (Schoonhoven 1981; Mohr 1982). This fit is a vital concept, as it needs to support firm's competitive strategies. In fact, strategic fit may aid the firm to acquire and develop critical resources and capabilities, which may endow it with competitive edge (Drazin and Van de Ven, 1985).

Perceived quality corresponds to firms' financial health. Thus, it is imperative for managers to comprehend whether consumers perceive their product offerings of high quality relative to their competitors. We posit that while crafting market-mix plans, managers internalize perceived quality information. Specifically, if perceived qualities of product offerings are high, firms would continue to adopt marketing strategies that would convey similar and consistent cue to their consumer base. On the contrary, if firms have a history of low perceived quality, managers would adopt marketing strategies that would influence consumer's perception regarding product quality towards better. Thus, we theorize that firm's adoption of promotional strategies is contingent on lagged value of perceived quality of its product offerings.

Extant literature indicates that two common features of consumer durable goods markets are inventory pile up relative to sales and declining product prices over its life cycle (Copeland, Dunn, and Hall (2005). Thus, managers are constantly required to synchronize their promotional strategies, inventory and supply management to maximize firm valuation and sale. Even though depleting inventory restricts inventory carrying costs, running too low on inventory may prove to be detrimental for firm reputation (Hendricks and Singhal 2003). Additionally, supply uncertainties due to external factors often require managers to adjust promotional strategies to adjust with projected product demand. For example, due to natural calamities, manufacturing firms may experience unplanned manufacturing parts or product supply disruptions (Chopra and Sodhi 2004). Furthermore, demand for firm's product offerings are exposed to seasonal variations. Consistent with contingency theory, we posit that promotional incentives are often endogenously determined, adopted by managers to improve sales, deplete inventory and adjust variations in supply. Specifically, they provide the firm with a strategic fit between its internal requirements and the environmental conditions it is exposed to, thereby improving its valuation.

1.6.2 Unit Root Test

First, we conduct unit-root tests to determine whether the variables used in the study (i.e., sales, promotions, inventory, etc.) are stationary or evolving over time. A unit root test helps us to determine whether the variables should enter the Granger Causality Model in level or difference form. We applied the augmented Dickey Fuller (ADF) test to examine the stationarity of each individual series. Following is the general form of the test equation:

$$\Delta S_t = \alpha_0 + \alpha_1 t + (\rho - 1)S_{t-1} + \sum_{k=1}^{n-1} \beta_k \, \Delta S_{t-k} + \varepsilon_t \qquad (5)$$

where S_t is the variable of interest; t is a trend variable; $\Delta = 1 - L$ where L is the lag operator; and ε_t is a white noise term. Additionally, α_0 is the intercept term that accounts for the fact that S_t at $t = 0$ (i.e., S_0) need not necessarily be equal to zero (Nijs et al., 2001). The null hypothesis is $H_0 : \rho = 1$ and S_t is said to possess the unit root property if one fails to reject H_0 (Dickey and Fuller, 1979).

1.6.3 Cointegration Test

Evolving variables are said to be cointegrated when a linear combination of the variables exists and results in stable residuals (Dekimpe and Hanssens, 2003). Various factors may drive such long-run equilibria. For example, a boost in sales may translate into higher marketing budget allocations, which may be reflected in a firm's higher sales promotion expenditure. In addition, competitive decision rules may restrict skewed distribution of the marketing budget. This may ensure that budget allocation across marketing mix variables does not deviate substantially. We use Johansen's Full Information Maximum Likelihood (FIML) procedure to test for possible pairwise cointegration of the five time series (i.e., finance rates, rebates, inventory, supply and sales functions) (Johansen, 1995).

1.6.4 Granger Causality Test

We perform the Granger causality test to analyze whether an incidence of promotions is triggered by the firm's lagged sales, inventory, and supply information as well as history of

perceived quality of its product offerings. This is a well-established test for bivariate causality, which involves estimating a linear reduced-form vector autoregression (VAR) (Granger, 1988):

$$X_t = \alpha_0 + \sum_{i=1}^{K} \alpha_{Xi} X_{t-i} + \sum_{i=1}^{K} \alpha_{Yi} Y_{t-i} + \varepsilon_{X,t}$$

$$Y_t = \beta_0 + \sum_{i=1}^{K} \beta_{Yi} Y_{t-i} + \sum_{i=1}^{K} \beta_{Xi} X_{t-1} + \varepsilon_{Y,t}$$

(6)

where α_{Yi} is the coefficient on the lagged Y values, β_{Xi} is the coefficient on the lagged X values, and $\varepsilon_{X,t}$ and $\varepsilon_{Y,t}$ are assumed to be *independent* and identically distributed (i.e.,

$iid(0, \sigma_i^2), i = 1,2$). To examine Granger causality between X and Y, the following null hypotheses were tested: $H_0 : \alpha_{Yi} = 0 \ \forall \ i = 1 \ to \ K$ and $H_0 : \beta_{Xi} = 0 \ \forall \ i = 1 \ to \ K$. If neither set of null hypotheses can be rejected, then X and Y are an independent series. If both are rejected, then there is "feedback" between X and Y. If the hypothesis $H_0 : \beta_{Xi} = 0 \ \forall \ i = 1 \ to \ K$ is rejected but the other is not, there is unidirectional causality running from X and Y. Conversely, if hypothesis $H_0 : \alpha_{Yi} = 0 \ \forall \ i = 1 \ to \ K$ is rejected but the other is not, then the reverse is true (Hiemstra and Jones, 1994; Granger, Huang and Yang, 2000). Further, to avoid model misspecification, appropriate lag structure must be identified based on statistical criterion (Thornton and Batten, 1985).

Results from the Dickey Fuller test reveal that cash rebates, finance rate, sales, inventory, and supply series are stationary. Next, we conduct a Johansen cointegration trace test to examine if pairwise series share a common stochastic drift. Cointegration test results reveal that each of the pairwise series has two cointegrated processes. Thus, we introduced the error correction term while conducting the Granger Causality test (Granger, Huang and Yang, 2000).

Estimates in the Granger Causality test reveal that for every 1 unit increase in sales in period $t-2$, finance rate offered by the ith manufacturing firm against brand j in period t increases by .00001 percentage points, significant at a 10 percent level of significance. Additionally, for every 1 unit drop in inventory in period $t-2$, finance rate offered by the ith manufacturing firm against brand j in period t increases by .00001 percentage points, significant at a 5 percent level of significance. Improvement in sales and depletion in inventory are positive signals to a firm's management regarding product management. Thus, managers respond to such positive signals by increasing finance rates, thereby adjusting the marketing-mix strategies by reducing their promotion expenditure against finance rate deals.

Estimates also reveal that for every 1 unit drop in sales in period '$t-2$', incidence of cash rebates in period 't' increases by .00261 cents, significant at a 10 percent level of significance. Additionally, for every 1 unit increase in inventory in period '$t-2$', incidence of cash rebates in period 't' increases by .00047 cents, significant at a 5 percent level of significance. Thus, managers often extend cash rebates incentives to consumers to make product purchases, thereby improving sales and depleting excess inventory. Interestingly, we observe a two period lag between the dip in sales and an increase in inventory and the execution of the strategic action by the firm. Findings are consistent with our conjecture that a firm's decision to extend promotional strategies (i.e., finance rates and cash rebates) is contingent on the firm's lagged sales, inventory, and supply functions. However, findings fail to confirm our hypothesis that a firm's decision to extend promotional strategies is contingent on consumers' perceived quality regarding its product offerings. This may be due to the intangibility characteristic of 'perceived quality' and manager's inability to quantify it.

Estimates also indicate that incidence of finance rate in period t exhibits a negative correlation with finance rates and cash rebates offered in periods $t-1$ and $t-2$, significant at a 10 percent or higher level of significance. This suggests that firms are less likely to offer attractive finance rates as promotional strategies in consecutive periods. Additionally, if the firm offers attractive finance rates in the current period, it is less likely that the firm would have offered cash rebates in the last two periods. This may be indicative of the fact that managers are less inclined to opt for alternative promotional tactics in consecutive periods.

Results also indicate that an incidence of cash rebates in period t exhibits a negative correlation with a firm's extension of cash rebates in periods $t-1$ or $t-2$, significant at a 5 percent level of significance or higher. This may indicate that firms are less likely to extend cash rebates in consecutive period. Additionally, findings also suggest that a firm's decision to extend a cash rebate is not contingent on its decision to extend an attractive finance rate in previous periods.

1.7 Discussion

Key Findings: Threats of market share erosion, mass customization, and product commoditization are some critical factors that motivate firms to differentiate their product offerings through various promotional incentives (Neslin, 2002, Busse, Simester and Zettelmeyer, 2010). U.S. auto manufacturers are no exceptions. They frequently extend sales promotions as rebates, attractive finance rates, or a combination of the two to enhance product attractiveness and increase consumers' willingness to buy (Thompson and Noordewier, 1992). Historically, while the big-3 automakers typically offer a combination of cash rebate and

attractive finance rate deals to attract consumers, Honda and Volkswagen exclusively offer attractive financing rates cut to attract potential consumers (Automotive News).

Thus, the intriguing question is why firms, even in the same industry, differ in their extension of promotional incentives. Do firms use promotional strategies to signal product quality? In the current study, we investigate if incidence of sales promotions has a direct and an indirect impact on sales. Results confirm that in addition to the direct relationship between sales promotions and sales, consumers' perceived quality mediates the relationship. In particular, after controlling for firm's history of bankruptcy filing and firm characteristics, incidence of both categories of promotional tactics (i.e., finance rates and cash rebates) improves perceived quality. Moreover, perceived quality has a positive and significant impact on firm sales irrespective of the product market characteristics.

Next, we examine whether the impact of promotion mix on sales is moderated by product class. Results indicate that an extension of attractive finance rates boosts sales exclusively in the luxury market where as effectiveness of rebates as a driver of sales is limited in the mass market. Estimates indicate that incidence of finance rates improves consumer perceived value in both categories of product classes. Interestingly, positive relation between incidence of cash rebates and perceived quality is observed exclusively in the mass market.

Empirical findings suggest that the dealership network improves consumers' perception regarding product quality and sales. This may indicate that a dense dealer network increases competition among the dealers and induces them to provide better value propositions to their consumers, thereby improving consumers' perceived quality. Moreover, intense dealer network improves consumers' access to firm and brand related information, which may consequently influence product sales.

Ceteris paribus, managers may strive to adjust their promotion-mix tactics to maximize firm sales while dynamically optimizing their inventory holdings as well as adjusting for variations in product demand and uncertainty in supply. Thus, to complete the analysis, our post-hoc analysis investigates whether firm's promotional tactics are endogenously determined by firm specific criterion, such as lagged sales, inventory, and supply functions as well as consumers' perception of product quality. Granger causality estimates indicate that promotional tactics adopted by firms are not ad-hoc decisions imposed by the top management team. Rather, they are endogenously determined tactics, dependent on the firm's internal factors, such as inventory and sales. Interestingly, estimates suggest that managers may not internalize consumer's perception of product quality while adopting their promotion-mix decisions. This may be due to the intangibility characteristics of 'perceived quality' and the manager's inability to quantify the concept.

Results also indicate that a firm's adjustment to promotional tactics with the advent of sales and inventory information is not instantaneous; rather one observes the adjustment process with few lag periods. In particular, with a dip in sales or inventory pile up in period $t-2$, managers typically extend rebates to boost sales and deplete inventory in period t. On the contrary, a boost in sales and the depletion of inventory in period $t-2$ encourages managers to increase their finance rate offerings in period t, thereby reducing budget allocation targeted towards this specific promotion strategy.

Managerial Implications: Auto firms tend to invest heavily to advertise and promote their product offerings. For example, according to Kantar Media's 2011 index of top advertisers, General Motors ranks second in marketing budget, with an overall budget approximately equal to $3.1 billion, 2.081 percent of its revenue. Thus, it is imperative for a firm's management to

adopt optimal marketing-mix strategies that would not only cover the marketing cost but also ensure increasing returns. Estimates indicate that effectiveness of finance rates as a demand booster is restricted in the luxury product market whereas that of cash rebates is limited to the mass market. Thus, managers' promotion-mix decisions are contingent on the product class of their offerings. In particular, incidence of rebates in the luxury market may not only drain firm's exchequer without any significant improvement in sales but also may have no implications on consumer perceived value.

Limitations and Future Research: In this section, we address some of the limitations of the current study and list potential future research. Even though we have access to promotional tactics, sales, and inventory information at the brand level, information on firm performance (i.e., revenue, net income, earnings per share etc.) is only available at the firm level. Thus, due to data limitations, analysis of the impact of promotions on firm performance in the luxury and mass product classes is restricted to variation in firm sales.

The current study assumes that at any given time period, firms offer identical finance rates to their entire consumer base. However, in reality, finance lenders segment their finance rate offerings based on consumers' credit worthiness. However, due to lack of adequate consumer credit information and information regarding the credit segmentation process employed by the lenders, we were unable to incorporate segmentation analysis in our study. It may be interesting to analyze how incidence of varying finance rates across segments of consumers with differing credit scores affects perceived quality and sales.

Furthermore, it may be interesting to investigate the moderating effect of market dynamism on the relationship between promotional tactics and firm performance. Specifically, in a highly competitive industry, firms are expected to aggressively offer price promotions to attract

consumers and to maintain their market share in the industry. On the other hand, with less competition and few key players in the market, firms may be less threatened by erosion of market share. Thus, one may observe managers allocating significantly less budget resources toward promotions in low to mildly competitive markets.

APPENDIX

Table 1: Prior Research on Sales Promotions in Marketing

Article	Assess Various Promotions Independently?	Consider Contingency Effects?	Consider Attitudinal Outcome?	Consider Behavioral Outcome?	Address Data Frequency Mismatch Issues?
Current Paper	✓ Rebates and finance rate offers	✓ Moderating Effects of Product Class	✓ Perceived Quality	✓ Unit Sales	✓ Mixed Data Sampling Regression (MIDAS)
Gangwar, Kumar and Rao (2013)	✓ Shallow versus deep price promotions with varying depth and frequency	✗	✗	✓ Consumer stockpiling	✗
Leeflang and Parreño-Selva (2012)	✗	✗	✗	✓ Cross category demand	✗
Martín-Herrán, Sigué and Zaccour (2010)	✓ Rebates, trade deals	✓ Moderating effect of consumer sensitivity to promotions	✗	✓ Unit sales	✗
Busse, Simester and Zettelmeyer (2010)	✗	✗	✓ Consumers' perception of price changes	✓ Purchase acceleration	✗

Table 1 (cont'd)

Silva-Risso and Ionova (2008)	✓ Cash discounts, finance rates, and lease payment discounts	✗	✓ Consumers' sensitivity towards pricing instruments, transaction type and brand choice	✗	✗
Silk and Janiszewski (2008)	✓ Mail-in rebates	✗	✓ Consumers' price sensitivity	✓ Consumers' buying pattern	✗
Attanasio, Koujianou, and Kyriazidou (2008)	✓ Finance rate	✓ High versus low income households	✓ Consumers' sensitivity to maturity of loans and interest rate changes	✗	✗
Barron, Chong and Staten (2008)	✓ Finance rate	✓ Banks versus captive financing institutions	✓ Consumers' likelihood of loan repayment	✗	✗
Manning and Sprott (2007)	✗	✓ Magnitude of quantity specified in the promotion offer	✓ Consumers' accessing anchor-consistent knowledge	✗	✗
Lu and Moorthy (2007)	✓ Coupons, rebates	✓ Redemption costs	✓ Consumers' riskaversity and redemption periods of rebates	✗	✗

Table 1 (cont'd)

Chen, Moorthy and Zhang (2005)	✓ Coupons, rebates	✗	✓ Consumers' willingness to pay	✗	✗
Pauwels, Silva-Risso, Srinivasan and Hanssens (2004)	✗	✗	✗	✓ Stock market performance, top and bottom line financial metrics	✗
Pauwels, Hanssens and Siddarth (2002)	✗	✗	✗	✓ Category-incidence, brand-choice and purchase-quantity	✗
Nijs, Dekimpe, Steenkamp and Hanssens (2001)	✗	✓ Marketing intensity and competition	✗	✓ Category demand	✗
Zhang, Krishna and Dhar (2000)	✓ Front-loaded versus rear-loaded coupons	✓ Variety-seeking, inertia	✗	✓ Sales, profit	✗
Yoo, Donthu and Lee (2000)	✗	✓ Frequency of price promotions	✓ Brand equity	✗	✗
Chandon, Wansink, and Laurent (2000)	✗	✓ Band equity	✓ Hedonic benefits	✓ Utilitarian benefits	✗
Jedidi, Mela, and Gupta (1999)	✗	✗	✓ Brand equity	✓ Brand choice, sales	✗
Krishna and Zhang (1999)	✓ Short versus long-duration coupons	✓ Firm's market share, coupon duration	✗	✓ Coupon profitability and redemption	✗

Table 1 (cont'd)

Dekimpe, Hanssens and Silva-Risso (1998)	✗	✓ National and private-label brands	✗	✓ Category and brand sales	✗
Dhar and Raju (1998)	✓ Cross-ruff coupons	✓ Demand complements or substitutes	✗	✓ Target and carrier brand sales and profit	✗
Mela, Gupta, and Lehmann (1997)	✗	✗	✓ Consumers' brand choice behavior	✗	✗
Narasimhan, Neslin, and Sen (1996)	✓ Featured price cuts, displayed price cuts, and pure price cuts	✓ Number of brands offered, category penetration, interpurchase times, and consumer propensity to stockpile	✗	✓ Impulse buying, private label market share	✗
Dhar and Hoch (1996)	✓ In-store coupons, off-the-shelf price discounts	✗	✗	✓ Unit category sales, retailer profit	✗
Greenleaf (1995)	✓ Price promotions, trade deals	✗	✓ Consumers' reaction to reference price effects	✓ Profit	✗
Raju, Dhar and Morrison (1994)	✓ Package coupons	✗	✗	✓ Market share	✗

Table 1 (cont'd)

Thompson and Noordewier (1992)	✓ Financing rate, rebates	✘	✘	✓ Sales	✘
Grover and Srinivasan (1992)	✓ Price, feature, coupon or combination	✓ Brand loyal versus switching segments	✘	✓ Purchase acceleration, stockpiling activities	✘
Campbell and Diamond (1990)	✓ Monetary versus non-monetary promotions	✘	✓ Customers' suspiciousness	✘	✘

Table 2: Summary Statistics

	N	Mean	Std Dev	Perceived Quality	Finance Rate	Rebate Ratio	Log (Sales)	Dealer network	Advertising Expenditure	Log (Firm Assets)	Inventory	CAPX
Perceived Quality	5296	6.8514	0.3420	1.000								
Finance Rate	3020	-2.8750	1.5885	-0.162 ***	1.000							
Rebate Ratio	990	6.4306	2.4561	-0.282 ***	0.002	1.000						
Log (Sales)	11460	12.5134	1.2682	0.232 ***	-0.273 ***	-0.002	1.000					
Dealer network	5296	6574.2700	3623.5600	-0.004	-0.148 ***	0.246 ***	0.133 ***	1.000				
Advertising Expenditure	8858	5155.2900	4849.8900	-0.020	-0.548 ***	0.061 *	0.206 ***	0.982 ***	1.000			
Log (Firm Assets)	11924	12.1043	0.5900	-0.048 **	-0.366 ***	0.445 ***	0.098 ***	0.448 ***	0.459 ***	1.000		
Inventory	12760	3577532.1500	4698853.2800	0.058 ***	-0.208 ***	-0.050	0.781 ***	0.048 **	0.185 **	0.093 ***	1.000	
CAPX^	11924	0.0804	0.0434	-0.009	-0.304 ***	0.149 ***	0.145 ***	0.167 ***	0.227 ***	0.322 ***	0.131 ***	1.000

*, **, and *** indicates 10%, 5% and 1% level of significance

^ CAPX: Adjusted Capital Expenditure

Table 3: Impact of Sales Promotions on Perceived Quality and Sales in the U.S. Auto Industry

Variables	Perceived Quality		Log (Sales)	
Intercept	5.6630	(00.0447) ***	6.8851	(00.5383) ***
Perceived Quality			.5964	(00.0628) ***
Finance Rate	.0646	(00.0056) ***	.0132	(00.0158)
Rebate Ratio	.0200	(00.0027) ***	.0232	(00.0080) **
Luxury	.0420	(00.0410)	-.0278	(00.1054)
Luxury*RR^	-.0092	(00.0050) *	-.0167	(00.0129)
Luxury*FR&	-.0046	(00.0074)	-.0287	(00.0192)
Bankruptcy	-3.3154	(00.0879) ***		
Dealer network	.0007	(00.0000) ***	.0005	(00.0000) ***
Advertising Expenditure	-.0002	(00.0000) ***	-.0004	(00.0000) ***
Log (Firm Assets)			.1284	(00.0326) ***
Inventory			.0001	(00.0000) ***
CAPX#			-1.8022	(00.4703) ***
System Weighted R-Square	0.855			

*, **, and *** indicates 10%, 5% and 1% level of significance

^ RR: Rebate Ratio; & FR : Finance Rate; # CAPX: Adjusted Capital Expenditure

Table 4: Impact of Auto Promotions on Firm Value and Perceived Quality: Mass Vs. Luxury Product

Variables	Mass Product				Luxury Product			
	Perceived Quality		Log (Sales)		Perceived Quality		Log (Sales)	
Intercept	5.6823	(00.0459) ***	7.3715	(00.5592) ***	5.5947	(00.1651) ***	1.3598	(01.5484)
Perceived Quality			.5972	(00.0681) ***			.8145	(00.1797) ***
Finnace Rate	.0663	(00.0058) ***	.0053	(00.0165)	.0280	(00.0112) **	-.0761	(00.0265) **
Rebate Ratio	.0203	(00.0027) ***	.0279	(00.0083) **	.0071	(00.0083)	-.0274	(00.0185)
Bankruptcy	-3.2875	(00.0924) ***			-3.4493	(00.3223) ***		
Dealer network	.0007	(00.0000) ***	.00044	(00.00003) ***	.0008	(00.0001) ***	.0006	(00.0001) ***
Advertising Expenditure	-.0002	(00.0000) ***	-.0004	(00.0000) ***	-.0002	(00.0000) ***	-.0005	(00.0000) ***
Log (Firm Assets)			.0827	(00.0355) **			.4585	(00.0754) ***
Inventory			.0001	(00.0000) ***			.0002	(00.0000) ***
CAPX[#]			-1.2992	(00.5018) **			-4.9089	(01.2053) ***
System Weighted R-Square	0.8577				.85980			

*, **, and *** indicates 10%, 5% and 1% level of significance

CAPX: Adjusted Capital Expenditure

Table 5: Granger Causality Test: Impact of Lagged Sales, and Inventory and Supply on Firm's Promotional Strategies in the U.S. Automobile Industry (2003 - 2012)

Independent Variables	Finance Rate in period t		Cash Rebate in period t	
Finance Rate in period t-1	-.45344	(00.03694) ***	-7.13807	(22.33557)
Rebate in period t-1	-.00021	(00.00007) **	-.24347	(00.03958) ***
Perceived Quality in period t-1	-.03691	(00.12019)	14.97643	(72.67596)
Total Sales in period t-1	-.00001	(00.00000)	.00047	(00.00143)
Inventory in period t-1	-.00001	(00.00000)	.00008	(00.00021)
Supply in period t-1	.00003	(00.00046)	-.61426	(00.27975)
Finance Rate in period t-2	-.27874	(00.03442) **	39.85498	(20.81159) *
Rebate in period t-2	-.00010	(00.00006) *	-.12125	(00.03531) **
Perceived Quality in period t-2	-.13022	(00.12011)	32.57484	(72.62346)
Total Sales in period t-2	.00001	(00.00000) *	-.00261	(00.00141) *
Inventory in period t-2	-.00001	(00.00000) **	.00047	(00.00021) **
Supply in period t-2	.00063	(00.00046)	-.87895	(00.27905)
month	yes			
Granger-Causality Wald Test				
		82.07 ***		

*, **, and *** indicates 10%, 5% and 1% level of significance

Figure 1: Conceptual Model: The Differential Effects of Promotions for Mass versus Luxury Brands

MASS BRANDS

LUXURYBRANDS
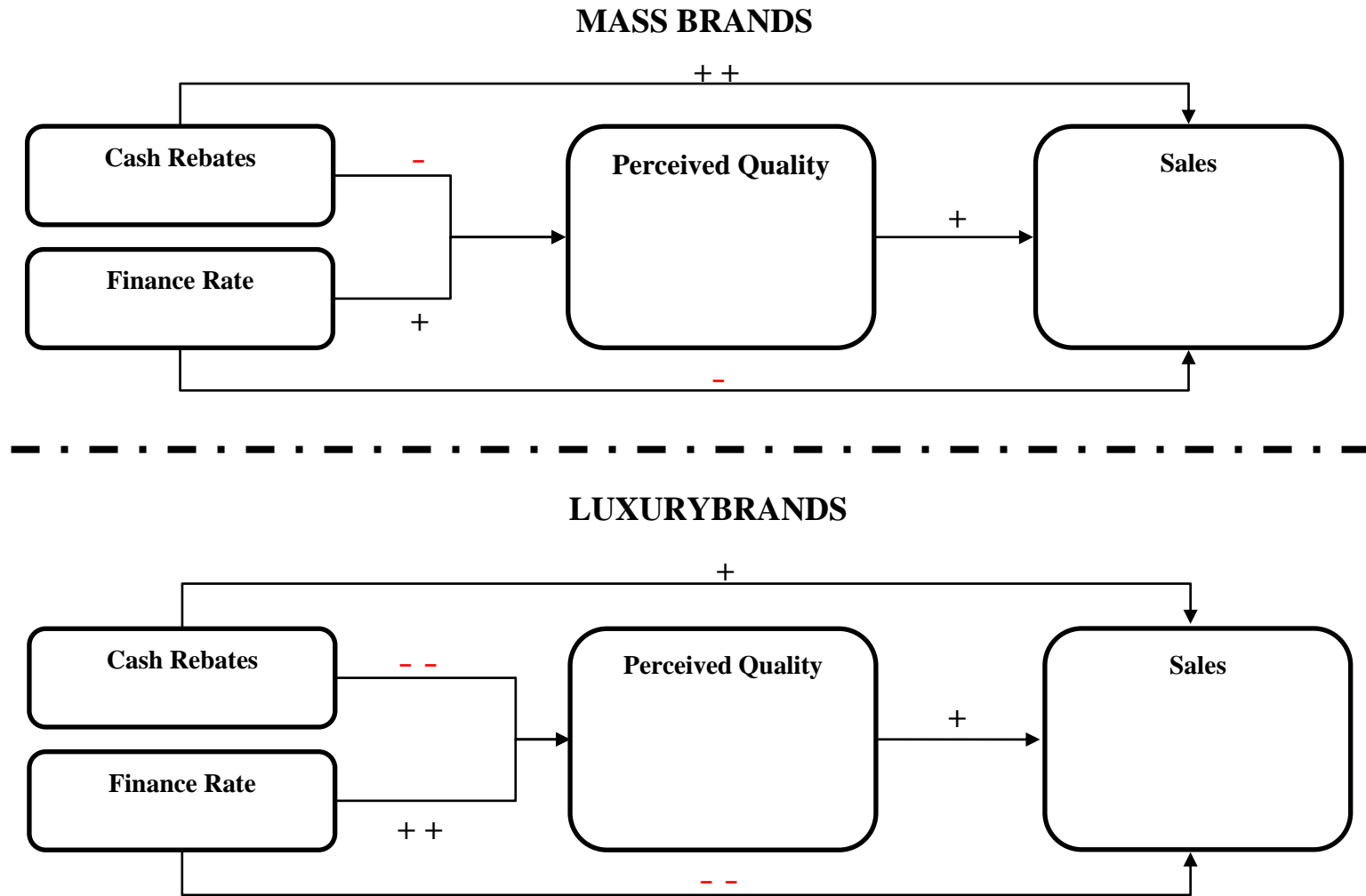
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Chapter 2

Does Marketing Communication Mix Attract Generic Competition?

2. ABSTRACT

Once the prescription drug patent expires, generic manufacturing firms enter the industry with a time lag. However, even with competition from generics, incumbent's loss in market share is not immediate, thereby extending patent life beyond the patent expiration date. Current study utilizes diffusion theory to analyze effectiveness of marketing communications to ensure diffusion of prescription drugs and enhance customer responsiveness across product life cycle (PLC). Next, we utilize signaling theory to analyze whether in the post-patent era, marketing efforts undertaken by incumbents discourage generic competition or do they signal unexplored market potential and thereby lure competition. Current study utilizes sales, revenue and marketing expenditure data across 11 therapeutic classes from September, 2008 to October, 2014. Estimates indicate that effectiveness of 'Detailing' (i.e., marketing communications targeted at the physicians) and DTCA (i.e., direct-to-consumer advertising) follows a 'U' path, with minimum effectiveness in the 'growth' stage of PLC. Findings also demonstrate that marketing communication mix for prescription drugs in the post-patent period acts as an entry deterrent strategy for the first and second waves of generic entry whereas high brand price induces competition.

Keywords: prescription drugs, detailing, direct-to-customer-advertising, generic manufacturers

2.1 Introduction

Firms in the pharmaceutical industry adopt aggressive marketing mix strategies to aid in the rapid diffusion of new products (Leffler, 1981; Mackowiak and Gagnon, 1985; Vogel, Ramachandran and Zachry, 2002). Detailing and Direct-to-customer-advertisement (DTCA) are two critical components of the marketing mix plan. Detailing educates physicians regarding the new product characteristics whereas DTCA exposes existing and new consumers to product information (Narayanan, Desiraju and Chintagunta, 2004). Firms also promote their products through distribution of free samples and product advertisement in medical journals. Interestingly, firm's emphasis on communication channels vary across product life cycle (Fischer and Albers, 2010). For example, prescription drugs protected by the patent window are among the most heavily promoted drugs in the U.S. economy. During this period, incumbents adopt marketing mix strategies that help them to build a loyal customer base and strong brand equity (Ladha, 2007) However, once the drug patent expires, incumbents may encounter competition for generic manufacturers conditional on economic and financial factors (Grabowski, Ridley and Schulman, 2007). Interestingly, Hudson (2000) indicates that even with competition from generics, incumbents' loss in market share is not immediate, implying that value of patents extend beyond their expiration period (Hudson, 2000). Thus, during the post-patent period, incumbents tend to adopt 'reminder oriented' marketing mix strategies that emphasize point of difference between the off-patent prescription drugs and generics (Agrawal and Thakkar, 1997).

However, for generic manufacturers, decision to enter a new market is exponentially more challenging and risky. Königbauer (2007) suggests that generic manufacturers may consider entering the drug market if expected stream of revenue income significantly outweighs the cost

and risk associated with the corporate strategy. Literature is, however, equivocal regarding the impact of incumbent's marketing effort in the post-patent window on generic entry decision. Hurwitz and Caves (1988) and Rizzo (1999) demonstrate that brand-name marketing activities inhibit generic market entry. Scott Morton (2000) conclude that incumbent's advertising expenditure in the pre-expiration period has no impact on generic manufacturers' entry decision. On the other hand, Königbauer (2007) uses a two-period Bertrand model of competition to demonstrate that product differentiation through advertising induces generic entry.

The current study identifies some of the critical gaps in the pharmaceutical promotion literature and addresses them. Studies analyzing effectiveness of incumbent's marketing strategies in new product diffusion tend to concentrate on product life cycle within the patent protection window (Sridhar, Mantrala, and Albers, 2014). We utilize diffusion theory to analyze the effectiveness of incumbent's marketing communication mix to promote the prescription drug and enhance customer responsiveness across product life cycle, with particular emphasis in the post patent period. Furthermore, literature is equivocal regarding the impact of incumbent's marketing effort on generic entry decision. Current study solves the puzzle by demonstrating that certain factors (i.e. aggressive marketing strategies such as detailing and DTCA) may serve as entry deterrent strategies where as certain economic factors (i.e. high prescription drug prices) may actually lure generic competition. Moreover, majority of the studies examining the impact of incumbent's marketing strategies on generics' entry decisions tend to assume that the latter enters the drug market simultaneously. In reality, once the patent window expires, generic manufacturers tend to enter the market in sequential waves (Grabowski and Vernon, 1992). We utilize signaling theory to resolve the ambiguity with regards to the relation between incumbent's marketing effort on waves of sequential generic entries.

We demonstrate that each waves of generics' decision to enter the market is contingent on the current economic and marketing conditions, independent of the decisions taken by the previous waves of generics that have already entered the market. In particular, in the post-patent period, incumbents' continued marketing communications through detailing and DTCA (direct-to-consumer advertising) help them to keep their consumers and physicians well informed regarding effectiveness of the prescription drug and emphasize on its comparative advantage. Thus, incumbents' continued marketing communications act as an entry deterrent strategy for the first and second waves of generic entry. Interestingly, high prescription drug prices even in the off-patent period may signal revenue-generation potential, which may consequently induce generic entry.

The article is organized as follows. Section 2 deals with literature review and hypothesis development. Section 3 provides details of the Prentice-Williams-Peterson Gap time (PWP gap-time) conditional model, methodology and variables used in the study and section 4 reports the data collection. Section 5 reports the results and section 6 provides a brief summary and discussion.

2.2 Hypothesis Development

2.2.1 Marketing Communication Mix Strategy

Pharmaceutical firms' marketing communications are typically directed towards the physicians who prescribe them as well as existing and potential consumers. Firm's marketing efforts directed at physicians encompass detailing (i.e., personal selling through sales representatives), sampling distribution (i.e., distribution of free samples of drugs), physician meetings and events, and advertisements in medical journals. Even though promotion expenditure to educate professionals receives major share of firms' promotion budget, direct-to-consumer advertising (DTCA) has gained prominence over the last decade (Ma et al., 2003).

2.2.2 Detailing

In the pharmaceutical industry, detailing, i.e. personal selling by pharmaceutical firms sales representatives to hospital and office-based physicians has been a critical component of drug promotions for decades (Donohue et al., 2004; Gagnon and Lexchin, 2008; Sridhar, Mantrala, and Albers, 2014). It includes direct contact by sales representatives at drug fair or a brief mention of the drug in hospital clinics, meeting rooms etc. Firms also provide physicians information regarding the drug over the phone or through educational press. Cegedim-SK&A (2011) reports that in 2009–2010, U.S. Pharma Companies spent about $28 billion promoting drugs to prescribers, with detailing accounting for about $15.3 billion, or about 54 % of total annual promotion spending. Meta-analysis estimates by Sridhar, Mantrala, and Albers (2014) indicate that current-period detailing elasticity is 0.21. Additionally, elasticity estimates are higher for products

that are offered in early life cycle stages and differ across countries. Even though detailing is a

dominant marketing strategy, yet firms selectively employ this strategy to aid product diffusion

(Donohue, Cevasco and Rosenthal, 2007). Additionally, studies suggest that detailing impacts

physician's decision differentially, contingent on drug's effectiveness and side effects

(Venkataraman and Stremersch, 2007).

2.2.3 Direct-to-Customer Advertising (DTCA)

Drug manufacturing firms often spend millions of dollars to promote their products directly

to the customers through multiple media channels (ie, internet, television, newspapers, magazine,

radio) (Bell, Kravitz and Wilkes, 1999; 2000a; 2000b). For example, in 2001, the US

pharmaceutical industry spent an aggregate of US$2.7 billion in DTCA campaigns (Young, 2003).

Proponents of DTCA argue that this marketing channel is an opportunity to enhance health care by

having patients identify symptoms of a curable medical condition and seek medical attention and

also treat more broadly diseases that are currently underdiagnosed or undertreated, and improve

communication between the health care system and their patients (Pines, 2000).Such massive

advertising efforts are geared towards improved consumer awareness of advertised drugs that may

eventually open up dialog between physicians and patients. That conversation is most likely to

induce the physician to prescribe the recommended drug, thereby generating demand for

prescription drugs (Mintzes et al., 2003; Frosch et al., 2007). Opponents of DTCA argue that

marketing effort by pharma firms directed at the customers is motivated by profit making

incentives rather than concern for the public health (Gellad and Lyles, 2007). They also argue that

DTCA often results in wasting causes physicians' valuable time during their encounter with

patients and also encourages the consumption of expensive and often times, unnecessary

medications (Rosenthal et al., 2002). Additionally, they argue that manufacturing firms tend to promote expensive prescription drugs that are newer with incomplete safety information (Lexchin 1999; Bradford et al., 2006). Therapeutic classes such as allergies, obstetrical/gynecological, dermatological, Cardiovascular, tobacco addiction are those that are advertised most frequently (Wilkes, Bell and Kravitz, 2000). There is ample evidence in the literature supporting the positive association of firm's expenditure on DTCA of prescription drugs with sales (Basara, 1996; Donohue, Cevasco and Rosenthal, 2007; Dave and Saffer, 2010).

2.2.4 Sample Distribution

Sales representatives of the manufacturing firms typically distribute samples either in person or during service visit or through mail (Dong, Li, and Xie, 2014). A drug sample in the prescription drug industry is defined as '… a package containing a limited quantity of a pharmaceutical product sufficient to evaluate clinical response, distributed to authorized health care practitioners free of charge, for patient treatment' (Warrier et al., 2010). Dispensing free samples by pharmaceutical companies' sales representatives is one of the competitive marketing practices in the prescription drug industry (Gönül et al, 2001). Moreover, distributing free samples to patients may be indicative of care and involvement that may eventually improve the physician-patient relationship (Groves, Sketris and Tett, 2003). Groves, Sketris and Tett (2003) indicates that expenditure on free sampling distribution accounts for more than half of the total marketing expenditure incurred by the U.S. pharmaceutical industry. Specifically, in aggregate, pharmaceutical firms delivered an estimated $18.4 billion worth (in retail value) of free drug samples to doctors in year 2005 alone – more than all other marketing expenses combined (Dong, Li and Xie, 2014). Findings indicate that distribution of free drug samples and detailing as the two

critical pharmaceutical marketing practices with significant positive impact on demand for prescription drugs (Mizik and Jacobson, 2002).

2.2.5 Journal Advertising

Physicians derive valuable information regarding latest drugs and devices from medical journals. In addition, these journals are also the source of scholarly articles. Simultaneously, medical journals often contain advertisements of drugs, thereby explicitly promoting sales of the drug under consideration. By concurrently printing scholarly 'articles and advertisements within their pages', these medical journals implicitly confer credibility on both the journal articles under consideration as well as the advertisements. Moreover, by printing advertisements for drugs and devices, these medical journals are indirectly recommending these drugs and complement respective incumbent's marketing effort. Journal advertisements not only generate profits for pharmaceutical firms that advertise in those reputed journals but also for the medical journals and the physician organizations that publish in those journals (Fugh-Berman, Alladin and Chow, 2006).

2.2.6 Detailing and DTCA Marketing Strategies

Rogers (1976; 1995) defined 'diffusion' as the process through which a new idea/ product is adopted by the mass consumers over time. Products have a life span. Long established products eventually loose consumer demand, while in contracts, demand for new product or idea increases dramatically after they are launched. Literature categorizes product life cycle (PLC) by four distinctive stages, namely introduction, growth, maturity and decline (Qualls, Olshavsky, and Michaels, 1981).

In line with the above categorization of PLC, we define 'infant' drugs as prescription drugs that have received FDA approval over the last five years and are within the patent protection window (Sridhar, Mantrala and Albers, 2014). These drugs are in their initiation stage in the diffusion process when information regarding the product becomes available to potential customers (i.e. physicians and consumers). The manufacturing firms typically adopt market expansion strategies that target and provide product related information to physicians and consumers so as to enhance latter's likelihood of acceptance of the new product. In particular, given the monopoly market structure, incumbents typically allocate marketing budgets to educate the physicians (i.e., Detailing) and the consumers (i.e. DTCA) regarding the new drug and build brand equity. This stage corresponds to the 'introduction' stage in PLC.

Next, we define 'growth' drugs as those prescription drugs that have less than five years for the patent to expire. This stage corresponds with 'growth' stage in PLC when the manufacturing firms already have a loyal consumer base and benefit from economies of scale in production. Consistent with 'infant' stage, managers continue to adopt offensive marketing strategies to reduce information asymmetry among consumers and physicians, improve market share and maximize sales.

With patent expiration and generics entering the market, the competitive nature of the market segment changes. Off-patent prescription drugs experiences price competition and threat of market erosion. However, given that these drugs still have positive revenue generating potential, managers may need to optimally distribute marketing budget across the communication channels so as to maximize returns. Specifically, they may tend to adopt defensive marketing strategies geared towards retaining their existing customer base and fight competition (Berndt et al., 1996). Thus, one may conclude that the post-patent stage of prescription drugs corresponds with the 'mature'

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stage in PLC. In the current study, we define prescription drugs as 'mature/post-patent' if they lost patent protection over the last five years.

Physicians' access to drug related information is least in the 'infant' stage. Thus, incumbents' marketing efforts geared towards educating physicians help to address this information asymmetry problem, thereby aiding new product diffusion process. However, as new drug move along the PLC, physicians access to drug related information increases. Thus towards the later stages in PLC, increased detailing expenditure may not necessarily translate into enhanced product demand. We hypothesize that firm's return from detailing expenditure is high towards early life cycle. However, its ability to generate high product demand and revenue drops as the product progresses towards its 'growth' stage.

Once the patent expires, the incumbent experiences increased competition from generic drug manufacturers. Managers adopt 'reminder oriented' marketing strategies that stress on points of difference (Agrawal and Thakkar, 1997). In particular, the marketing communications not only emphasize the off-patent prescription drug's effectiveness but also its comparative advantage over generics that have flooded the market. Generics are typically priced much lower than the prescription drugs. However, physicians may not have full information regarding chemical composition of the generics. They may even have limited information regarding generics' possible side effects (Borgheini, 2003) Moreover, these cheaper alternatives may not necessarily have gone through all the steps in clinical trials and physicians may not be very comfortable prescribing the generics over the off-patent prescription drugs. Thus, adoption of 'reminder oriented' marketing mix plan may help the incumbents to retain their consumer base and prevent market erosion. We hypothesize that effectiveness of 'detailing' as a marketing strategy to educate the physicians follow a 'U' path across PLC.

H₁: Effectiveness of 'Detailing' as the marketing strategy to enhance manufacturing firm's revenue follows a 'U' path across drug lifecycle.

Similar line of reasoning applies for effectiveness of DTCA as the marketing strategy that communicates directly with the consumers and increases latter's likelihood of product purchase. Towards the early stage of PLC, consumers have incomplete information regarding effectiveness of the drug as well as the possible side effects. Thus advertising strategies that aim at educating the customers help in the product diffusion process (Lexchin 1999; Bradford et al., 2006). As the product progresses towards its maturity stage, information regarding effectiveness of the drug and related side effects are widely available. Thus, improvement in incumbent's marketing expenditure towards DTCA may not translate into higher sales. However, once the patent window expires, the manufacturing firm may have to defend its market share. It may do so by adopting marketing strategies that effectively communicates with its loyal customer base and reconfirms drug effectiveness. We hypothesize that firm's return from DTCA expenditure follows a 'U' path as the drug progresses along its PLC.

H₂: Effectiveness of 'DTCA' as the marketing strategy to enhance consumer responsiveness follows a 'U' path across drug lifecycle.

Mental illness refers to a wide range of mental health conditions that affects patients' mood, behavior and thinking pattern (Mayo Clinic). Depression, schizophrenia, addictive behaviors, anxiety disorders are some examples of mental illness. On the other hand, disease is a

pathological condition of a body part, an organ, or a system caused by infection, inflammation, environmental factors, or genetic defect (Tikkinen et al., 2012). Diagnosis and treatment of mental illness is relatively more dependent on patients' interpretations of the symptoms of the illness rather than on concrete laboratory results. One may posit that mental illness is relatively more subjective than diseases; demand for drugs that treat mental illness is more driven by consumers than by physicians. Firms employ DTCA (detailing) as the primary communication channel to promote their products directly to the consumers (physicians). Thus, we hypothesize that compared to detailing, DTCA is more effective in promoting drugs that treat mental illness.

H₃: 'DTCA' is the relatively effective marketing strategy to improve sales of drugs that treat mental illness relative to those that treat diseases.

Diagnosis and treatment of diseases are relatively more driven by laboratory examinations rather than patients' interpretation of the symptoms. One may conclude that diseases are more objective and organic than mental illness. Since detailing primarily educates the physicians, we hypothesize that relative to DTCA, detailing is more effective in promoting drugs that treat diseases rather than those that treat mental illness.

H₄: 'Detailing' is the relatively effective marketing strategy to improve sales of drugs that treat diseases relative to those that treat mental illness.

2.2.7 Entry Deterrent Strategies *by Prescription Manufacturing Firms*

Patent window ensures market exclusivity to the inventor(s) of the prescription drugs for a fixed period of time during which the pioneer firm can recuperate the 'huge sunk innovation costs' (Königbauer, 2007) and to ensure diffusion of new products (Eisenberg, 2003). Within this window, incumbents enjoy monopoly power and 'may even charge monopoly price for their products'. However, once the patent window expires, market conditions may change contingent on several economic (Caves, Whinston & Hurwitz, 1991; Hudson, 2000) and marketing (Königbauer, 2007) factors. One observes entry of generic manufacturing firms with a time lag ranging from few days to several years (Hudson, 2002). Consequently, incumbents experience significant erosion of market share and loss in revenue (Grabowski and Vernon, 1992).

There is as extensive body of literature that captures the relation between the marketing efforts and generic market entry. Interestingly, studies are equivocal with regards to the relationship. Hurwitz and Caves (1988) demonstrates that in the pharmaceutical industry, incumbent's history of marketing expenditure directed at educating the physicians and the consumers help the firm to retain its market share. However, generic price discounts erode market share. Rizzo (1999) suggests that brand-name advertising enhances brand loyalty, thereby decreasing price-elasticity of demand. Thus, both these studies conclude that brand-name marketing inhibits generic market entry. Scott Morton (2000) investigates the influence of incumbent's advertising expenditure in the pre-expiration period on generic manufacturers' entry decision. The study concludes that generics' entry decision is not influenced by brand-name advertising. Königbauer (2007) uses a two-period Bertrand model of competition to demonstrate that product differentiation through advertising induces generic entry. The author argues that market entry is costly. Thus, the expected profit that the generic manufacturers may earn once they

enter the market must be sufficiently high. Thus, incumbent's effort to differentiate its product through advertising activities induces generic market entry.

Despite many studies documenting the incidence of generic entries in the pharmaceutical industry, there is scarcity of research that recognizes the sequential nature of generic entry. In particular, generic manufacturing firms enter the drug market in waves, contingent on FDA approval for their bioequivalent drug. Additionally, entry of generics range from the date of patent expiration of the prescription drug to few years, depending on the revenue generation capability of the latter (Hudson, 2000). We posit that market communication mix and market saturation are two critical factors that influence generic entry decision. Entry into a new market is costly. Hence, generic manufacturing firms are likely to enter the market only if they expect the payoff to be greater the cost and risk of entering the market. In particular, we hypothesize that in the off-patent era, incumbent's continuance of marketing communications through detailing, DTCA, distribution of free samples to its customers and advertisement of drugs in medical journals signal incumbent's market dominance.

H5: Incumbent's marketing communications geared towards promoting off-patent drugs deter generic competition.

2.3 Methodology

2.3.1 Empirical Model

Following Kadiyali (1996), we measure effectiveness of changes in incumbent's marketing effort to boost sales using the following regression analysis (i.e. equation, 7).

$$\begin{aligned}
\log(\text{Sale}_{ijt}) = {} & \alpha_0 + \alpha_1 \text{FATAL}_j + \alpha_2 \text{DISEASE}_j + \alpha_3 \log(DETAIL_{ijt}) \\
& + \alpha_4 \log(DTC_{ijt}) + \alpha_5 \text{DISEASE}_j * \log(DETAIL_{ijt}) \\
& + \alpha_6 \text{DISEASE}_j * \log(DTCA_{ijt}) + \alpha_7 \log(DETAIL_{ijt}) * \log(DTC_{ijt}) + \varepsilon_{it}
\end{aligned} \tag{7}$$

We now provide a definition of the variables used in the analysis:

Dependent Variable

- Sale $_{ijt}$: Total sales of the ith drug that belongs to jth therapeutic class in time t.

Explanatory Variables

- FATAL$_j$: 'FATAL' is a dummy variable that is equal to zero if the drug in jth therapeutic class treats non-fatal medical conditions else is assumes the value of unity.

- DISEASE$_j$: 'DISEASE' is a dummy variable that is equal to zero if the drug in jth therapeutic class treats mental health else is assumes the value of unity.

- Detail ($DETAIL_{ijt}$): "Detail advertising" is firm's practice of deploying sales representatives to doctors' offices to educate and promote ith drug by engaging in one-on-one conversations.

- DTCA ($DTCA_{ijt}$): Firm's marketing effort to promote ith drug directly to its customers.

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2.3.2 Prentice-Williams-Peterson Gap Time Model

Cox Proportional Hazard (CoxPH) model analyzes time to event outcomes (Fox, 2002). It takes into consideration of the time to relapse and does not assume a constant hazard rate. Alternatively, it assumes that the ratio of risk for generic competition between two off-patent prescription drugs is constant over time. Cox proportional hazard function may be expressed as:

$$\lambda(t) = \lambda_0(t) \exp\left(\sum_{i=1}^{p} z_i \beta_i\right) \tag{8}$$

where $z_i, i = 1,2,..., p$ are values of p covariates and $\beta = (\beta_i, i = 1,2,..., p)$ is a $1 \times p$ vector of regression parameters. $\lambda_0(t)$ is the baseline hazard function that describes how risk of an event is a function of time at baseline levels of covariates and the effect parameters describe response of hazard to changes in explanatory covariates. Since the generic manufacturers enter the off-patent drug market in sequential waves, each wave is expected to alter the competitive environment. In particular, with every wave of generics entering the market, the off-patent prescription drug and the existing bio-equivalent generics compete for market share. Thus, this is a typical example where the baseline hazard function varies by strata, thereby not satisfying the basic assumption of proportional hazard model. Additionally, the sequence of occurrence of events is critical, specifically, the second wave of generics will not enter the market until the first wave of generic have already entered the market.

Our study employs Prentice-Williams-Peterson Gap time (PWP-GT) conditional model, an extension of the COX proportional hazard model that analyzes recurrent events with stratifications. It is the conditional model that conserves the order of sequential entry of generic manufacturing firms in the creation of the risk set, thereby allowing for entry dependence. In particular, PWP-GT model incorporates for 'event dependence via stratification by event number so that' different

events correspond to different baseline hazards. We estimate the PWP-GT model with the data organized in gap time (ie, time since last wave of generic entry) (Ullah, Gabbett, and Finch, 2014). PWP-GT specified that the hazard function at time t as a function of earlier generic entries and firm characteristics of $\{N(t), Z(t)\}$, as given by equation (9)

$$\lambda\{t \mid N(t), Z(t)\} = \lambda_{0s}\left(t - t_{n(t)}\right)\exp\left(z(t)\beta_s\right) \tag{9}$$

Where $\lambda_{0s}(.) \geq 0 (s = 1, 2, ...)$ are completely artibrary baseline intensity functions; stratification variable $s = s\{N(t), Z(t), t\}$ may vary as a function of time for a specific wave of entry, β_s is a column vector of regression coefficients specific for the strata. $t_{n(t)}$ is the time of the $n(t)^{th}$ failure $(t_0 = 0)$ and $\left(t - t_{n(t)}\right)$ represents the gap time between occurrences of two sequential events.

In the PWP-GT model, dependent variable is the hazard rate, i.e., the likelihood of generic manufacturing firms entering the market, given that the prescription drug's patent window has closed. In the current study, we control for type of medical condition (i.e. mental health vs diseases) and criticality of the medical condition (i.e. non-fatal vs fatal). We also control for the incumbent's market share in period t. Following are the independent variables used in the analysis:

- Sample: It is the quantity of the drugs distributed in the form of samples by manufacturing firm's sales representatives to customers.

- Percentage of Marketing Expenditure on RVOS: It represents the percentage of pharmaceutical firm's total marketing expenditure used in the distribution of free samples among consumers.

- Percentage of Marketing Expenditure on Detailing: It represents the percentage of pharmaceutical firm's total marketing expenditure geared towards educating the physicians.

- Percentage of Marketing Expenditure on DTCA: It represents the percentage of pharmaceutical firm's total marketing expenditure geared towards directly advertising to the consumers.

- Firm Size of Generic Manufacturers: We use log of total asset as the proxy for firm's total asset.

- Market Share of Prescription Manufacturers: Market share is measured by the ratio of firm's total sales to industry sales in that period.

- Prescription Drug Price: Price of the prescription drug charged by the manufacturer.

2.4 Data Collection

We obtained monthly marketing expenditure data for eleven therapeutic classes for the month September, 2008 through August, 2014 from IMS Health. Marketing expenditure directed to physicians is composed of four components: detailing (i.e. providing drug related information in a face-to-face meeting to the office and hospital-based physicians, providing free samples to physicians, and advertising in medical journals (Rosenthal et al., 2002). Drug patent applicant and supplier information, patent expiration dates are obtained from drugpatentwatch.com. Additional information on generic manufacturing firms entering the respective drug market are obtained from drugs.com and WebMD .com. We obtained information on firm performance (i.e., total sales, firm size, R&D intensity) from COMPUSTAT.

2.5 Results

Table (6) provides the summary statistics of promotional expenditure by prescription drug manufacturers across 11 therapeutic classes. Estimates indicate that drugs that treat fatal diseases (i.e., Pyrimidine, Antineo Monoclonal Antibody, Tyrosine Kinase Inhibator etc.) channelize substantially less marketing expenditure towards DTCA vis-à-vis drugs that treat mental illness (i.e. Serotonin) and non-fatal diseases (Beta Blockers, HMG-CoA Reductase etc.). Similar dichotomy is observed in pharma marketing expenditure towards sampling distribution and journal advertising. Specifically, incumbents that manufacture drugs that treat mental illness (i.e. Serotonin, SSRI and SNRI) and those that treat non-fatal diseases tend to invest in sampling distribution. However, there is a significant drop in marketing expenditure geared towards distribution of free samples by firms that manufacture cancer treatment drugs (i.e. Pyrimidine, Antineo Monoclonal Antibody, Tyrosine Kinase Inhibator etc.). One may infer that high value of samples may act as disincentives. Interestingly, estimates of manufacturing firm's percentage of sales towards detailing are approximately consistent across all the therapeutic classes, ranging between .001 to .1 percentage of sales.

In this section we classify therapeutic classes against three broad categories, specifically, non-fatal mental illness (category 1), non-fatal disease (category 2) and fatal disease (category 3). Table (7) presents the difference in marketing expenditure by manufacturing firms before and after prescription drug patent expiration across these three categories. Estimates indicate that the difference in mean expenditure before and after patent window closes for drugs that treat category 1, category 2, and category 3 are 14.8349 (p<.1), 18.5372 (p<.05), and 13.9029 (p<.05) million dollars respectively. Thus, findings suggest that manufacturing firms tend to significantly reduce

their promotional expenditure in RVOS once the patent window expires. Interestingly, findings also suggest that pharmaceutical firms that produce drugs to treat category 2 (i.e., non-fatal disease) actually enhance their DTCA expenditure once the patent window closes by 3.2047 million dollars ($p < .05$).

Table 8 provides the correlation coefficient matrix of the variables used in the current study. Findings suggest that there is negative association between incumbent's percentage of marketing expenditure across all the marketing channels of communication. In particular, percentage of expenditure for distribution of free samples (Pct RVOS) is negatively correlated with that of detailing (Pct Detailing) ($p < .001$), journal advertisement (Pct Journal) ($p < .001$) and direct-to-customer advertising (Pct DTCA) ($p < .001$). Additionally, estimates indicate negative correlation between brand price (Brand Price) and brand sales (Brand Sales) ($p < .001$) and percentage of marketing expenditure across the different channels ($p < .001$). Interestingly, brand sales (Brand Sales) has positive association with percentage of expenditure for distribution of free samples (Pct RVOS) ($p < .001$) and direct-to-customer advertising (Pct DTCA) ($p < .001$), whereas it is negatively correlated with percentage of expenditure geared towards detailing (Pct Detailing) ($p < .001$) and that of journal advertisement (Pct Journal) ($p < .001$).

The elasticity estimates of the marketing effort are presented in table (9). In panel (A), dependent variable is logarithmic value of total revenue generated by the drug, whereas in panel (B), the dependent variable is log of total sales of the product. Exogenous variables used in the analysis are logarithmic values of the firm's marketing expenditure targeted at educating and building awareness among the consumers (i.e. Direct to Customer Advertising (DTCA)) and the physicians (Detailing). Panel A (Panel B) provides us with the estimates of responsiveness of revenue (total sales) to changes in marketing expenditure.

The first column provides us with the elasticity estimates for drugs in 'infant' or 'early' stage. Similarly, the second and third column provides us with elasticity estimates in the 'growth' stage and in the 'mature' or 'post-patent' stage respectively. As defined in the previous section, a drug is in its 'infant' or 'early' stage of PLC if it has been launched in the market less than 5 years. Similarly, a drug is categorized as 'growth' if it has less than 5 years for patent to expire. Additionally, we define a drug as 'mature' or 'post-patent' if it went off-patent over the last 5 years.

In panel (A), the coefficients are marketing elasticity of revenue (MER) that measures responsiveness in total revenue to a change in the expenditure on the marketing effort for a specific product (% change revenue / % change in marketing expenditure). Similarly, panel (B) provides estimates of marketing elasticity of sales (MES) that measures responsiveness in total sales (Sales) to a change in the expenditure on the marketing effort for a specific product (% change in sales / % change in marketing expenditure).

'FATAL' is an indicator variable that is equal to zero if the drug treats non-fatal medical condition; else is assumes the value of unity. Estimates in panel (A) indicate that in the 'infant' and 'post-patent' PLC stages, increase in marketing expenditure towards promoting the drug that treats non-fatal diseases has higher effect on revenue that those that treat fatal diseases. Interestingly, we observe a switching pattern in the growth PLC stage improvement in marketing expenditure on fatal drugs has greater effect on revenue generation vis-à-vis non-fatal drugs.

'DISEASE' is an indicator variable that is equal to zero if the drug treats mental illness; else is assumes the value of unity. Findings indicate that in the 'infant' stage, total revenue generated by drugs that treat diseases are more responsive to changes in marketing expenditure vis-à-vis those that treats mental health. However, as the drugs moves through their stages in PLC (i.e. growth and

post-patent stage), changes in revenue generation to changes in marketing expenditure is more for those drugs that treat mental health than those that treat diseases.

Findings in Panel A indicate that a 10% increase in the detailing expenditure increases revenue generated by the product by a 16.54% (p<.001) in its infant/early stage. However, a similar increase in marketing expenditure improves revenue by 2.82 (p<.001) and 7.98 (p<.001) percentage points in the growth and post-patent expiration era respectively. Additionally, estimates also suggest that revenue responsiveness to changes in DTCA expenditure is inelastic. In particular, one percentage change in manufacturing firm's expenditure towards DTCA enhances revenue generated by the product by .860 (p<.001), .129 (p<.001) and .465 (p<.001) percentage points in the infant, growth and post-patent expiration era respectively.

The fourth column provides us with difference estimates between the infant and growth stages whereas the fifth column provides us with difference estimates between the mature and growth stages. Estimates indicate that effectiveness of Detailing as a marketing strategy to improve revenue (sales) is higher in the infant stage than the growth stage by 1.372 (p<.001) and .841 (p<.001) percentage points respectively. Additionally, its effectiveness in improving revenue (sales) is higher in the mature stage than the growth stage by .561 (p<.01) and (.313) (p<.05) percentage points respectively. Thus, one may conclude that effectiveness of detailing as a marketing communication to generate revenue and sales is lowest at the product's growth stage. Furthermore, results suggest that effectiveness of DTCA as a marketing strategy to improve revenue and sales is higher in the infant stage than the growth stage by .731 (p<.001) and .284 (p<.05) percentage points respectively. Additionally, its effectiveness in improving sales is higher in the mature stage than the growth stage by .079 (p<.1) percentage points respectively. Thus, one may conclude that effectiveness of detailing and DTCA as a marketing communication to

generate sales is lowest at the product's growth stage. Thus, effectiveness of both 'DTCA' and 'Detailing' as a sales generating strategy follows a 'U' path, with minimum effectiveness at the 'growth' stage in PLC. Similarly, effectiveness of Detailing as a revenue generating strategy also follows a 'U' path, with minimum effectiveness at the 'growth' stage in PLC. Thus, findings are consistent with hypotheses H1 and partially satisfy hypotheses H2.

Empirical findings in panel (A) indicate that for prescription drugs that treat diseases, for one percentage improvement in incumbent's marketing expenditure towards detailing enhances revenue generation by the product by .267 (p<.001), .330 (p<.001) and .530 (p<.001) percentage points in the infant, growth and post-patent expiration stages respectively. Similarly, for prescription drugs that treat diseases, one percentage increase in incumbent's expenditure towards DTCA depresses revenue generated by the product by .344 (p<.001) and 0.141 (p<.05) in the infant and post-patent expiration stages respectively. The difference in estimates between responsiveness of detailing and DTCA in generating revenue is .611 (p<.001), .256 (p<.001) and .671 (p<.001) in the infant, growth and mature stages respectively. Similarly, according to the estimates in panel (B), the difference in estimates between responsiveness of detailing and DTCA in generating sales is .117 (p<.01) and .290 (p<.001) in the infant and mature stages respectively. Thus, findings support hypothesis H4 that 'Detailing' is relatively more effective in generating revenue and sales when the drug under consideration treats 'diseases' as compared to 'mental illness'. Interestingly, the effectiveness of 'detailing' in generating revenue is maximum in the post-patent period of the drug.

Moreover, effectiveness of DTCA as a firm's marketing effort to enhance total revenue varies across PLC and is contingent of the characteristics of the medical condition it treats. In particular, DTCA is an effective strategy for those drugs that treat mental health and are either in their

'infant/early' or in the 'post-patent' stage of their PLC. However, it is an effective strategy to enhance revenue if the drug treats diseases and is in its mature stage.

Table (5) provides us with the estimates of PWP-Gap time model. The dependent variable is the hazard rate, i.e., the likelihood of generic manufacturing firms entering the market, given that the prescription drug's patent window has closed. Column (A) provides us with the estimates of the incumbent's marketing strategies targeted at the first to enter generic manufacturers. Column (B) provides us with the estimates targeted at the second wave of generic manufacturers who enter the drug market. The standard errors have been reported in parenthesis. We report the corresponding hazard ratio directly below the standard errors.

If the hazards ratio an independent variable is less than 1, an improvement in the variable decreases the hazard rate. According to HR estimates in column A, HR for marketing strategy targeted at educating the physicians (Detailing) and customers (DTCA) is 0.017 (p<.05) and .001 (p<.01) respectively. Results indicate that in the post-patent era, 'detailing' and 'DTCA' expenditure incurred by the prescription drug manufacturing firm helps to them to continue building awareness among physicians and customers regarding the effectiveness of the drug. Specifically, it improves the likelihood of physicians continue to prescribe the drug and customers continue to consume it. These entry deterrent strategies employed by the incumbent consequently discourage generic manufacturers from entering the market.

If the hazards ratio (HR) of an independent variable is larger than 1, an increment in the variable increases the hazard rate. Estimates of HR for the prescription drug price is 1.005 (p<.05). This may indicate that high prescription drug prices are likely to attract competition from generics. In the post-patent era, incumbents typically experience competition from generic manufacturing firms. Drop in prescription drug prices may have been an effective strategy adopted by incumbents

to prevent market share erosion. However, the very fact that incumbents continue to maintain high prescription drug prices even in the post-patent period is a strong signal to potential competitors regarding unexplored market potential. This pricing strategy may however attract the first wave of generic entry.

Column (B) provides us with the estimates for the second wave of generic entry. HR for Retail value of samples (RVOS) and Detailing are .018 ($p<.01$) and .011 ($p<.05$) respectively. Distribution of free samples to consumers and continuance of physician education are expensive affairs. Findings suggest that when incumbents continue to allocate significant marketing budget towards these marketing strategies, they successfully deter even the second wave of generic entry. Interestingly, firm size of the generic manufacturer is a critical factor influencing its decision to enter the market. Finally, HR for firm size of the generic manufacturer is .190 ($p<.05$). Thus, estimates suggest that prescription drug manufacturing firm is less likely to encounter competition from generics if the latter's firm size is high.

2.6 Discussion

Key Findings and Theoretical Implications: The U.S. drug manufacturers promote their products heavily to ensure accelerated adoption of new drugs and retain market share of existing drugs (Neslin, 2002; Rosenthal et al., 2002; Donohue, Cevasco, and Rosenthal, 2007). Although the patent window of a prescription drug closes on a specific date, the drug's trademark continues to live on as the vehicle for maintaining the pharmaceutical incumbent's goodwill and possibly delaying or impeding subsequent generic competition (Caves, Whinston and Hurwitz, 1992). Thus, the incumbent often continues to promote its prescription drug even after the latter goes off patent and faces competition from generic manufacturers (Aitken, Berndt, and Cutler, 2009). These marketing communications by the incumbent serve two primary purposes. First, they continue to build brand loyalty and re-establish the relative effectiveness of the brand drug compared to the bio-equivalent generics that may be available in the market (Grabowski and Vernon, 1992). Second, they serve as an entry deterrent strategy (Ellison and Ellison, 2007).

In the current study we analyze effectiveness of incumbent's marketing communications across stages of PLC. We consider detailing, direct-to-customer advertising (DTCA), sample distribution and journal advertising as the four broad categories of marketing strategies that are typically adopted by the U.S. pharmaceutical firms to promote their drugs. Our results indicate that effectiveness of both 'Detailing' and 'DTCA' as a marketing strategy to improve consumer and physicians awareness regarding the product follows a 'U' path along the product life cycle stages, with minimum effectiveness at the growth stage. One may conclude that drugs in their growth stage have an established market with known effectiveness and possible side effects. Thus, additional marketing expenditure to increase consumer awareness may not necessarily yield high

returns. However, when a drug is in its infant stage, physicians and consumers have limited information regarding its effectiveness in treating the medical condition and possible side effects. Thus, incumbent's marketing communications through detailing and DTCA helps to resolve some of these uncertainties and decrease risk.

Empirical estimates also indicate that effectiveness of 'detailing' as an effective marketing strategy also varies across therapeutic classes. Specifically, 'detailing' is more effective in generating sales of drugs that treat 'diseases' vis-a-vis 'mental illness'. Diseases are medical conditions that are relatively organic and subject to observable pathology vis-à-vis mental health that are more descriptive and not observable readily. Additionally, diagnosis of the former requires expert clinical eye of physicians whereas the latter subject to interpretation of the patient. Thus, increased budget allocation towards detailing (i.e. marketing effort geared towards educating the physicians) is expected to generate sales and revenue for drugs treating diseases relative to those treating mental health. Our findings confirm our hypothesis.

Interestingly, DTCA is an effective strategy to improve sales and revenue in the infant and post-patent period. In both these stages, the incumbent utilizes DTCA to establish product credibility and emphasize on its comparative advantage. Since mental illness is a subjective medical condition and depends largely on patients' interpretation of the condition, DTCA helps to resolve some of the uncertainties by providing information directly to the customers.

Finally, results indicate that continuance of marketing communications mix by the incumbent in the post-expiration period emits mixed signal to the wave of generics entering the market. Specifically, estimates indicate that in the post-patent period, incumbent's continued marketing communications through detailing and DTCA (direct-to-consumer advertising) act as an entry deterrent strategy for the first and second waves of generic entry. Given that these strategies

are effective in generating incumbent's revenue and sales even in the off-patent period may deter generic. Interestingly, continuance of high brand price even in the off-patent period lures competition. In particular, when the generic manufacturers observe that the incumbent continues to charge high price for its off-patent drug, they may interpret this as signals of drugs' revenue generation potential, which may consequently induce them to enter the market.

Managerial Implications: Current study indicates that effectiveness of marketing strategies in promoting the product and generating sales varies across product lifecycle. Thus, in order to maximize returns and firm valuation, managers of pharmaceutical firms may need to adjust their marketing expenditure and effort contingent on whether the drug is in its infant/ mature or post-patent stage.

Additionally, findings suggest that once the prescription drug goes off-patent and generic manufacturing firms consider entering the market, they tend to interpret incumbent's marketing expenditure as signals of market potential. Thus, managers of the incumbent firm may need to be aware of the downside of continuance in marketing efforts even in the post-patent stage. They may need to adjust their marketing effort accordingly.

Limitations and Future Research: The current study establishes that effectiveness of marketing communications vary across drug life cycle. An interesting extension of the current study may be to solve the incumbent's dynamic allocation of marketing expenditure problem across marketing channels and across product life cycle that maximizes total sales/ revenue generation.

Incumbents adopt detaining and DTCA as primary promotional vehicles to diffuse their product. It may be interesting to analyze in a game theoretic setup how these strategies may impact rival firm's marketing strategies who manufacture non-bioequivalent or quasi-bioequivalent drugs

in the same therapeutic class. An interesting analysis may be examining the cross-marketing effect

if the rival firm introduces the close-substitute drug with a time lag.

APPENDIX

Table 6: Distribution of Marketing Expenditure on Prescription Drugs Across Therapeutic Classes

(Sept, 2008 - Nov, 2014)

Variable	Serotonin	SSRI	SNRI	Beta Blockers	HMG-CoA Reductase	ACE Inhibitor	Pyrimidine	Anti Neo Plastics	GRH Analogs	Antineo Monoclonal Antibody	Tyrosine Kinase Inhibator
Direct-to-customer advertising (millions of dollars)**	61.501	9.871	6.805	16.401	1477.129	0.000	0.556	28.754	0.199	2.517	3.463
Percentage of sales	0.889	0.082	0.022	0.343	2.570	0.000	0.007	0.495	0.005	0.005	0.017
Promotion to professionals											
Detailing (millions of dollars)$^{\&}$	1.499	2.878	6.805	4.776	8.970	0.054	0.136	0.372	0.348	0.807	0.657
Percentage of sales	0.022	0.024	0.022	0.100	0.016	0.012	0.002	0.006	0.008	0.001	0.003
Retail value of samples (millions of dollars)	436.519	801.686	2690.574	749.838	3986.680	12.396	52.667	222.551	3.139	674.536	71.752
Percentage of sales	6.307	6.637	8.835	15.688	6.935	2.667	0.633	3.833	0.074	1.222	0.344
Journal advertising (millions of dollars)	0.911	0.000	45.323	26.712	26.394	0.000	6.009	17.197	1.550	29.322	19.706
Percentage of sales	0.013	0.000	0.149	0.559	0.046	0.000	0.072	0.296	0.036	0.053	0.094
Total professional promotion effort (millions of dollars)	438.929	804.564	2742.702	781.326	4022.044	12.450	58.812	240.120	5.036	704.665	92.115
Percentage of sales	6.342	6.661	9.006	16.347	6.997	2.678	0.707	4.136	0.119	1.276	0.441
Total promotional efforts (millions of dollars)	500.430	814.435	2749.507	797.727	5499.173	12.450	59.368	268.874	5.235	707.182	95.578
Percentage of sales	7.230	6.743	9.029	16.690	9.566	2.678	0.714	4.631	0.123	1.281	0.458
Free Samples distributed (millions)	11.632	36.393	77.539	49.885	127.496	0.956	0.024	0.421	0.012	0.095	0.181
Percentage of unit sales	18.984	73.448	42.509	69.438	62.084	26.176	0.220	13.397	0.190	0.261	4.158

* Data Source: IMS Health

** Data include spending on advertising on internet, network and cable television, newspaper, magazine as well as spot radio and spot television.

& Data include spending on educating hospital and office-based physicians

Table 7: Difference in Promotional Expenditure (in Millions $) Pre and Post Prescription Drugs' Patent Expiration (Sept, 2008 - Aug, 2014)

Therapeutic Class			Samples (in Millions)	RVOS (in Millions $)	Detailing (in Millions $)	Journal (in Millions $)	Direct to Customer (in Millions $)
Non-Fatal Mental Health (Category 1)	Pre Patent Expiration (A)	N	194	190	205	109	174
		Mean	0.5259	17.2230	0.0446	0.5612	6.4443
		Std Dev	[0.451]	[17.924]	[0.033]	[0.525]	[9.193]
	Post Patent Expiration (B)	N	119	114	176		93
		Mean	0.0486	2.3881	0.0027		0.4313
		Std Dev	[0.135]	[14.801]	[0.006]		[1.784]
	Difference in Mean (A-B)		0.4773	14.8349 *	0.0419	0.5612	6.0129
Non-Fatal Disease (Category 2)	Pre Patent Expiration (A)	N	162	151	229	160	86
		Mean	0.9128	25.7454	0.0517	0.2918	9.1683
		Std Dev	[0.581]	[19.407]	[0.042]	[0.264]	[9.092]
	Post Patent Expiration (B)	N	125	121	233	35	57
		Mean	0.2437	7.2082	0.0013	0.2277	12.3730
		Std Dev	[0.414]	[11.833]	[0.001]	[0.184]	[11.905]
	Difference in Mean (A-B)		0.6692	18.5372 **	0.0504	0.0641	-3.2047 **
Fatal Disease (Category 3)	Pre Patent Expiration (A)	N	66	56	222	204	173
		Mean	0.0049	14.2689	0.0074	0.2706	0.0374
		Std Dev	[0.006]	[55.235]	[0.005]	[0.209]	[0.047]
	Post Patent Expiration (B)	N	5	4	44	7	22
		Mean	0.0020	0.3660	0.0005	0.0300	0.0044
		Std Dev	[0.002]	[0.321]	[0.001]	[0.015]	[0.002]
	Difference in Mean (A-B)		0.0029	13.9029 **	0.0069	0.2406	0.0330

***, **, and * indicates 1%, 5% and 10% level of significance

Table 8: Summary Statistics

	Mean	Standard Deviation	Samples (in 100000)	Pct RVOS[^]	Pct Detailing	Pct Journal	Pct DTCA[#]	Brand Price	Brand Sales
Samples (in 100000)	0.2713449	1.5222292	1.0000						
Pct RVOS[^]	0.2751564	0.4271668	0.3096 ***	1.0000					
Pct Detailing[%]	0.3369917	0.4530551	-0.2002 ***	-0.4730 ***	1.0000				
Pct Journal[$]	0.2422847	0.4069128	-0.1533 ***	-0.3709 ***	-0.4124 ***	1.0000			
Pct DTCA[#]	0.1455672	0.2987558	0.0697 ***	-0.2074 ***	-0.2786 ***	-0.2063 ***	1.0000		
Brand Price	1609.91	3112.83	-0.0898 ***	-0.3031 ***	-0.0500 ***	0.2182 ***	0.2205 ***	1.0000	
Brand Sales	60672.21	273580.21	0.8485 ***	0.2664 ***	-0.1898 ***	-0.1353 ***	0.0912 ***	-0.1035 ***	1.0000

***, **, and * indicates 1%, 5% and 10% level of significance

^ Pct RVOS: Percentage of Marketing Expenditure on Retail Value Of Service; % Pct Detailing: Percentage of Marketing Expenditure on Detailing; $ Pct Journal: Percentage of Marketing Expenditure on Journal; # DTCA: Percentage of Marketing Expenditure on Direct-to-Consumer Advertising

Table 9: Effectiveness of Marketing Strategies Across Prescription Drugs' Product Life Cycle

	Infant/ Early Drugs[&] (C)		Growth Drugs[^^] (D)		Mature/ Post Patent Expiration[#] (E)		Difference between Infant and Growth Stages (C) -(D)		Difference between Mature and Growth Stages (E) -(D)	
Panel A: Responsiveness of Revenue to changes in marketing expenditure										
Intercept	0.930	[0.292] **	13.746	[0.203] **	9.628	[0.209] ***	-12.816	[0.363] ***	-4.118	[0.590] ***
Fatal	-1.253	[0.221] ***	1.325	[0.155] ***	-1.166	[0.162] ***	-2.578	[0.276] ***	-2.491	[0.354] **
Disease	1.866	[0.357] ***	-3.821	[0.228] ***	-2.210	[0.255] ***	5.687	[0.434] ***	1.612	[0.627]
log(Detailing)	1.654	[0.061] ***	0.282	[0.038] ***	0.798	[0.039] ***	1.372	[0.074] ***	0.516	[0.194] *
log(DTCA)	0.860	[0.125] ***	0.129	[0.055] **	0.465	[0.061] ***	0.731	[0.141] ***	0.336	[0.231]
Disease*log(Detailing) (F)	0.267	[0.068] ***	0.330	[0.046] ***	0.530	[0.046] ***	-0.064	[0.085]	0.200	[0.202] ***
Disease*log(DTCA) (G)	-0.344	[0.070] ***	0.074	[0.043] *	-0.141	[0.039] **	-0.418	[0.086] ***	-0.215	[0.204] *
log(Detailing)*log(DTCA)	-0.086	[0.011] ***	-0.001	[0.006]	-0.044	[0.006] ***	-0.085	[0.013] ***	-0.043	[0.035]
Difference in Estimates between Detailing and DTCA across the three stages ((F) - (G))	0.611	[0.122] ***	0.256	[0.076] ***	0.671	[0.073] ***				
Panel B: Responsiveness of Total Sales to changes in marketing expenditure										
Intercept	0.474	[0.157] **	8.660	[0.126] ***	6.079	[0.121] ***	-8.186	[0.216] ***	-2.581	[0.351] ***
Fatal	-1.142	[0.118] ***	-0.142	[0.096]	-2.022	[0.093] ***	-1.000	[0.164] ***	-1.880	[0.211] ***
Disease	1.302	[0.191] ***	-2.640	[0.142] ***	-1.025	[0.147] ***	3.943	[0.258] ***	1.615	[0.373] **
log(Detailing)	1.125	[0.033] ***	0.285	[0.023] ***	0.597	[0.022] ***	0.841	[0.044] ***	0.313	[0.115] **
log(DTCA)	0.347	[0.067] ***	0.063	[0.034] *	0.142	[0.035] ***	0.284	[0.084] **	0.079	[0.041] *
Disease*log(Detailing)	-0.131	[0.037] **	0.135	[0.029] ***	0.172	[0.026] ***	-0.266	[0.050] ***	0.037	[0.120] **
Disease*log(DTCA)	-0.247	[0.038] ***	0.064	[0.027] **	-0.118	[0.023] ***	-0.311	[0.051] ***	-0.182	[0.122]
log(Detailing)*log(DTCA)	-0.030	[0.006] ***	0.006	[0.004] *	-0.006	[0.003] *	-0.036	[0.008] ***	-0.013	[0.021]
Difference in Estimates between Detailing and DTCA across the three stages ((F) - (G))	0.117	[0.065] *	0.071	[0.047]	0.290	[0.042] ***				

***, **, and * indicates 1%, 5% and 10% level of significance

Prescription drugs whose patent expired over the last 5 years; & Prescription drugs who received FDA approval over the last 5 years; ^^ Prescription drugs whose patent is expected to expire within the next 5 years

Table 10: Prescription Drug Manufacturing Firm's Entry Deterrant Strategy Using PWP-Gap time Model with Stratum-Specific Regression Coefficients

	Strategy Targeted at First to Market Generic Manufacturer Column (A)	Strategy Targeted at Follower Generic Manufacturer Column (B)
Intercept	0.304 *	-0.091
	(0.170)	(0.093)
	[1.355]	[0.913]
Samples (in 100000)	-0.162	-0.042
	(0.002)	(0.167)
	[1.002]	[0.959]
Percentage of Marketing Expenditure on RVOS^	-1.419	-4.003 *
	(1.591)	(2.123)
	[0.242]	[0.018]
Percentage of Marketing Expenditure on Detailing	-4.097 **	-4.494 **
	(2.015)	(2.232)
	[0.017]	[0.011]
Percentage of Marketing Expenditure on DTCA#	-17.354 *	-2.044
	(8.906)	(6.353)
	[0.001]	[7.720]
Firm Size of Generic Manufacturer	-0.208	-1.662 **
	(0.415)	(0.762)
	[1.231]	[0.190]
Market Share of Prescription Manufacturing Firm	2.710	0.523
	(1.815)	(1.601)
	[15.031]	[0.592]
Prescription Drug Price	0.005 *	0.002
	(0.003)	(0.002)
	[1.005]	[0.998]

***, **, and * indicates 1%, 5% and 10% level of significance

^ RVOS: Retail value of samples; # DTCA: Direct to Customer Advertisement

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Chapter 3

The effect of Loyalty Program on firm risk and value

3. ABSTRACT

Loyalty programs (LPs) are dynamic incentive programs where consumers are benefitted from cumulative purchase over time. Studies indicate that not all LP are equally successful and some fail to generate the expected stream of revenue for the firm, leading to volatility in expected stream of revenue. A report published by Colloquy reiterates the fact by indicating that American businesses distribute approximately $48 billion worth of perceived value in reward points and miles annually; surprisingly only two-third of these points are redeemed by consumers. The current study utilizes a sample of 336 U.S. firms – inclusive of retail, hospitality, telecommunication and entertainment sectors – that offer loyalty programs. We estimate firm's idiosyncratic risk after it adopts the program following the Fama-French four-factor model. Results indicate that firm's adoption of LP alleviates firm-specific risk. Next, we demonstrate that market share moderates the relation between firm's adoption of loyalty program and sales. In particular, adoption of loyalty program by firms with high market share depletes sales. On the other hand, adoption of loyalty programs by small firms boost sales, thereby improving firms' market share.

Keywords: loyalty program, firm-specific risk, market share, sales

3.1 Introduction

Loyalty programs are designed to offer accumulated economic benefits to customers who purchase the product in the near future (Uncles, Dowling and Hammond, 2003). Customers typically accumulate points over a period of time, which he/she may consequently exchange for free products or rewards such as air miles (Dowling and Uncles, 1997; Sharp and Sharp, 1997). Consequently, these programs encourage consumers to shift their purchase decisions to a multi-period framework rather than focus on single-period decisions (Lewis, 2004). Over the last decade, loyalty programs have assumed a critical role in customer relationship management (CRM), thereby rendering these strategies critical for firm management in initiating and maintaining relationships, motivating product and service usage, and retaining customer base (Musalem and Joshi, 2009).

Acquiring a new customer base is few folds more expensive than customer retention (Blattberg, Getz and Thomas, 2001; Griffin and Lowenstein, 2001; Thomas, Blattberg and Fox, 2004). Moreover, on average, existing customers spend significantly more than a new customer (Zeithaml, Rust, Lemon, 2001). Thus, one of the important factors driving marketing strategists to implement loyalty programs is retaining existing customer base (Lee, Lee, Feick, 2001). A report published by Colloquy reiterates the fact by indicating that American businesses distribute approximately $48 billion worth of perceived value in reward points and miles annually; surprisingly only two-third of these points are redeemed by consumers. Thus, significant portion of company's time and effort spent towards the loyalty program get lost and customers do not get any additional benefit from buying business to which they are loyal (Keh and Lee, 2006). Another report by Colloquy indicates that the average U.S. household has joined 14.1 loyalty and rewards programs; however, they actively operate only 6.2 of them. Thus, market strategists

realize that loyalty and rewards programs have the potential to spark business growth. However, there may be misalignment between loyalty program offerings and customers' expectations from the business that needs to be addressed to increase the effectiveness of loyalty programs (McCall and Voorhees, 2010). Customers express the need for loyalty programs that are relevant and customized based on individual consumer preference structure (Kivetz and Simonson, 2003).

Firm management and consumer enthusiasm for loyalty programs (LP) has been echoed in the marketing literature. In particular, scholars have examined effectiveness of loyalty programs in changing consumer purchase pattern. Consistent with the 'goal-gradient hypothesis', Kivetz, Urminsky, and Zheng (2006) demonstrates consumers expend more effort as they approach a reward. Moreover, consumers are more likely to have high perception regarding the LP if they experience an idiosyncratic fit with the program offerings (Kivetz and Simonson, 2003). Additionally, LPs with high requirements tend to shift consumer preference towards luxury rewards as compared to necessity rewards (Kivetz and Simonson, 2002). Studies demonstrate that loyalty program in conjunction with marketing instruments such as shipping fees, e-mail coupons etc. aids in customer retention (Verhoef, 2003; Lewis, 2004). Studies have also focused on the economic aspects of loyalty programs (Shugan, 2005). Retail firms with high assortment homogeneity and product offerings characterized by high purchase frequency are more likely to adopt loyalty program to limit consumer's tendency to switch (Zhang et al., 2000; Leenheer and Bijmolt, 2008). Adoption of successful loyalty program helps the firm to build a strong customer base that tends to discount negative evaluations of the company relative to its competitors (Bolton, Kannan and Bramlett, 2000). Kim, Shi and Srinivasan (2001) demonstrates that reward programs weaken price competition. In particular, 'by offering the incentives for repeat purchases, reward programs increase a firm's cost to attract competing firms' current

customers. Moreover, since firms gain less from undercutting their prices, equilibrium prices go up.'

Adoption of LP is a critical component of customer relation management that not only improves firm's visibility in the market but also adds value to customers (Dowling and Uncles, 1997). Moreover, LPs are designed to decrease consumer defection rate and build a loyal customer base (Zhang et al., 2000). Thus, one may conjecture that firm's investments on such market-based assets may dampen uncertainty in future cash flow that may lead to a decrease in firm risk (Rego, Billett and Morgan, 2009) and improvement in firm valuation (Srivastava, Reibstein, and Joshi, 2006). Thus, it may be interesting to examine the impact of firm's adoption of loyalty program on firm risk.

Considering the 'the sunk-cost fallacy' where already accumulated reward points lock customers into the LP (Keiningham et al., 2005), key to successful adoption of LP is the firm's market entry position. However, there is paucity in the literature on the relation between firm's adoption of loyalty program and first mover advantage. An important question is whether the pioneering firm who is first to adopt loyalty program in the industry has relative advantage vis-à-vis other competitors in the industry who are yet to adopt similar corporate strategy.

An underlying assumption to an effective loyalty program is that the offerings match closely with the expectations and needs of firm's customer base. This may especially be challenging for a firm with high market share since it typically has a diverse customer base with differentiated preference structure. On the other hand, a firm with low market share usually has a niche customer base. Thus, tailoring its loyalty program to satisfy the requirements of its clientele may not be an impossible task. A critical question is whether the relation between firm's adoption of loyalty program and firm performance is moderated by firm's market share.

Our study makes the following contributions to the extant literature. We demonstrate that firm's adoption of loyalty program alleviates risk. In particular, estimates indicate that upon adoption of the loyalty program, firm's exposure to idiosyncratic risk steadily decreases over the next three years vis-à-vis its exposure to idiosyncratic risk prior to the launch of the program. Firms with high market share often adopt loyalty programs to retain their current customer base and prevent market share erosion. We empirically illustrate that such a defensive marketing strategy is likely to hurt firm performance, as indicated by drop in sales. Interestingly, when a low market share firm adopts loyalty program as an offensive strategy to improve upon its customer base, it boots sales.

The article is organized as follows. Section 2 deals with literature review and hypothesis development. Section 3 provides details of the measures of idiosyncratic risk and firm performance. Section 4 reports the data collection and sample selection procedure used in the analysis. Finally, section 5 provides the results of the analysis followed by a discussion section.

3.2 Hypothesis Development

3.2.1 Does Adoption of loyalty programs lowers firm risk?

Valuation of a firm is determined by the present value of expected future cash flows (Kaplan and Ruback, 1995). Financial managers may improve firm valuation either by increasing expected future cash flows or by reducing uncertainty of the cash flows, which translates into a lower discount rate and firm risk. If one compares two firms with identical cash flows but differ in risk structure, present value of the low risk firm's future cash flow will be higher than that of the firm with higher risk structure. Thus, former has higher firm valuation than the later, even though the level of cash flow is identical for both the firms (Rego, Billett and Morgan, 2009).

The association between firm's investment on market-based assets such as brand, patents, trademarks etc., and risk is central to the relation between marketing and firm performance (Madden, Fehle and Fournier, 2006). This is because if such an investment helps to alleviate risk and reduce uncertainty in future cash flow, it improves firm value. Fornell et al. (2006) posits that by investing in superior market based assets, managers may be able to simultaneously improve return and alleviate risk. Rego, Billett and Morgan (2009) demonstrates that firm's investment on consumer based brand equity (CBBE) has strong implications on firm's exposure to risk. In particular, the authors demonstrate that even though CBBE has significant risk-reducing effect on both idiosyncratic as well as systematic risk, its impact on alleviating the former is stronger than shielding the firm from economy-level shocks.

A firm's total risk or volatility is composed of systematic and idiosyncratic risk (Low, 2009). While systematic risk reflects firm's sensitivity to the market returns changes or to

information regarding broad market changes (e.g., unemployment, natural disaster etc.) that are common to all stocks, idiosyncratic risk is the 'risk associated with firm-specific strategies', after systematic risk has been accounted for (Fu, 2009). Since, by definition, idiosyncratic risk is unique to a specific firm, it is a diversifiable risk (Lee and Faff, 2009), whereas systematic risk involves uncertainty inherent to the entire market and hence is non-diversifiable. Firm's 'idiosyncratic risk is priced by investors in financial markets' and is the major contributor to firm's total risk (Ang et al., 2006; Goyal and Santa-Clara, 2003). Studies indicate that firm specific idiosyncratic risk has profound influence in stock market performance, rendering it as an important factor for the managers as well as the investors. Thus, in the presence of transaction costs, asymmetric information and market inefficiency, corporations' risk management division traditionally lay greater emphasis in managing unsystematic risk (Brown and Kapadia, 2007).

An emerging strand in the finance literature deals with the relation between firm's idiosyncratic risk and economic and financial factors such as firm profitability and investment decisions (Wei and Zhang 2006; Panousi and Papanikolaou, 2012), corporate governance (Ferreira and Laux 2007), institutional holding (Xu and Malkiel 2003), consumer word of mouth (Luo, 2007) etc. Osinga et al. (2011) examines the relation between firm's marketing activities and its impact on stock market returns, generation of systematic and unsystematic risk. The study focuses on direct consumer (i.e., direct-to-consumer advertising, DTCA) and physician (i.e., direct-to-physician, DTP) advertising expenditure incurred by pharmaceutical firms. Findings indicate that investors regard expenditure on DTCA as value enhancing as reflected in upward movement of stock prices. Interestingly, results also indicate that such marketing activities generate higher idiosyncratic risk. In contrast, DTP marketing activities have relatively modest impact on stock returns and idiosyncratic risk. Luo and Bhattacharya (2009) examines whether

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corporate social performance (CSP) influences firm's idiosyncratic risk. Empirical results indicate that even though there is a negative and significant relationship between firm's CSP and idiosyncratic risk, firm's effort to simultaneously pursue CSP, advertising, and R&D may enhance its idiosyncratic risk.

Current study examines the impact of firm's adoption of LP on firm risk. Pioneered by the airline industry in the 1980s, LP has penetrated virtually all industries, ranging from retail to hospitality, department stores to specialty stores, and entertainment to communications. With growth of the internet, LP has also captured the online shopping market (Keegan 2010, Wong 2011). Firms embrace LPs and invest billions of dollars in their implementation and maintenance for multitude of reasons (Nunes & Dréze, 2006). First, LPs helps to reduce customer defection (Keiningham et al., 2005). The authors suggest that customers are driven by 'the sunk-cost fallacy' where they focus on the total reward points they have already accumulated so far. This fallacy locks them into the LP and ensures continued interaction in the future even though the consumer may not feel truly loyal towards the firm's products and service offerings (p.119). Furthermore, by providing extra incentives, loyalty programs encourage consumers to 'direct more of their purchases toward a business and less at competitors'. It may even entice customers to buy more than they originally intended. Thus, LPs help firms to win a greater share of customers' wallet. Furthermore, with strong customer patronage, LPs may decrease variability in customers' cash flows even in cases of environmental shocks, such as negative press coverage, product recall etc. Thus, establishing a strong customer base helps the firm to reduce uncertainty in cash flow and alleviate risk (Kumar and Shah, 2015).

Firms often utilize LP as a tool to obtain customer specific data which might yield valuable insight into customer behavior and purchase pattern. In particular, marketing managers

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may be able to use the data to decipher information regarding consumers' preference structure, volume and frequency of purchase. Consumer specific information may be utilized to determine customer segmentation and relative effectiveness of marketing strategies across segment. Additionally, insider information may help the firm to reduce overall marketing and promotional costs, and maximize effectiveness of marketing communication mix.

Furthermore, marketing managers may even use insider information to establish special bond with the customers, which goes beyond offering just economic or functional value of the product or service. It may help the firm to establish a relationship of trust and commitment with its customer base. Using customer relation management (CRM), one may observe metamorphosis of 'an explicit contractual relationship governed by laws into an implicit friendship governed by passion, purpose, and mutual respect' (Sheth and Parvatiyar, 1995).

We posit that adoption of LP help the managers to make firm's cash flow less sensitive to unexpected changes in firm's environment. The firm may be exposed to unexpected shocks specific to the firm (i.e. massive product recall, disruption in supply chain etc.) or the industry. The impact of such firm or industry specific shock is captured by firm's idiosyncratic risk. The firm may also be exposed to shock targeted at the broader market due to unexpected events (i.e., hurricane Katrina, tsunamis, earthquakes etc.), impact of which is captured by systematic risk. We hypothesize that adoption of a successful loyalty program and building a strong customer base shields the firm from both categories of shocks and helps the manager to manage risk better.

H_{1a}: Firm's adoption of loyalty program lowers idiosyncratic risk

H_{1b}: Firm's adoption of loyalty program lowers systematic risk

3.2.2 Loyalty Program and Firm Sales

Loyalty programs are dynamic incentives designed to benefit consumers from cumulative purchase over time and helps the firm to retain its current customer base while attracting potential customers (Liu, 2007). In other words, an optimally designed loyalty program is expected to benefit both the parties involved in the transaction (i.e. the consumers as well as the firm). Thus, adopting a successful loyalty program is an effective marketing strategy by the firm, especially in a competitive environment. Bolton, Kannan and Bramlett (2000) demonstrates that an effective reward program not only make customers happy and makes them believe that the program provides them good value for their money but also makes them less sensitive to any negative evaluations of the firm vis-à-vis its competitors. Thus, it helps the firm to build a loyal customer base with positive evaluations and repeat purchase intentions. In particular, these loyalty program members provide firms with a consistent source of revenue (repeat and increased purchases) and helps in cost reduction through less promotional expenses, thereby elevating profit.

However, building a loyal customer base takes time and resources (Taylor and Neslin, 2005). Furthermore it is a learning process for the firm to be able to offer a loyalty program that matches customer requirements as well as satisfies their corporate goals. There are numerous instances of firms re-launching loyalty programs, each time with minor revisions that better suits customer needs and helps them to fulfill their organizational goals (Nunes and Drèze, 2006). For example, Kohl's, Star bucks etc. have history of re-launching their loyalty programs, each time with incremental changes in their program offering packet. Thus we posit that launching of loyalty program may not have a significant impact on firm sales in the immediate future . However, it helps the firm to improve sales in the long run (Figure 1).

H$_2$: Launch of LP has positive impact on sales in the long run.

3.2.3 Incumbent Effect

In this section we investigate whether firms who are the pioneers in adopting loyalty programs in their respective industry enjoy first mover advantage. Extant literature indicates that first-mover advantage depends on certain demand-related inertial advantage and supply-related efficiency advantages (Mueller, 1997). Specifically, first-mover advantage is significant in industries where products are associated with high set-up and switching costs, product with high network externalities or high dollar value of transactions (Kerin, Varadarajan and Peterson, 1992). 'Switching costs can take the form of transaction costs from switching brands, learning costs, or seller-induced costs like contractual costs' (Klemperer, 1987). For instance, usability and value of a credit card is directly proportional to the number of stores, restaurants, etc., which accept it, which in turn is a function of the number of possible customers who also use similar cards. Consumer's uncertainty regarding product quality is a demand-related factor that may actually prove to be disadvantageous for the first mover in the industry. On the other hand, network externalities, economies of scale, set-up and sunk costs are some of the supply related factors typically enjoyed by the pioneering firm in the industry. For example, a firm that develops a new product may be able to establish a contractual relationship with suppliers of important inputs.

Literature indicates that pioneers firms have different skill sets and resources at their disposal relative to the early adopters and late entrants. Robinson, Fornell and Sullivan (1992) investigates whether successful market pioneers necessarily have access to superior skills and

resources. Findings suggest that market pioneers are not necessarily stronger and have access to superior skills. However, skills and resource profiles of market pioneers vary significantly from that of early followers and late entrants (Lieberman and Montgomery, 1988). However, studies indicate that first mover advantage is contingent on industry and product characteristics (Lieberman and Montgomery, 1998). In similar vein, studies indicate that the pioneer firm offering loyalty program enjoys distinct advantage over the other firms in the industry (Van Osselaer, Alba and Manchanda, 2003). However, the relation may be moderated by loyalty program offerings and its pricing structure. We hypothesize that the pioneer firm who is the first to launch a loyalty program in the industry enjoys a significant improvement in sales vis-à-vis its competitors who are yet to adopt such a marketing strategy.

H₃: Pioneering firms who are first to launch loyalty programs in their industry may experience improvement in sales relative to other firms in the industry.

3.2.4 Does market share moderate the relationship?

Fornell (1992) and Griffin and Hauser (1993) indicated the possibility of a negative association between customer satisfaction and market share. Authors posit that a firm with small market- share may target niche customers and address their needs, thereby resulting in high degrees of satisfaction. On the contrary, a firm with large market share may target 'a more diverse and heterogeneous set of customers'. As a firm grows by bringing in customers with preferences further away from the firm's target market, the overall level of customer satisfaction is likely to fall.

Similar analogy may be drawn between firm's market share and its adoption of loyalty programs. A small market share firm serving a niche customer base may be able to tailor its loyalty program offerings to address the needs of its customer. Loyalty program members may believe that the program provides them good value for their money. This in turn may translate into higher customer satisfaction (Bolton, Kannan and Bramlett, 2000) and customer retention (Lewis, 2004). Thus, an effective loyalty program not only makes the customers happy but also helps the firm to improve its sales and performance through customer retention and by attracting potential customers. Thus, one may conclude that small market share firm utilizes announcements and adopting launching loyalty programs as an offensive marketing strategy to improve its customer base and gain market share in the long run (Hauser and Shugan, 1983).

On the contrary, a high-market share firm with large and diverse customer base may offer a generic loyalty program that addresses overall customer needs. However, "one size fits all" marketing strategy is 'likely to be profitable only if enough customers have similar preferences'. The firm may offer multiple loyalty programs targeted at its multiple customer segments. However, such a differentiated marketing approach may not necessarily translate into higher customer satisfaction 'due to the difficulty of serving multiple customers within each segment and the dilution of effort that comes from serving multiple segments' (Anderson, Fornell and Lehmann, 1994). Additionally, such a differentiated marketing strategy may not be very cost effective. Thus, we posit that for firms with high market share, either strategy (one generic loyalty program vs. multiple loyalty program targeted at multiple customer segments) may not necessarily translate into high firm performance.

H₄: Market share will negatively moderate the effect of firm's launching loyalty programs on its sales to the extent that firms with high market share will experience loss in sales from launching of the loyalty program.

3.3 Methodology

3.3.1 Measures of Idiosyncratic Risk

Firm's total risk may be measured by standard deviation of returns. In particular, it is given by $\sqrt{\dfrac{1}{n}\sum_{\tau=1}^{n}(R_{i\tau} - RF_{\tau})^2}$ where $R_{i\tau}$ is the ith firm's stock return on τ day and RF_{τ} is the risk free rate based the Fama and French four factor model (Campbell et al., 2001). Firm's total risk may be decomposed into Systematic Risk (or market risk) and Firm-Specific Risk (or idiosyncratic risk). We measure idiosyncratic risk of an individual stock using the Fama and French (1993) three-factor model expanded with the Carhart (1997) momentum factor:

$$R_{i\tau} - RF_{\tau} = \alpha_{it} + b_{it}(RM_{\tau} - RF_{\tau}) + s_i SMB_{\tau} + h_i HML_{\tau} + m_i MOM_{\tau} + \varepsilon_{i,\tau} \qquad (10)$$

where τ is the subscript for the day and t is the subscript for the month, $\tau \in t$ and b_i, s_i, and h_i are factor sensitivities or loadings. $R_{i\tau}$ is the ith firm's stock return on τ day, RM_{τ} is the return in month t on a value-weighted market proxy, RF_{τ} is the risk free return and is measured by in month t of a one-month treasury bill. Daily stock returns are obtained from the Center for Research in Security Prices (CRSP). We regress daily excess returns of individual stocks $(R_{i\tau} - RF_{\tau})$ on the following four factors: (i) the excess return based on a market portfolio $(RM_{\tau} - RF_{\tau})$, (ii) the difference in return between a portfolio of small stocks and that of a

portfolio of large stocks (SMB_τ), (iii) the difference in return between a portfolio of high book-to-market stocks and that of a portfolio of low book-to-market stocks (HML_τ), and (iv) the difference in return between a portfolio of long on past one-year winners and that of short on past one-year losers (MOM_t).

The residual ($\varepsilon_{i,\tau}$) of the model is a measure of firm-idiosyncratic excess return (Ang et al. 2006; Cao, Simin, and Zhao 2008). Following Lou and Bhattacharya (2009), we assume that $\varepsilon_{i,\tau} = \rho u_{i,\tau-1} + \delta_{i,\tau}$, where $\delta_{i,\tau}$ is a normal random variable with mean 0 and variance σ_δ^2. Thus, presence of serial correlation is evident in the residual term. Firm's idiosyncratic risk is measured by the variance of the residuals over the time period under consideration. Specifically, in the kth year, i^{th} firm's idiosyncratic risk may be expressed as $\dfrac{1}{n}\sum_{\tau=1}^{n}\varepsilon_{i,\tau}^2$ where n denotes the number of days (i.e., 252) over which the model is estimated.

3.3.2 Measures of Firm Performance

We employed multivariate regression analysis with performance indicator as the dependent variables and launching of loyalty programs as the independent variable. We used sales ($Sales$) as indicators of firm performance. We used firm size and leverage as control variables (equation 2). Consistent with Leenheer and Bijmolt (2008), we include customer satisfaction index to control for firm's customer orientation.

$$
\begin{aligned}
Performance\_measure_{i,t} = {} & \alpha_0 + \alpha_1 \text{Loyalty Program}_{i,t} + \alpha_2 \text{Incumbent}_{i,t} \\
& + \alpha_3 \text{Market Share}_{i,t} + \alpha_4 \text{Loyalty Program}_{i,t} * \text{Market Share}_{i,t} \\
& + \alpha_5 \text{Consumer Satisfaction index}_{i,t} + \alpha_6 Size_{i,t} + \alpha_7 \text{Leverage}_{i,t} \\
& + \alpha_8 \text{Retail dummy}_t + \alpha_9 \text{Hospitality dummy}_t + \varepsilon_{i,t}
\end{aligned} \tag{11}
$$

- *Loyalty Program* ($\text{Loyalty Program}_{i,t}$) is an indicator variable that takes the value of 1 if the ith firm has adopted a loyalty program in period t else equals.

- *Incumbent* ($\text{Incumbent}_{i,t}$) is an indicator variable that takes the value of 1 if the ith firm is the pioneering firm in the industry to launch the loyalty program else equals 0.

- *Market Share* ($\text{Market Share}_{i,t}$): It is the ratio of ith firm's sales in period t to total industry sales in that period. It is an indicator of relative competitiveness of the firm in the industry.

- Consumer Satisfaction index ($\text{Consumer Satisfaction Index}_{i,t}$): It is economic indicator that measures the satisfaction of the U.S. consumers for product and/or service offerings of the ith firm in period t.

- Size: We use log of firm's total asset as a proxy for firm size. Data for firm's total asset was obtained from the Compustat database.

- *Leverage* (Leverage): It is the firm's debt to total asset ratio. Data for firm debt and total asset information was obtained from the Compustat database.

- Retail dummy (Retail dummy_{t}): this is an indicator variable that takes the value of unity if the firm under consideration belongs to the retail industry; else it takes the value of zero.

- Hospitality dummy ($\text{Hospitality dummy}_{t}$): this is an indicator variable that takes the value of unity if the firm under consideration belongs to the hospitality industry; else it takes the value of zero.

3.4 Data and Measurement Variables

Current analysis includes four sectors, namely: retail, hospitality, telecommunication and information, and entertainment. Consistent with ASCI convention, we include department and discount stores (SIC: 5651, 5311), specialty retail stores (SIC: 5700, 5940), drug stores (SIC: 5912), and super markets (SIC: 5411, 5331, 5399) as 'retail' sector. Next, we include hotel (SIC: 7011, 6794), restaurants (SIC: 5812, 6794), airlines (SIC: 4512), internet travel (SIC: 4700) as 'hospitality' sector. 'Telecommunications and Information' sector includes cellular phone (SIC: 4812), and subscription TV/ Cable (SIC: 4841). Finally, we include amusement and theme parks (SIC: 7990), and cruises (SIC: 4400) as the 'entertainment' sector. Once we obtain a consolidated list of publicly traded firms corresponding to the list of SIC given above, we acquired loyalty program related information from company websites, COLLOQUY (Colloquy.com) and LexisNexis (LexisNexis.com). Information on firm performance measures (i.e., sales, debt-to-asset ratio, total asset) are obtained from COMPUSTAT. Finally, we obtain information on customer satisfaction index from American Customer Satisfaction Index (ACSI). Thus, we constructed a panel data set that contains financial as well as loyalty program information of the publicly traded firms in the four sectors identified in the study (i.e., retail, hospitality, telecommunication and information, and entertainment) from 1980 to 2013.

3.5 Results

3.5.1 Descriptive Statistics

Table 11 gives the summary statistics of firms included in our study. Column 'A' gives the number of firms in the respective sector that has launched loyalty programs since 1980. In particular, there are approximately 228, 75, 23 and 10 firms that have adopted loyalty programs in the retail, hospitality, telecommunications and information and entertainment sectors respectively over the time period. Similarly, column 'B' provides us with information regarding the number of firms in of these four sectors who are yet to adopt loyalty programs in the corresponding time period.

Table 12 provides the descriptive statistics of the financial variables used in the current study. Findings suggest that there is positive association between a firm's likelihood of launching loyalty program and its market share (p>.001), sales to asset ratio (p>.05) and size (p>.001). Estimates also indicate that firms with high market share tend to have positive association with consumer satisfaction (p>.05), sales to asset ratio (p>.001), and size (p>.001).

3.5.2 Loyalty programs and Firm risk

In this section we examine firm's adoption of loyalty program and consequent exposure to risk. We constructed a panel data set that contains financial information of the firm three years prior to and post adoption of the loyalty program. In particular, if firm i adopts loyalty program in period t, we consolidated a data set with firm $i's$ financial information for period $t-3$ to $t+3$. First two columns of table (13) provide estimates for all three components of risk (i.e.,

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total firm risk, systematic risk and firm-specific risk) for one year before and after the launch of the program. The third column provides the difference in estimates. We measure total risk by standard deviation of firm's returns. Parameter estimates suggest that firm's total risk is .4020 ($p<.001$) and .3810 ($p<.001$) one year before and after the adoption of the loyalty program respectively. Findings also suggest that over this time period, systematic risk has been 1.0135 ($p<.001$) and 1.0084 ($p<.001$) respectively. Finally, estimates indicate that firm-specific risk has been .3521 ($p<.001$), .3285 ($p<.001$) one year pre and post adoption of the loyalty program respectively. Next, empirical estimates indicate that the difference in overall firm-risk and firm-specific risk over the time period is -.0210 ($p<.1$) and -.0236 ($p<.001$) respectively.

Columns four and five of table (13) provide estimates of firm risk for three years before and after the launch of the program. The sixth column provides the difference in estimates. Parameter estimates suggest that firm's total risk is .4538 ($p<.001$) and .3902 ($p<.001$) three years before and after the adoption of the loyalty program respectively. Findings also suggest that over this time period, systematic risk has been 1.0590 ($p<.001$) and 1.0339 ($p<.001$) respectively. Finally, estimates indicate that firm-specific risk has been .3950 ($p<.001$), .3388 ($p<.001$) three years pre and post adoption of the loyalty program respectively. Finally, empirical estimates indicate that the difference in overall firm-risk and firm-specific risk over the time period is -.0636 ($p<.001$) and   -.0561 ($p<.001$) respectively.

Thus, empirical estimates indicate that firm's adoption of LP alleviates firm risk in both the one year and three years interval. Interestingly, we do not observe any significant difference in firm's exposure to systematic risk. However, we do observe significant drop in firm risk in both the time intervals. Thus, findings are consistent with hypothesis (H1a) that firm's adoption

of loyalty program reduces idiosyncratic risk. However, findings do not support hypothesis (H1b) that firm's adoption of loyalty program reduces systematic risk.

3.5.3 Firm's adoption of loyalty program and impact on sales

Table 14 reports the impact of firm's launching of loyalty program on firm performance one year, three years and five years after the launch date. We use sales as the measures of firm performance. As mentioned earlier, loyalty program is an indicator variable that takes the value of unity (i.e., $LoyaltyProgram = 1$) if the firm has launched a loyalty program; else it takes the value of 0 (i.e., $LoyaltyProgram = 0$). We include prior year change in sales as a control in the regression analysis since firms may launch LPs in light of declining sales. We also include firm size measured by log of total assets and consumer satisfaction index to control for firm characteristics. Effectiveness of LP varies across sectors. In particular, even though the emphasis on LP in the retail sector is minimal, it is exponentially significant in the hospitality industry. Thus, we included sector dummy in the analysis to control for the imbalance in emphasis on LP across sectors.

Parameter estimates indicate that firm's adoption of LP may not translate into an immediate improvement in sales. Interestingly, it registers a boost in sales by 4893.66 (p<.1) and 9905.70 (p<.05) units after three and five years of launching the program respectively. Thus, consistent with hypothesis H2, we demonstrate that firm's launching of loyalty program has a long term positive impact on sales.

Estimates indicate that pioneering firms who were among the first to launch loyalty programs in the respective industry experience improvement in sales by 6373.09 units (p<.1) three years after the launch date. Interestingly, we do not observe any significant impact of loyalty programs

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on sales one year and five years after the launch date. Thus, findings partially confirm hypothesis H3 that incumbent's advantage in the industry is limited to the first year of launch of the program.

Findings suggest that firm's market share drives sales by 42054.00 ($p<.001$), 51875.00 ($p<.001$) and 76837.00 ($p<.001$) one year, three years and five years after the launch date respectively. Consistent with the literature, findings indicate a positive association between market share and sales (Szymanski, Bharadwaj, and Vara-darajan, 1993). Interestingly, market share of firms who have launched loyalty programs diminishes sales by 32933.00 ($p<.05$), 44187.00 ($p<.001$) and 52270.00 ($p<.001$) one year, three years and five years after the launch date respectively. This suggests that adoption of loyalty program hurts firms with high market share in the short and long run. Thus, findings confirm hypothesis H4 that market share negatively moderates the relation between firm's launching of loyalty program and sales in all the three periods under consideration.

Findings suggest that in the hospitality sector, loyalty programs hurts sales by 9417.10 units ($p<.05$), 8068.89 units ($p<.05$) and 11008.00 units ($p<.05$) one year, three and five years after the launch year respectively. However, we do not observe any significant impact on sales after the firm's adoption of LP in the retail sector.

3.6 Post-Hoc Analysis: Response Surface Approach

Analysis in the previous sections indicates the presence of possible non-linear relation between firm characteristics and adoption of loyalty program. Thus, post hoc, we conduct an optimization analysis using response surface methodology (RSM) (Bas and Boyacı, 2007). RSM is a portfolio of mathematical methods that helps to develop, improve, and optimize processes in which a response of interest is contingent on several independent factors and the objective is to optimize this response (Venkatesh and Goyal, 2010). 'RSM has important application in the design, development and formulation of new products, as well as in the improvement of existing product design' (Mittal and Kamakura, 2001; Kim and Hsieh, 2003). In particular, it characterizes the impact of the independent variables, alone or in combination, on the response of interest. The relationship between firm's adoption of loyalty program and firm characteristics is given in equation (3):

$$\eta_{i,t} = f\left(\begin{matrix} \text{Market Share}_{i,t}, \text{Consumer Satisfaction index}_{i,t}, \\ Sales\_asset\_ratio_{i,t} \end{matrix}\right) + \varepsilon_{i,t} \qquad (12)$$

where $\eta_{i,t}$ is the response, f is the unknown function of response, $\text{Market Share}_{i,t}$, $\text{Consumer Satisfaction Index}_{i,t}$, and $Sales\_asset\_ratio_{i,t}$ are the independent variables and finally $\varepsilon_{i,t}$ is the statistical error that represents other sources of variability, such as measurement error, that has not been accounted for in the analysis. It is generally assumed that $\varepsilon_{i,t}$ follows normal distribution with mean zero and variance.

Panel A of table (15) indicates that the quadratic model fits the data very well, suggesting a non-linear relationship between firm's adoption of loyalty program and firm characteristics.

Additionally, R-square is 0.1359, which indicates 13.59% of variability explained by the fitted

model. Panel B of table (15) provides the estimates of the coefficient of response surface

analysis. Estimates indicate that market share is not significant in the analysis of variance for the

model. Findings also indicate that quadratic and interaction terms are significantly important,

with the exception of interaction between consumer satisfaction index and market share.

3.7 Discussion

Key Findings and Theoretical Implications: Loyalty programs (LPs) are dynamic incentive programs designed to benefit consumers from cumulative purchase over time. Despite extensive literature on loyalty programs and their impact on the customer's buying pattern, little is known about the impact of firms' adoption of loyalty programs on firm's exposure to risk and its valuation in the long run. Studies indicate that not all LP are equally successful and some fail to generate the expected stream of revenue for the firm (Reinartz and V. Kumar, 2002; Shugan, 2005). Thus, from firm management perspective, it is important to analyze whether launching a LP increases firm's revenue depletion risk. We examine this gap by measuring firm's idiosyncratic risk after the firm adopts the program. We empirically demonstrate that firm's adoption of loyalty program depletes risk. In particular, estimates indicate that upon adoption of the loyalty program, firm specific risk drops steadily and significantly.

Firm management realizes that loyalty programs or frequent shopper programs involve firm's extending substantial discounts to its loyal customers with the assumption that the loss generated due to discounts may be negated by overwhelming increase in sales to new and existing customers over a period of time (Lal and Bell, 2003). A critical question is whether firms experience a drop in performance within a year of adopting the LP and whether it is able to recuperate its losses and is able to successfully enhance firm value in the long run.

Third, we analyze if firms enjoy first mover advantage by being the pioneer in the industry to adopt the loyalty program. In particular, we examine whether pioneer firms enjoy a distinct advantage over the rival firms in the industry by examining short and long term firm performance of these first movers across industries. Findings suggest that firm's adoption of

loyalty program depletes sales in the short run. However, it is able to recuperate its loss in the long run. We observe improvement in sales three years after launching the program. Results also indicate that market share moderates the relationship between firm's adoption of loyalty program and sales. In particular, adoption of loyalty programs by firms with high market share hurts sales. Additionally, estimates suggest that first-mover advantage is limited to the first year after adopting the loyalty program.

Finally, we conduct a post-hoc analysis to investigate probable non-linear relationship between firm's adoption of loyalty program and critical firm characteristics. Specifically, we utilize Response Surface Methodology to investigate if there is an optimal combination of firm's sales to asset ratio, consumer satisfaction index and market share that makes launching of loyalty program a feasible solution for the firm. Findings confirm existence of non-linear relationship.

Managerial Implications: It has been well established in the literature that loyalty programs are risky marketing strategies. A report published by Colloquy reiterates the fact by indicating that American businesses distribute approximately $48 billion worth of perceived value in reward points and miles annually; surprisingly only two-third of these points are redeemed by consumers. Thus, one may conclude that either the consumers are unaware of the benefits offered by the loyalty program or their requirements are not addressed by the program offerings.

Current study reiterates the statistics through empirical findings. Results suggest that successful adoption of loyalty programs require managers to craft programs whose offerings matches closely with that of the expectations and requirements of the consumers. However, this may be a challenging requirement for managers, especially for those of big firms. In particular, firms with high market share typically cater to a consumer base with diverse preference structure. Thus, tweaking program offerings to meet the requirements of each consumer segment

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may be a daunting task almost impossible to achieve. On the other hand, managers of small firms may be able to customize program offerings to satisfy the requirements of their niche customer base, and in the process yield positive returns.

Limitations and Future Research: Heerde and Bijmolt (2005) investigates the differential impact of communication mode of loyalty programs (i.e. direct mail to loyalty program members only vs. door-to-door flyers to its entire customer base) across its customer base. We would like to extend the study by analyzing wthere effectiveness of loyalty programs is contingent on communication channel and characteristics of the loyalty program offerings. In particular, we would like to examine the effectiveness of corporate websites, direct contact with customers through emails, word-of-mouth, point-of-sale information, direct mail, dedicated club sites, SMS text messages and social network as effective marketing channels impacting success of the launching program. Furthermore, firms differ in their loyalty program offerings. Some programs are built on tier system to reward initial loyalty, where as some charge an initial fee to receive benefits (Zeithaml, Rust and Lemon, 2001). Some firms even structure non-monetary programs around their customer's values while some opt to partner with another company to provide all-inclusive offers to its customers. Additionally, we would like to investigate whether reward program characteristics are critical factors driving loyalty program success.

APPENDIX

Table 11: Sample Breakdown by Industry

Sector	Industry	Number of firms who offer Loyalty Programs (A)	Number of firms who do not offer Loyalty Programs (B)
Retail	Department and Discount Stores, Specialty Retail Stores, Drug stores, Super Markets	228	1018
Hospitality	Hotel, Restaurants*, Airlines, Internet Travel	75	468
Telecommunications and Information	Cellular phone, Subsciption TV/ Cable	23	272
Entertainment	Amusement and theme parks, Cruises etc.	10	195
Total		336	1953

*incudes limited as well as full service

Table 12: Descriptive Statistics

Variable	N	Mean	Std Dev.	Loyalty Program	Market Share	Sales	Consumer Satisfaction Index	Sales to Asset ratio	Log (Total Assets)	Leverage
Loyalty Program	4883	0.03932	0.1944	1.000						
Market Share	1655	0.02806	0.0846	0.303 ***	1.000					
Sales	1655	6136.99	29954	0.104 ***	0.250 ***	1.000				
Consumer Satisfaction Index	3886	75.4436	3.1446	-0.018	0.103 ***	-0.013	1.000			
Sales to Asset ratio	1655	0.97129	1.2418	0.072 **	0.112 ***	0.037	0.244 ***	1.000		
Log (Total Assets)	1664	6.16644	2.8526	0.234 ***	0.317 ***	0.385 ***	-0.044	-0.256 ***	1.000	
Leverage	1530	1.34857	8.842	-0.004	0.012	0.018	-0.022	0.007	0.070 **	1.000

*, **, and *** indicates 10%, 5% and 1% level of significance

Table 13: Firm's Exposure to Risk upon Launching of Loyalty Programs

	1 Year Before	1 Year After	Difference	3 Year Before	3 Year After	Difference
Total Firm Risk	.4020 ***	.3810 ***	-.0210 *	.4538 ***	.3902 ***	-.0636 ***
	(0.016)	(0.015)	(0.012)	(0.017)	(0.014)	(0.018)
Systematic Risk	1.0135 ***	1.0084 ***	-.0051	1.0590 ***	1.0339 ***	-.0251
	(0.035)	(0.036)	(0.033)	(0.034)	(0.034)	(0.032)
Firm-Specific Risk	.3521 ***	.3285 ***	-.0236 ***	.3950 ***	.3388 ***	-.0561 ***
	(0.014)	(0.014)	(0.010)	(0.016)	(0.013)	(0.015)
N	140	140	140	137	137	137

*, **, and *** indicates 10%, 5% and 1% level of significance

Table 14: Impact of Adoption of Loyalty Program on Firm Sales

	One Year After	Three Years After	Five Years After
Intercept	-29257.00 *	-36775 **	-44882.00 **
	(17170.000)	(15105.000)	(14330.000)
Loyalty Program	4835.66	4893.66 *	9905.70 **
	(3274.114)	(2802.571)	(3176.061)
Incumbent	1850.05	6373.09 *	1892.13
	(4887.944)	(3946.170)	(3963.514)
Market Share	42054.00 ***	51875.00 ***	76837.00 ***
	(9605.152)	(7767.405)	(7180.155)
Loyalty Program*Market Share	-32933.00 **	-44187.00 ***	-52270.00 ***
	(14966.000)	(12098.000)	(12795.000)
Retail Sector Dummy	-2350.52	-3585.50	-4850.49 **
	(2679.336)	(2183.848)	(2181.208)
Hospitality Sector Dummy	1594.75	1511.79	1928.16
	(2035.992)	(1699.072)	(1641.269)
Loyalty Program*Retail Sector	-2459.98	-1386.32	-8012.94
	(6117.252)	(4770.769)	(4910.074)
Loyalty Program*Hospitality Sector	-9417.10 **	-8068.89 **	-11008.00 **
	(4557.313)	(3903.184)	(4114.417)
Change in Sales	3.48 ***	3.12 ***	1.16 ***
	(0.079)	(0.073)	(0.132)
Consumer Satisfaction Index	137.62	278.52	391.65 **
	(227.191)	(200.284)	(190.257)
Log (Total Assets)	3189.32 ***	2655.84 ***	2517.36 ***
	(276.091)	(224.018)	(226.694)
R-square	0.7202	0.7503	0.4475

*, **, and *** indicates 10%, 5% and 1% level of significance

Table 15: Analysis of Results Based on Response Surface Approach

Panel A

Regression	DF	Type I Sum of Squares	R-Square	F Value
Linear	3	10.7739	0.0921	43.1 ***
Quadratic	3	4.4186	0.0378	17.68 ***
Crossproduct	3	0.7077	0.0061	2.83 **
Total Model	9	15.9002	0.1359	21.2 ***

Panel B

Indicators	Estimates	Standard Error
Intercept	7.2494	(02.0208) ***
Market Share	.6176	(01.7727)
Consumer Satisfaction Index	-0.196863	(00.0560) **
Sales to Asset Ratio	.4851	(00.2354) **
Market Share*Market Share	-1.2395	(00.3255) ***
Consumer Satisfaction Index*Market Share	0.017321	(00.0235)
Consumer Satisfaction Index*Consumer Satisfaction Index	.0013	(00.0004) **
Sales to Asset Ratio*Market Share	-.2378	(00.1167) **
Sales to Asset Ratio*Consumer Satisfaction Index	-0.005394	(00.0032) *
Sales to Asset Ratio*Sales to Asset Ratio	-.0147	(00.0054) **

*, **, and *** indicates 10%, 5% and 1% level of significance

Figure 2: Conceptual Model

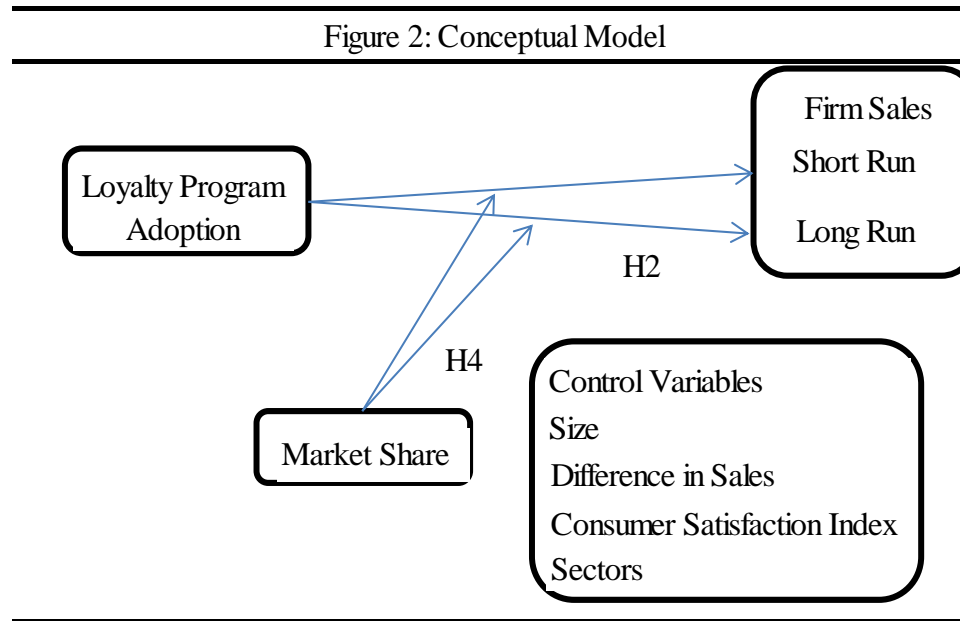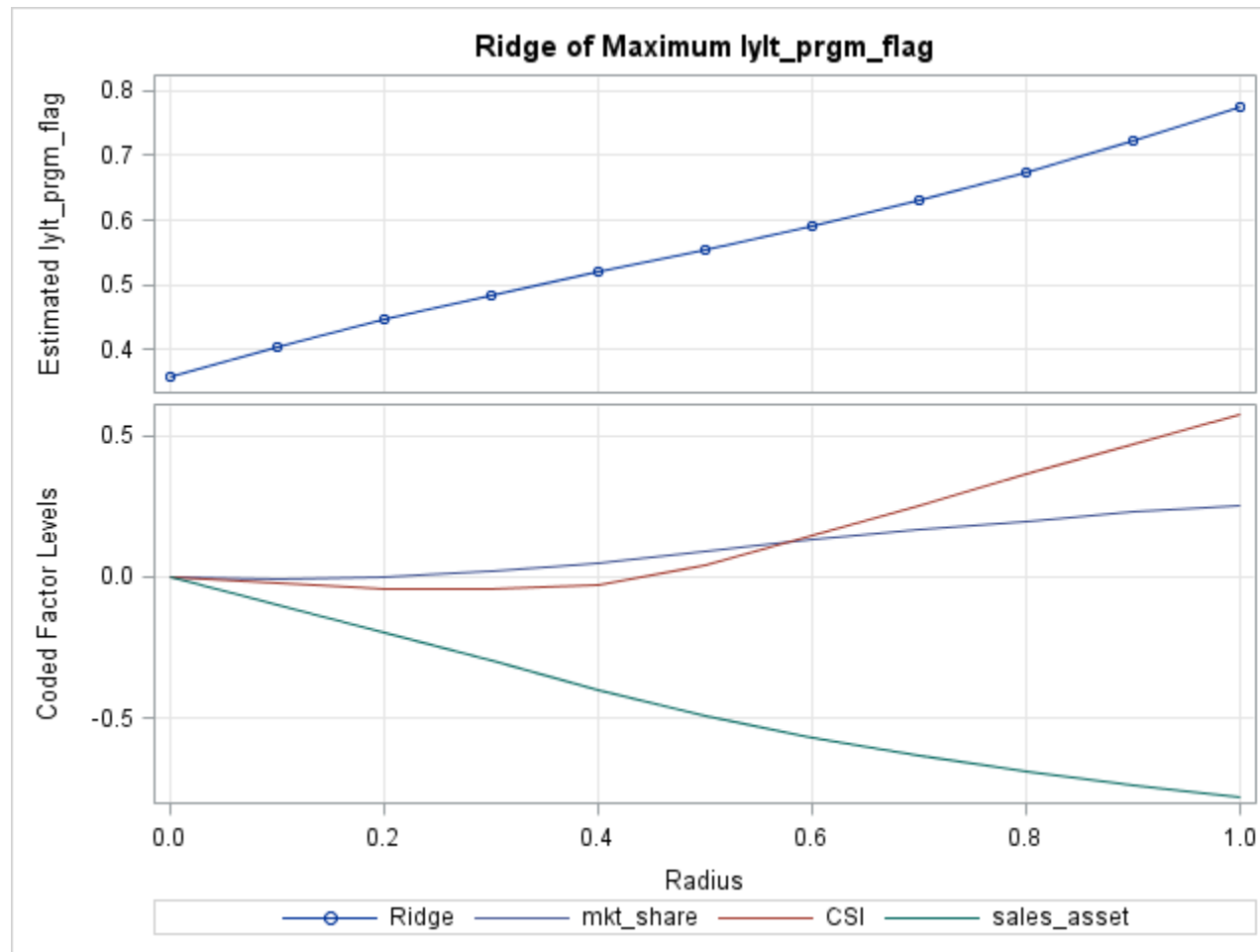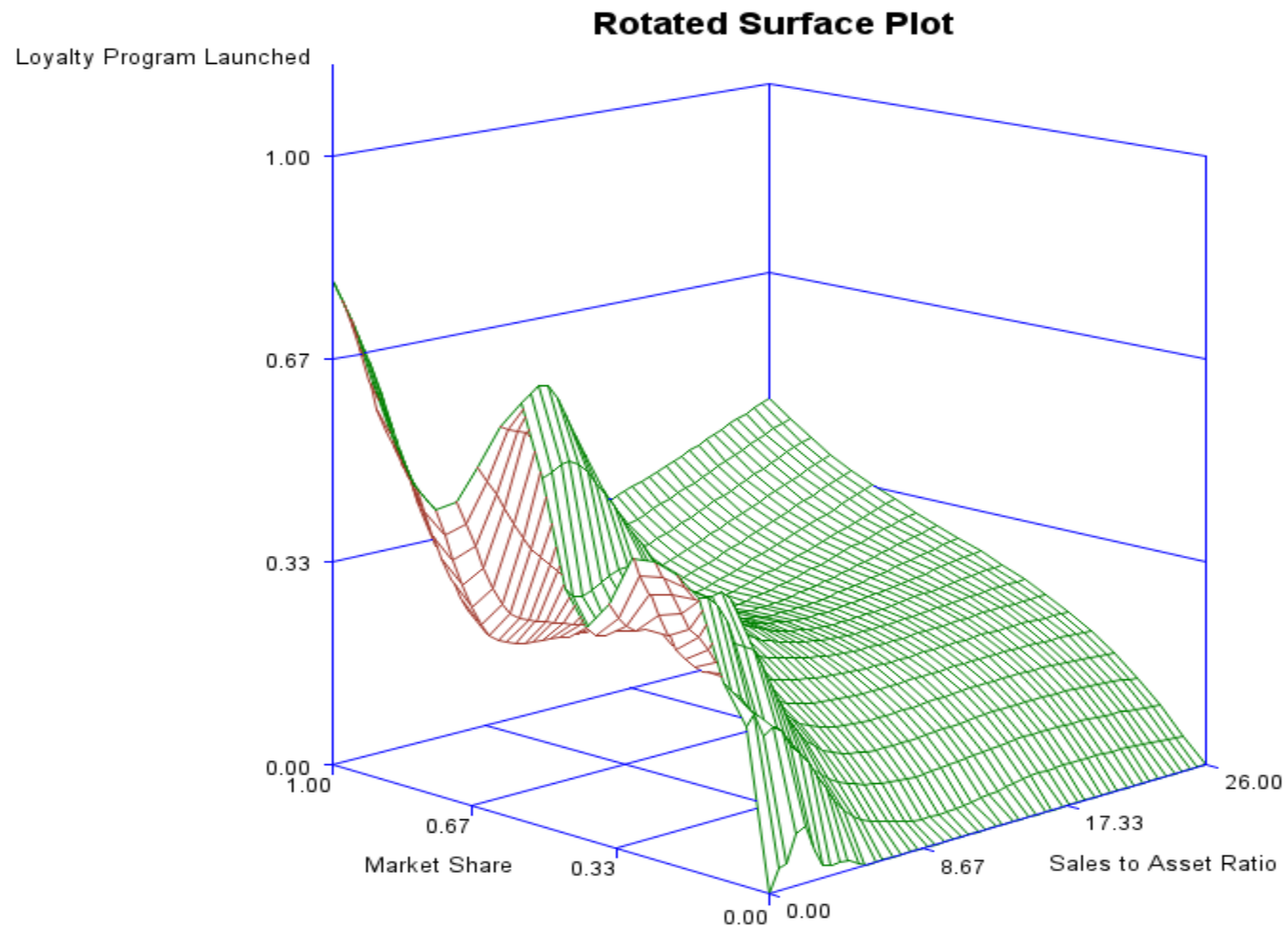Figure 3: Ridge of Maximum

Figure 4: Rotated Surface Plot

Rotated Surface Plot

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