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Three essays on the customer satisfaction-customer loyalty association

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THREE ESSAYS ON THE CUSTOMER SATISFACTION-CUSTOMER LOYALTY ASSOCIATION

by

Young Han Bae

An Abstract

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

July 2012

Thesis Supervisors: Associate Professor Lopo L. Rego
Professor Gary J. Russell

ABSTRACT

The association between customer satisfaction and customer loyalty is one of the most central relationships for marketing theory and practice. To improve our understanding of this essential relationship in marketing, we develop a comprehensive and flexible theoretical framework for analyzing the association between customer satisfaction and customer loyalty, which simultaneously incorporates heterogeneity in the possible dimensions of competitive settings. This theoretical framework is grounded by more than 40 years of academic and practitioner research on the association between these two constructs, which allows us to more precisely examine the true nature of the association between satisfaction and loyalty by incorporating competitive setting heterogeneity. In addition, we test our theoretical framework by estimating a 3-level empirical hierarchical linear model, using American Customer Satisfaction Index data and several customer, firm and industry characteristics.

Our findings indicate that the true nature of the association between satisfaction and loyalty is significantly influenced by competitive setting differences. Accounting for such differences allows firms and managers to significantly increase their ability to effectively convert satisfaction investments into loyalty. Also, we identify important trade-offs between the intercept and slope of the association between the two metrics, indicating that firms' incentives to invest or not in satisfaction differ dramatically across industries. Depending on the shape of their satisfaction-loyalty curve, firms can obtain a certain level of loyalty by indirectly choosing how much to invest in satisfaction. Therefore, customer satisfaction must be treated as an endogenous variable. In our subsequent analysis, we control for both satisfaction endogeneity and competitive

settings heterogeneity using a Two-Stage Least Squares 3-level hierarchical linear model, correcting the standard error estimates via a jackknife procedure. This research provides precise, important theoretical and managerial insights, and broadens our understanding of the essential features of the satisfaction-loyalty relationship.

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CERTIFICATE OF APPROVAL

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PH.D. THESIS

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To Sunie, Daeil, my parents, and my parents-in-law

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The association between customer satisfaction and customer loyalty is one of the most central relationships for marketing theory and practice. To improve our understanding of this essential relationship in marketing, we develop a comprehensive and flexible theoretical framework for analyzing the association between customer satisfaction and customer loyalty, which simultaneously incorporates heterogeneity in the possible dimensions of competitive settings. This theoretical framework is grounded by more than 40 years of academic and practitioner research on the association between these two constructs, which allows us to more precisely examine the true nature of the association between satisfaction and loyalty by incorporating competitive setting heterogeneity. In addition, we test our theoretical framework by estimating a 3-level empirical hierarchical linear model, using American Customer Satisfaction Index data and several customer, firm and industry characteristics.

Our findings indicate that the true nature of the association between satisfaction and loyalty is significantly influenced by competitive setting differences. Accounting for such differences allows firms and managers to significantly increase their ability to effectively convert satisfaction investments into loyalty. Also, we identify important trade-offs between the intercept and slope of the association between the two metrics, indicating that firms' incentives to invest or not in satisfaction differ dramatically across industries. Depending on the shape of their satisfaction-loyalty curve, firms can obtain a certain level of loyalty by indirectly choosing how much to invest in satisfaction. Therefore, customer satisfaction must be treated as an endogenous variable. In our subsequent analysis, we control for both satisfaction endogeneity and competitive

settings heterogeneity using a Two-Stage Least Squares 3-level hierarchical linear model, correcting the standard error estimates via a jackknife procedure. This research provides precise, important theoretical and managerial insights, and broadens our understanding of the essential features of the satisfaction-loyalty relationship.

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INTRODUCTION

The customer satisfaction-customer loyalty association is one of the most vital relationships for marketing theory and practice, due to the marketing effectiveness that these metrics summarize (Anderson et al. 2004; Bolton and Lemon 1999; Fornell 1992; Reichheld and Sasser 1990) and their implications for firms' current and future product-marketplace and financial performance (Anderson et al. 1994, 2004; Anderson and Mittal 2000; Fornell 1992; Gruca and Rego 2005; Gupta and Zeithaml 2006).

Forty years of marketing academic and practitioner research are indicative of the importance of the customer satisfaction-loyalty association. In summary, the extant literature posits customer satisfaction – generally conjectured to be an attitude summarizing customers' perceptions regarding their overall consumption experiences (Anderson and Salisbury 2003), as the primary driver of customer loyalty – usually conjectured to be a behavioral measure of future intentions to repurchase (Reinartz and Kumar 2003). That is, the literature indicates that customer satisfaction, also viewed as a customer mindset or attitude, leads to customer loyalty, regarded as a customer behavior. This association, if sustained, will lead to firms' product-marketplace performance and financial performance, thus creating shareholder wealth (see the conceptual framework of the augmented value chain in Figure G1 for these logical linkages). To this purpose, firms invest billions of dollars in developing customer satisfaction monitoring systems so as to gather customer intelligence and to better predict how satisfaction translates into customer loyalty (Ittner and Larcker 2003; Reichheld 2003). In fact, these customer satisfaction investments represent the number one marketing research expenditure item

for the vast majority of firms, amounting to roughly $14B annual expenditures in marketing research[1].

In spite of the magnitude of these expenditures and investments, paired with more than 40 years of academic and practitioner research on the association between customer satisfaction and customer loyalty, numerous knowledge gaps still exist. First of all, customer satisfaction commands a relatively modest predictive power over loyalty because of a relatively modest overall coefficient of association between customer satisfaction and customer loyalty metrics in the entire dataset from the American Customer Satisfaction Index, which is measured at approximately 0.607. This would indicate an R^2 of nearly 37% in a regression setting. This is a rather small number, indicating that 63% of the variance in customer loyalty is unexplained after accounting for customer satisfaction.

In addition, several studies on this association have clearly established a positive association between customer satisfaction and customer loyalty (Anderson 1996; Fornell 1992; Fornell et al. 1996). However, this positive association often fails to be generalizable. This positive association between customer satisfaction and loyalty is not supported within some contexts (Deming 1986; Jones and Sasser 1995; Kamakura et al. 2002; Oliver 1999; Seiders et al. 2005). Clearly, there exists heterogeneity in the satisfaction-loyalty relationship. This heterogeneity with respect to the satisfaction-loyalty association is also an indicator that customer satisfaction does not always completely account for customer loyalty.

Recent academic research suggests one of the primary reasons advanced in resolving these puzzles on the association between customer satisfaction and loyalty to be

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differences in competitive settings facing customers, firms and competitors. Such differences can lead to many diverse settings under which customer satisfaction translates – or does not – into customer loyalty. In fact, several studies (Anderson 1994; Anderson and Sullivan 1993; Bryant and Cha 1996; Gronholdt et al. 2000; Homburg and Giering 2001; Mittal and Kamakura 2001) have highlighted that customer, firm and industry differences (i.e., competitive setting differences) result in varying levels of customer satisfaction, customer loyalty, and therefore, variations in the sensitivity of the strength of the satisfaction-loyalty association (i.e., the sensitivity of a change in loyalty according to a change in satisfaction). Thus, failure to account for these competitive setting differences is likely to be the primary reason for the relatively modest predictive power of customer satisfaction over customer loyalty and heterogeneity with respect to the satisfaction-loyalty relationship.

Although a few recent studies have addressed heterogeneity in customer characteristics (Bryant and Cha 1996; Homburg and Giering 2001; Mittal and Kamakura 2001) and industry conditions (Anderson 1994; Fornell and Johnson 1993; Gronholdt et al. 2000; Voss et al. 2010), to our knowledge, no research has simultaneously addressed heterogeneity in several possible dimensions of competitive settings faced by customers, firms, and industries. It is critical to simultaneously incorporate differences in all possible dimensions of competitive settings in order to resolve the existing knowledge gaps – i.e., the relatively modest predictive power of satisfaction over loyalty and heterogeneity with respect to the satisfaction-loyalty association – when analyzing the association between satisfaction and loyalty. Furthermore, previous research has mainly focused on these moderating effects only with respect to the intercept of the satisfaction-

loyalty curve. It is very important to investigate the moderating impact of competitive setting heterogeneity on both the intercept and slope parameters because the moderating impact of competitive setting heterogeneity on the intercept and slope can be different. Both the intercept and slope determine the shape of the satisfaction-loyalty curve.

To improve our understanding of the satisfaction-loyalty relationship by overcoming these puzzles, Chapter 1 develops a comprehensive, yet simple and flexible theoretical framework and an analytical model for examining the association between customer satisfaction and customer loyalty, which simultaneously incorporates heterogeneity in such dimensions of competitive settings as customer, firm, and industry characteristics. These theoretical framework and analytical models are solidly grounded in more than 40 years of existing marketing theory on the association between these two constructs. By directly addressing several possible dimensions of competitive setting heterogeneity, the framework allows us to more precisely examine the true nature of the association between satisfaction and loyalty. By doing so, our conceptual framework simultaneously incorporates the moderating effects of competitive setting heterogeneity on both the intercept and slope of the satisfaction-loyalty curve.

In Chapter 2, we empirically test this conceptual framework by estimating a 3-level hierarchical linear model using American Customer Satisfaction Index (ACSI) data and several customer, firm and industry characteristics (e.g., demographic information to proxy for customer differences, business characteristics such as firm size, advertising and R&D expenditures, and brand portfolio and business segment strategies to measure firm differences, and market concentration, market type and market dynamism to capture industry differences).

In addition to the competitive setting heterogeneity, firms' decision-making, as well as consumers' decisions, are expected to influence levels of customer satisfaction, since firms are likely to obtain a certain level of loyalty by indirectly choosing (or controlling) their optimal level of customer satisfaction. Failure to account for the effects of firm efforts on the determination of customer satisfaction is likely to cause endogeneity in satisfaction, which will bias coefficient estimates. Therefore, satisfaction must be treated as an endogenous variable. In a subsequent analysis in Chapter 3, we explore the extent to which customer satisfaction is endogenous, and how this endogeneity is likely to influence our understanding of the customer satisfaction-loyalty association. To control for both satisfaction endogeneity and competitive setting heterogeneity, we utilize a Two-Stage Least Squares 3-level hierarchical linear model that helps examine whether our current empirical findings are robust to these issues. By utilizing this framework in our reexamination of the satisfaction-loyalty association, this research resolves some of the puzzles existing in this topic, while providing generalizable and precise findings, gaining important theoretical and managerial insights for marketing theory and practice, and broadening our understanding of the essential features of the satisfaction-loyalty association.

The rest of this paper is organized as follows. First of all, by reviewing and integrating the relevant literatures, Chapter 1 develops a theoretical framework and an analytical model that simultaneously incorporates the moderating impact of competitive setting heterogeneity on the shape of the satisfaction-loyalty association. In Chapter 2, we empirically test this conceptual framework by estimating a 3-level hierarchical linear model, using 2004 ACSI data. Chapter 3 identifies potential endogeneity in customer

satisfaction and adjusts for both satisfaction endogeneity and competitive setting heterogeneity using a Two-Stage Least Squares 3-level hierarchical linear model. Finally, Chapter 4 discusses conclusions and managerial implications and provides limitations and future research directions.

CHAPTER 1

A THEORETICAL FRAMEWORK FOR EXAMINING THE ASSOCIATION BETWEEN CUSTOMER SATISFACTION AND CUSTOMER LOYALTY

The association between customer satisfaction and customer loyalty is one of the most essential relationships for marketing theory and practice, because loyalty impacts firms' financial performance and value. Also, the association between customer satisfaction and customer loyalty links customer attitudes (e.g., how much customers are satisfied with firms' product or service) to customer behavior (e.g., customers' actual repurchase behavior for the product or service). In their efforts to understand this essential association between customer satisfaction and customer loyalty, marketing academics and practitioners have researched this topic over the last 40 years. This chapter reviews and integrates these academic and practitioner studies on the satisfaction-loyalty association.

This chapter is organized as follows: first of all, we review the research on the customer satisfaction and customer loyalty metrics that are corner-stones for the satisfaction-loyalty association. Then, the literature on the association between customer satisfaction and loyalty is reviewed and integrated. Next, we develop a theoretical framework that simultaneously incorporates competitive setting heterogeneity into our analysis of the association between customer satisfaction and customer loyalty. Finally, to test this theoretical framework, we develop a very comprehensive and flexible analytical model that simultaneously incorporates competitive setting heterogeneity into an analysis of the satisfaction-loyalty relationship.

1.1 Literature Review

1.1.1 Customer Satisfaction

Over the last four decades, the marketing literature has defined and measured customer satisfaction in many different ways. Oliver (1997) specifies customer satisfaction as pleasurable fulfillment; as such, the consumer views consumption as satisfying some need, desire, goal, etc., in which its fulfillment is pleasurable.

In spite of many definitions of customer satisfaction in the literature, a common way to define customer satisfaction is to follow the approach of the expectancy-confirmation/disconfirmation paradigm (Anderson 1994; Anderson and Sullivan 1993; Kotler 1991; Oliver 1980; Oliver and DeSarbo 1988; Oliver and Swan 1989; Yi 1991). In this perspective, customer satisfaction is delineated as the consumer's evaluation that products or services meet or fall to meet the customer's expectations (Oliver and Swan 1989; Yi 1991). Out differently, customer satisfaction consists of post-consumption judgment concerning product or service quality, given pre-consumption expectations (Kotler 1991).

From this expectancy-confirmation/disconfirmation point-of-view, customer satisfaction happens in the case of a buyer's post-evaluation of a specific purchase experience (or experiences), contingent upon the buyer's quality perceptions and expectations, and confirmation/disconfirmation – the discrepancy between actual and expected quality (Yi, 1991).

Customer satisfaction has generally been suggested to contain two such different dimensions as a transaction-specific evaluation approach and an overall, cumulative

evaluation approach. That is, there exist two general conceptualizations of customer satisfaction in the literature (Anderson and Fornell 1993; Boulding et al. 1993; Yi, 1991).

Prior research has portrayed customer satisfaction as transaction-specific. Using this framework, customer satisfaction is seen as a post-consumption evaluative judgment of a particular purchase experience or activity (Bearden and Teel 1983; Cronin and Taylor 1992; Oliver 1980, 1993; Oliver and DeSarbo 1988). The theoretical rationale behind this framework is a variation of the expectancy-confirmation/disconfirmation paradigm (Prakash 1984; Oliver and Swan 1989).

Another formulation to measure customer satisfaction, widely used in recent studies, including studies utilizing the satisfaction metric in the ACSI data, is overall or cumulative satisfaction, which is, in other words, relationship-specific. With this formulation, overall satisfaction can be viewed as a customer's overall satisfaction experiences (Olsen 2002), and is gauged as the cumulative post-purchase evaluative judgment of a group of discrete purchase activities or transactions for a particular brand or firm over a duration of time (Fornell et al. 1996; Johnson and Fornell 1991; Oliver 1997; Rust and Oliver 1994).

Of these two formulations of customer satisfaction, overall or cumulative satisfaction has been widely used with regard to the association between customer satisfaction and customer loyalty. On one hand, transaction-specific satisfaction conceptualizes customer satisfaction as the outcome of a single transaction. Thus, this transaction-specific satisfaction formulation may be too restrictive – i.e., the transaction-specific satisfaction approach has a very limited predictive power (Anderson and Narus 1990; Fornell et al. 1996; Ganesan 1994).

Oliver (1999) maintains that overall satisfaction is more appropriate for an analysis of the satisfaction-loyalty relationship, inasmuch as the cumulative satisfaction construct is capable of aggregating or blending individual satisfaction episodes. Likewise, the overall satisfaction formulation is better at predicting consequent behaviors and economic outcomes (Johnson et al. 2001).

One of the most important recent aspects of this customer satisfaction metric is that academics (Anderson 1994; Anderson and Sullivan 1993; Bryant and Cha 1996; Fornell 1992; Fornell and Johnson 1993; Fornell et al. 1996; Homburg and Giering 2001; Johnson and Fornell 1991; Mittal and Kamakura 2001) identify differences in customer satisfaction across individual customers and competitive settings (product or service categories and firms). For example, Bryant and Cha (1996) highlight the effects of such customer characteristics as age, gender, income, and education on levels of customer satisfaction. In addition to customer characteristics, industry characteristics (industry or category concentration and industry type) are shown to affect customer satisfaction levels.

Customer satisfaction is one of the most important metrics in marketing, since firms regard customer satisfaction as one of the key business goals for evaluating the effectiveness of their business operations. In addition, customer satisfaction is a starting metric of the value chain between customer satisfaction, customer loyalty, firm product - marketplace performance and financial performance, and shareholder wealth, as demonstrated by recent studies. Marketing academics and managers have been increasingly interested in the effects of an increase in customer satisfaction levels on firm financial performance since the 1990s. For instance, customer satisfaction has been shown to positively impact operating margins (Bolton 1998; Rust et al. 1996), accounting

returns (Ittner and Larcker 1998), returns on investment (Anderson et al. 1994), and cash flow and shareholder value (Anderson et al. 2004; Gruca and Rego 2005).

Indeed, firms have invested a great amount of money on this metric, as customer satisfaction investments represent the number one marketing research expenditure item for most firms. Customer satisfaction can be seen as an essential measure used to oversee business outcomes, decide on limited resource allocation, and provide rewards to management (Anderson 1994). For the majority of firms, the pursuit of customer satisfaction is illustrated in their communications, including advertisements, public relations releases, and mission statements (Peterson and Wilson 1992). With regard to this importance, a variety of marketing academics and practitioners have studied customer satisfaction for the past forty years.

1.1.2 Customer Loyalty

Customer loyalty, the main consequence of customer satisfaction, has been defined and measured in many various ways over the past decades. Oliver (1997) defines customer loyalty as "a deeply held commitment to re-buy or re-patronize a preferred product or service consistently in the future, despite situation influences and marketing efforts having the potential to cause switching behaviors" (p. 392).

According to the literature on loyalty, customer loyalty has several distinct dimensions. The two most important dimensions are the behavioral and attitudinal components (Day 1969; Jacoby and Kyner 1973; Yi 1991). Earlier research conceptualized customer loyalty as a behavior (Dick and Basu 1994; Jacoby and Chestnut 1978). Behavioral loyalty signifies actual repeat purchasing behavior, or the likelihood of repeat product/service purchases from the same supplier. Yet, recent research seems

to measure loyalty attitudinally (including cognitive and/or affective components). Using this perspective, customer loyalty is perceived as future intention-to-repurchase or commitment that reflects the cognitive and emotional attachment associated with customer loyalty.

Each of these dimensions has pros and cons. Academics find fault with the behavior-based loyalty measure, insofar as it can fail to distinguish between true and spurious loyalty. Dick and Basu (1994) assert that if behaviorally loyal customers with spurious loyalty locate a superior alternative, they will probably switch to the alternative. Day (1969) blames behavior loyalty by stating, "These spuriously loyal buyers lack any attachment to brand attributes, and they can be immediately captured by another brand that offers a better deal," (p. 30) which means that actual repurchase behavior is not always due to a psychological and/or emotional commitment with respect to a product or service (i.e., true loyalty). Bowen and Chen (2001) state that an individual may reside at a hotel because it has the most convenient location. Nevertheless, an individual may also change to a new hotel when it is located across the street and provides better deals. As this example illustrates, repeat purchase behavior does not always indicate commitment; rather, it may signify a random actual repeat purchase, or spurious loyalty. Yet, this spurious loyalty can be disregarded when attitudinal loyalty is the construct of interest. Shankar and his colleagues (2003) also maintain that attitudinally loyal customers are not likely to change to an incrementally more attractive alternative, in that they have a certain degree of attachment or commitment to the product or service. Hence, attitudinal loyalty (or true loyalty) signifies both higher repurchase intention and refusal to consider counter-persuasion and negative expert opinion. More significantly, the attitudinal

loyalty metric (e.g., the ACSI loyalty metric) has recently been adopted with respect to the relationship between customer loyalty and firm financial performance (Morgan and Rego 2006).

As discussed earlier, the antecedent of customer loyalty is customer satisfaction, and the consequence of customer loyalty is firm performance. As the customer satisfaction metric is influenced by moderators, academics identify the effects of heterogeneity across individual customers and industry conditions on the customer loyalty metric.

Customer loyalty is one of the most important customer metrics in marketing due to the profit impact of maintaining a loyal customer base (Oliver 1999). The literature points out that customer loyalty leads to firm profitability because customer loyalty positively influences firm product-marketplace performance (Anderson and Mittal 2000; Fornell 1992) and financial performance (Anderson et al. 1994; Gupta and Zeithaml 2006), and creates shareholder wealth (Anderson et al. 2004). The literature explains this positive loyalty-firm profitability link for several reasons. First of all, according to Pfeifer (2005), loyalty reduces customer acquisition costs, which in turn, reduces firm costs or expenses.

Second, customer loyalty indicates customer retention, the most important customer metric for firm profitability, because loyalty measures customers' intention to repurchase a product or service. In a traditional sense, marketing academics and practitioners have emphasized the consequences of market-based assets on success within the product marketplace, as illustrated in product sales and market shares. Nonetheless, the significance of the effect of market-based assets on financial performance has

appeared in the past decade as top management has begun seeing the final objective of marketing as contributing to the favorable status of shareholder returns (Day and Fahey 1988). Top management has begun to realize that not only tangible assets, such as plant and equipment, raw materials, and finished products (whose values are enumerated on balance sheets), but also intangible market-based assets, such as brands and customers, channels, and partner relationships (whose values are not seen on balance sheets) all play a part in shareholder wealth. Moreover, Internet-based firms (e.g., Amazon, eBay, Google, and Facebook) are commonly present in the contemporary digital economy, and these firms generally do not hold tangible assets, as opposed to traditional firms. There are also quite a few subscription-driven firms (e.g., Verizon Wireless and Cable companies) in the contemporary digital economy. For these types of firms, market-based assets, including relationships with customers, are essential for their survival.

Marketing academics and practitioners have examined linkages between customer metrics and firm finance performance (Rust, Lemon, and Zeithaml 2004). Especially, studies demonstrate a strong and positive link between customer loyalty and firm profitability (Ittner and Larcker 1998; Anderson et al. 2004). A variety of studies (Gupta, Lehmann, and Stuart 2004; Reichheld and Sasser 1990; Reinartz, Thomas and Kumar 2005; Thomas, Reinartz, and Kumar 2004) demonstrate that customer retention instead of customer acquisition or cross-selling is the key driver of Customer Lifetime Value (CLV), and hence, firm financial profitability (Some studies argue that cross-selling is the key driver in the banking industry (Coyles and Gokey 2005), and customer acquisition is the key driver in a rapidly growing market such as China (Keiningham et al. 2005)). Customer retention is likely to be the key driver of firm financial performance and firm

value, but the linkage between retention and firm profitability depends on the industries or categories in which the firms operate.

1.1.3 Customer Satisfaction-Loyalty Association

Early academic and practitioner research focused on the customer satisfaction metric for several reasons, as discussed earlier. Firms have, however, shifted the focus of their marketing strategies from customer satisfaction to customer loyalty because of its profit impact. The literature points out this profit impact of the loyalty metric, as discussed earlier.

Responding to this, researchers and practitioners have been interested in how improvements in customer satisfaction can translate into an increase in customer loyalty, which in turn, increases firms' product-marketplace performance and financial performance, and creates shareholder wealth. Early research on the association between customer satisfaction and loyalty has clearly established a positive relationship between customer satisfaction and customer loyalty (Anderson 1996; Anderson et al. 1994; Fornell 1992; Fornell et al 1996; Ping 1993; Rust and Zahorik 1993; Rust, Zahorik, and Keiningham 1995; Taylor and Baker 1994).

On the contrary, several studies indicate that this positive association fails to be generalizable. Customer satisfaction does not always translate into customer loyalty. More specifically, studies fail to fully explain the number of satisfied customers who bolt and unsatisfied customers who stay loyal (Ganesh, Arnold, and Reynolds 2000; Bendapudi and Berry 1997; Keaveney 1995). Researchers (Oliver 1999; Seiders et al. 2005) note that high customer satisfaction does not always indicate high loyalty. In a similar vein, increasingly more recent evidence shows that merely keeping customers

satisfied is not enough to guarantee loyalty (Deming 1986; Jones and Sasser 1995). The reason for this is because even if customers are satisfied, they may defect (Reichheld 1993). Customer satisfaction, by itself, does not unconditionally guarantee customers' actual repeated purchase behavior; as a result, managers must try to both achieve exceptional customer satisfaction and convert this attitude – satisfaction – into accordingly relevant repurchase behavior or attitude, behavioral or attitudinal loyalty (Kamakura et al. 2002; Reichheld 1996). Simply speaking, the positive relationship between customer satisfaction and loyalty applies in some situations, but not for others (Deming 1986; Jones and Sasser 1995; Kamakura et al. 2002; Oliver 1999; Seiders et al. 2005).

1.2 Theoretical Framework: Competitive Setting Heterogeneity and the Customer Satisfaction-Customer Loyalty Association

The primary goal of the theoretical framework we develop next is to simultaneously incorporate differences in competitive settings faced by customers, companies, and competitors as potential determinants of the satisfaction-loyalty relationship. In this theoretical framework, we seek to understand which customer, firm and industry factors are likely to influence variations in the satisfaction-loyalty association: variations in the level of customer loyalty and variations in the sensitivity of the strength of the satisfaction-loyalty association.

As discussed before, we know relatively little about the crucial association between satisfaction and loyalty because we have not explained such unresolved puzzles

as the relatively modest predictive power of satisfaction over customer loyalty and heterogeneity in the satisfaction-loyalty association.

The extant marketing literature identifies a positive relationship between customer satisfaction and customer loyalty (Anderson 1996; Bolton, Lemon, and Bramlett 2006; Cooil et al. 2007; Fornell 1992; Fornell et al 1996; Mittal and Kamakura 2001) unless specific settings or conditions exist regarding customers' choices. However, recent studies highlight that constraints or circumstances can exist such that customer choice (i.e., purchases) behavior can be influenced and/or limited. For instance, extreme and significant departures from a positive satisfaction-loyalty association have been demonstrated under monopolistic settings (Agustin and Singh 2005; Deming 1986; Kamakura et al. 2002; Oliver 1999; Seiders et al. 2005; Verhoef 2003). Likewise, the research identifies several customer, firm, and industry characteristics that can significantly impact the satisfaction-loyalty association, and hence, can drive significant departures from a positive association.

That is, differences in customer characteristics (Fornell et al. 1996; Homburg and Giering 2001; Mittal and Kamakura 2001), firm characteristics (Bryant and Cha 1996), and competitive information (Anderson 1994; Anderson and Sullivan 1993; Oliver 1999, Seiders et. al. 2005) can result in dramatically different competitive settings faced by customers, firms, and competitors. These differences in competitive settings are likely to build a variety of diverse settings under which customer satisfaction does or does not translate into customer loyalty. Therefore, the differences are likely to drive significant variations in the levels of satisfaction and loyalty, and thus, the sensitivity of the strength of the satisfaction-loyalty association (i.e., the sensitivity of a change in loyalty according

to a change in satisfaction). Failure to account for heterogeneity in these competitive settings facing customers, firms, and competitors is likely the primary reason for the knowledge gaps in the association.

Although a few recent studies have addressed several dimensions of competitive setting heterogeneity (mainly, heterogeneity in customer characteristics and industry conditions), to our knowledge no research has simultaneously addressed heterogeneity in all customer, firm, and industry dimensions of competitive settings within one framework. In order to fill the knowledge gaps in the association, it is essential to simultaneously incorporate differences in all of these competitive setting dimensions into an analysis of the satisfaction-loyalty association.

As such, we develop a theoretical framework that simultaneously incorporates heterogeneity in the customer, firm, and industry dimensions of competitive settings as potential moderators of the satisfaction and loyalty association, and this conceptual framework is likely to find a solution to the unresolved puzzles in the association. This theoretical framework helps us understand and incorporate which customer, firm and industry factors are likely to influence variations in the levels of customer loyalty and variations in the strength of the satisfaction-loyalty association, which will allow us to more precisely examine the true nature of the satisfaction-loyalty association.

In summary, the existing research has studied the effects of a variety of these customer, firm and industry factors on the satisfaction-loyalty association. Below, we summarize and detail how the moderating factors have been shown to impact the level of customer loyalty and the sensitivity of the strength of the satisfaction- loyalty association, as reported by Table G1.

1.2.1 Customer Characteristics

The extant literature identifies several customer-level characteristics that influence the satisfaction-loyalty association, i.e., the level of customer loyalty (i.e., intercept) and the sensitivity of the strength of the satisfaction-loyalty association (i.e., the slope parameter of the satisfaction-loyalty curve). Following the extant literature, we focus on such customer-level covariates as age, gender, income, and education. Marketing theory indicates that these covariates can influence levels of customer satisfaction and customer loyalty, and the sensitivity of the strength of the satisfaction-loyalty association.

First of all, the level of customer loyalty has been demonstrated to vary on the basis of customer demographics. Age has been demonstrated to be positively associated with loyalty (Lambert-Pandraud et al. 2005; Mittal and Kamakura 2001; Patterson 2007; Verhoef and Donkers 2005). Purchasing involvement decreases with age (because information processing abilities decline with age), indicating that older customers spend less time in their search behavior (Slama and Tashchian 1985). Likewise, purchase involvement is usually inversely related with the level of customer loyalty (McDonald 1993), since customers with more purchasing involvement have the tendency to gather and use information more frequently. Therefore, they generally know more about the possible alternatives (Capon and Burke 1980). Moreover, older customers tend to choose what to buy primarily because of their experience (Phillips and Sternthal 1977). Therefore, older customers are likely to be more loyal.

Regarding gender, it has been empirically shown that female customers exhibit higher levels of loyalty (Mittal and Kamakura 2001; Petterson 2007; Verhoef and

Donkers 2005). Because female customers tend to highly value long-term relationships, they are also likely to be more brand loyal than males (Petterson 2007).

Regarding Social Economic Status (SES), a compounding factor of income and education, we expect that since higher SES customers who have higher levels of education and income are likely to have greater awareness of their products or services, they will face a higher level of purchase involvement. As a result, these customers will perform more price comparisons and searches among alternatives, which results in a lower level of loyalty for high SES customers. In other words, as SES levels increase, so does customers' awareness of available alternatives, thereby increasing purchasing involvement. The increased level of purchasing involvement leads to a lower level of loyalty. This association between SES levels and purchasing involvement suggests that SES levels should be negatively associated with levels of loyalty.

Next, the sensitivity of the strength of the association between customer satisfaction and loyalty (i.e., the degree of sensitivity in which satisfaction investments translate into loyalty or the degree of sensitivity of a change in levels of loyalty according to a change in the levels of satisfaction) is also expected to vary significantly as customer characteristics vary.

How do we expect the effects of these customer factors to influence the sensitivity of the strength of the satisfaction-loyalty association? Regarding customer age, we expect a negative association between age and the sensitivity of a change in loyalty according to a change in satisfaction. Loyalty tends to be high and stable for older customers due to their lower search behavior. Levels of loyalty will not change significantly according to a change in the levels of older customers' satisfaction. As a

result, the sensitivity of a change in the levels of older customers' loyalty is likely to be lower for a change in the levels of their satisfaction.

Likewise, it will be very difficult to make female customers be more loyal by increasing additional levels of their satisfaction because the level of their loyalty is already high and stable, which will result in a lower sensitivity of a change in loyalty according to a change in satisfaction for female customers.

However, a positive association between SES and the sensitivity of a change in loyalty according to a change in satisfaction is expected. High SES customers are less likely to be satisfied due to their considerable search among alternatives before purchasing a product or service. However, once they are satisfied with a product/service after they have spent enough time in their searching behavior (in this case, they have found the product/service they extremely like), they will be very loyal to the product/service. Therefore, it is likely that high SES customers will be sensitive to changes in satisfaction.

1.2.2 Firm Characteristics

In order to better understand how the effects of different circumstances facing firms impact the customer satisfaction-loyalty association, we examine several firm-level characteristics. While existing marketing research is much more limited in explaining the influence firm-level covariates may have on the satisfaction-loyalty association, we expect that firm differences are likely to play a moderating role in determining the association between satisfaction and loyalty (Bryant and Cha 1996). Systematic variations across firms are likely to influence both the antecedents and consequences of

customer satisfaction, thereby impacting the sensitivity of the strength of the satisfaction-loyalty association (Anderson and Sullivan 1993).

There have been several firm characteristics examined in the marketing-finance interface literature. Various firm characteristics have been adopted as the primary firm-level covariates in this literature. Morgan and Rego (2006) include firm size, advertising intensity, R&D intensity, and number of brands offered in exploring the relationship between different customer metrics (satisfaction/loyalty) and several short- and long-term firm financial performance measures. Similarly, Gruca and Rego (2005) used firm-level covariates such as advertising intensity, R&D intensity, number of brands, and the number of segments to investigate the impact of customer satisfaction on firm profitability and shareholder value. Based on the literature, we identify five firm-level covariates such as firm size, advertising expenditures, R&D expenditures, the number of brands offered (i.e., differentiation), and the number of distinct business segments in which a firm operates (i.e., diversification).

Several arguments can be advanced to justify the influence these firm-level covariates may have on the satisfaction-loyalty association. For example, why is firm size a relevant firm-level variable? According to the theory of economies of scale, firm size (measured by firm assets) is related to economies of scale. Larger firms tend to achieve low costs and low prices for their products or services due to larger economies of scale. These low prices are expected to increase consumer surpluses. The increased consumer surpluses will lead to higher levels of customer loyalty.

Advertising is likely to give customers more information about their products/services, and hence, increase awareness of the available alternatives. This

increased awareness strengthens the level of customer purchasing involvement, which results in a lower level of loyalty.

Why do we, then, expect differentiation and diversification to increase levels of loyalty? A larger number of distinct brands/segments in a firm's portfolio may not only signal product innovation and superior brand image, but also may promote increased marketing effectiveness by delivering effective targeting with an increased number of brands/segments and controlling for economies of scope (Kapferer 1992; McGahan and Porter 1997; Morgan and Rego 2006), thereby leading to a higher level of customer loyalty.

We also expect that these firm-level covariates will influence the sensitivity of the strength of the customer satisfaction-customer loyalty association. How do we expect these effects to impact the slope of the satisfaction-loyalty relationship? On one hand, the same logic behind the effects of customer age on the slope parameter can be used for explaining the effects of firm size and differentiation/diversification on the slope. Due to the increased consumer surplus, customers tend to exhibit a higher level of loyalty toward larger firms. It will be very difficult to significantly increase the loyalty levels of these highly loyal customers by increasing additional levels of their satisfaction since their loyalty level is already high and stable. As a result, the sensitivity of a change in loyalty is likely to be lower for a change in satisfaction. Similarly, a larger number of distinct brands/segments in a firm's portfolio will reduce the sensitivity of a change in loyalty along with a change in satisfaction.

On the other hand, the logic behind the impact of SES on the slope can apply to our explanation of the advertising influence on the slope parameter. That is, by

advertising, customers tend to conduct more searching behavior among alternatives with increased information of these alternatives. These customers are very difficult to satisfy due to their tendency to engage in frequent searching behavior, but once these customers are satisfied, they will be very loyal. As such, it will lead to higher levels of the customer sensitivity to increase additional levels of satisfaction investments.

1.2.3 Industry Characteristics

We also include industry-level characteristics to control for the impact that different competitive conditions can have on the satisfaction-loyalty relationship. The extant marketing literature indicates that these industry characteristics influence the satisfaction-loyalty association, i.e., the level of loyalty and the strength of the satisfaction-loyalty association.

Following the literature, we identify five primary industry-level covariates such as the Hirschmann-Herfindahl Index (HHI), industry type (goods versus services and short- versus long-inter-purchase cycle), and industry demand growth and industry demand variability.

The level of customer loyalty is likely to vary on the basis of industry competitive conditions. As customer satisfaction levels differ across industries (Anderson 1994; Anderson and Sullivan 1993; Fornell 1992; Fornell and Johnson 1993; Fornell and Robinson 1983; Johnson and Fornell 1991), so does the level of purchasing involvement. These differences also result in differences in the level of customer loyalty. For instance, a positive association between industry concentration and loyalty has been advanced by Anderson (1994). In addition to fewer alternatives and less bargaining power that firms in more concentrated industries tend to have, these firms also generally have fewer

products or services to offer. Therefore, customers do not spend significant amounts of time in their purchase involvement behavior. This reduced level of purchase involvement results in higher levels of customer loyalty.

Service-oriented industries have also been shown to exhibit higher levels of customer loyalty (Anderson 1994). Customers can more readily compare price and attributes levels for goods than they can for services. Given that customers tend to spend more time to compare the prices and attributes of goods versus services, service-oriented industries usually experience less purchase involvement; thus, they may also be characterized by higher levels of customer loyalty.

Similarly, industries characterized with a longer inter-purchase cycle also tend to exhibit lower levels of customer loyalty (Anderson 1994; Keaveney and Parthasarathy 2001). In industries with longer inter-purchase cycles, customers use products or services for a long time, which in turn, influences customers' experiences and reliance on offerings (Gupta 1988). In these circumstances, customers can more easily evaluate and compare prices and other product attribute levels, leading to higher purchase involvement and lowered levels of customer loyalty.

The sensitivity of the strength of the customer satisfaction-customer loyalty association has also been demonstrated to vary on the basis of industry conditions. One example is related to industry concentration. In terms of industry concentration, the more concentrated an industry is, the lower the sensitivity is of the strength of the customer satisfaction-loyalty association (Anderson 1994; Gronholdt et al. 2000; Voss et al. 2010). Similar to the way in which we explain the effects of customer age on the slope of the satisfaction-loyalty association, increasing additional loyalty levels of satisfaction is

unlikely to significantly increase additional loyalty levels of highly loyal customers for concentrated categories. Hence, the result would be a lower degree of sensitivity of a change in loyalty with regard to a change in satisfaction. Likewise, service-oriented industries are demonstrated to exhibit a weakened degree of sensitivity of the strength of the satisfaction-loyalty association (Anderson 1994; Edvardsson et al. 2000; Gronholdt et al. 2000). In contrast, industries characterized with a longer inter-purchase cycle are shown to increase the sensitivity of the strength of the satisfaction-loyalty association (Anderson 1994), just as SES strengthens the sensitivity of the strength of the association.

In addition to these industry-level covariates, we identified two additional industry-level covariates, industry demand growth and industry demand variability, which are also likely to influence the satisfaction-loyalty association. Based upon research conducted by Gruca and Rego (2005) and Morgan and Rego (2006), we expect that these two covariates will further explain variations in the level of loyalty and the sensitivity of the strength of the satisfaction-loyalty association.

1.3 Analytical Model

Although the association between customer satisfaction and customer loyalty is one of the most essential associations for marketing theory and practice, there still exist knowledge gaps, such as the relatively modest explanatory power of satisfaction on loyalty and heterogeneity with respect to the association.

Differences in customer, firm and industry characteristics can lead to drastically different competitive settings that customers, firms and competitors face, hence resulting in substantial variations in customer consumption experiences, and thus different levels of customer satisfaction, customer loyalty, and sensitivity of the strength of the

satisfaction-loyalty association. The primary research question that our theoretical framework addresses is how to simultaneously incorporate heterogeneity in such dimensions of competitive settings as customer, firm, and industry characteristics as potential determinants of the satisfaction-loyalty relationship.

For this purpose, the customer-, firm-, and industry-levels of competitive settings, which should be simultaneously adjusted for, need to be considered hierarchically within a single theoretical framework. That is, customers are nested into firms and firms are nested within industries (i.e., customers from a given firm within an industry) in a single framework. Also, customer-, firm-, and industry-level characteristics need to influence both the level of customer loyalty and the sensitivity of the strength of the satisfaction-loyalty association. As such, in order to incorporate our theoretical framework, we propose a 3-level hierarchical linear formulation for our analytical model, which includes firm- and industry- level moderators in a nested structure for our analytical model.

Our analytical model starts with the following formulation:

$$\text{Loyalty} = \alpha + \beta\left[\text{Satisfaction}\right] + \varepsilon, \tag{1.1}$$

where customer loyalty is modeled as a function of customer satisfaction. In this formulation, parameters α (i.e., intercept parameter) and β (i.e., slope parameter) reflect the level of baseline loyalty and the sensitivity of the strength of the satisfaction-loyalty association.

Since heterogeneity in competitive settings can be effectively constructed as the 5 C's, including Customers, Company, Competitors, Collaborators, and Climate (shown in Figure G1) (Ohmae 1982), we hierarchically model the satisfaction-loyalty association as a function of the 5 C's in our analytical model. Thus, we propose our hierarchical model

formulation to include 3-levels[2] such as customer (Customers), firm (Company/Collaborators), and industry (Competitors/Climate or Context) levels. In this formulation, parameters α and β are modeled as a function of the different competitive settings faced by customers, firms, and competitors.

1.3.1 Customer-Level

In the 1st or customer level, customer loyalty is modeled as a function of customer characteristics and the interactions between customer satisfaction and customer characteristics, where parameter α_{0jk} represents the level of baseline loyalty, and parameter β_{0jk} represents the sensitivity of the strength of the satisfaction-loyalty association (implying the efficacy or sensitivity of translating customer satisfaction investments into customer loyalty). Parameters α_{cjk}, c=1, ..., C (the number of customer-level variables) represent the direct impact of customer characteristics (e.g., gender, education, and so on) on loyalty, while parameters β_{cjk}, c=1, ..., C represent the moderating impact of customer characteristics on loyalty (in this case, customer characteristics influence loyalty via satisfaction) because the moderating effects of customer characteristics are operationalized in the formulation as interaction terms between satisfaction and these variables. Thus, heterogeneity in the customer dimension of competitive settings is incorporated into the 1st level of our hierarchical linear model formulation. For customer *i*'s loyalty for firm *j* in industry *k*, the customer-level is defined as:

[2] This formulation is generalizable to more or fewer levels.

$$\begin{aligned}
&\text{Loyalty}_{ijk} = \alpha_{jk} + \beta_{jk}\text{Satisfaction}_{ijk} + \varepsilon_{ijk},\\
&= \left[\alpha_{0jk} + \sum_{c=1}^{C} \alpha_{cjk}\text{CustomerCharacteristics}_{ijk}\right] +\\
&\left[\beta_{0jk} + \sum_{c=1}^{C} \beta_{cjk}\text{CustomerCharacteristics}_{ijk}\right]\text{Satisfaction}_{ijk} + \varepsilon_{ijk},\ \ \varepsilon_{ijk} \sim N(0, \sigma_{\varepsilon}^{2}).
\end{aligned} \tag{1.2}$$

1.3.2 Firm-Level

To follow the hierarchical nature of the research question we address and to incorporate the moderating effects of firm characteristics on the satisfaction-loyalty association, both the baseline loyalty (the intercept) and the sensitivity of the strength of the satisfaction-loyalty association (the slope) are modeled as a function of firm characteristics in the 2nd or firm level of the hierarchical linear model formulation.

Specifically, parameters π_{0fk}, f=1, ..., F (the number of firm-level variables) reflect the impact of firm characteristics (e.g., advertising) on the baseline loyalty, whereas parameters π_{1fk}, f=1, ..., F capture the effects of firm characteristics on the sensitivity of the strength of the satisfaction-loyalty association. Heterogeneity in the company/collaborators dimension of competitive settings is incorporated into the 2nd level of our hierarchical linear model formulation via:

$$\begin{aligned}
&\alpha_{0jk} = \pi_{00k} + \sum_{f=1}^{F} \pi_{0fk}\text{FirmCharacteristics}_{jk} + r_{0jk},\\
&\beta_{0jk} = \pi_{10k} + \sum_{f=1}^{F} \pi_{1fk}\text{FirmCharacteristics}_{jk} + r_{1jk},\\
&\underset{\sim}{r} \sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{r}}).
\end{aligned} \tag{1.3}$$

1.3.3 Industry-Level

Finally, to incorporate the moderating impact of industry characteristics on the satisfaction-loyalty relationship, the baseline loyalty and the sensitivity of the strength of the satisfaction-loyalty association are also modeled as a function of industry

characteristics in the 3rd or industry stage of the hierarchical model. Parameters γ_{00m}, m=1, ..., M (the number of industry-level variables) represent the effects of industry characteristics (e.g., concentration or competition) on the baseline loyalty, while parameters γ_{10m}, m=1, ..., M capture the effects of industry characteristics on the sensitivity of the strength of the association. Differences in the competitors/context dimension of competitive conditions are incorporated into the 3rd level of our hierarchical model formulation via:

$$\begin{aligned} \pi_{00k} &= \gamma_{000} + \sum_{m=1}^{M} \gamma_{00m} \text{IndustryCharacteristics}_k + \nu_{00k}, \\ \pi_{10k} &= \gamma_{100} + \sum_{m=1}^{M} \gamma_{10m} \text{IndustryCharacteristics}_k + \nu_{10k}, \\ \underset{\sim}{\nu} &\sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{\nu}}). \end{aligned} \tag{1.4}$$

As described above, this hierarchical linear formulation simultaneously incorporates the 5 C's levels of competitive conditions within a single framework. We are able to model the intercept and slope parameters to be dependent on the competitive setting heterogeneity faced by customers, company/collaborators, and competitors/climate in this framework. We are able to incorporate heterogeneity in the individual customer element into the 1st level, heterogeneity in the company/collaborate dimension into the 2nd level, and heterogeneity in the competitors/context dimension of competitive conditions into the 3rd level of our hierarchical linear model formulation.

This 3-level hierarchical linear model has a number of advantages. First of all, this model can effectively address the research question of how to simultaneously incorporate heterogeneity in the possible dimensions of competitive settings including the 5 C's levels.

Second, our analytical model enables us to take a look at the moderating effects of heterogeneity in these competitive setting elements on both the intercept and slope parameters of the satisfaction-loyalty curve (i.e., association). Our analytical model starts with a very simple satisfaction-loyalty association shown in equation (1.1) and then adds 3 dimensions of competitive setting heterogeneity by allowing both the intercept and slope to vary with customer, firm/collaborator, and industry/climate characteristics. Accordingly, these characteristics can shift the curve of the satisfaction-loyalty association and determine the shape of the curve because both the intercept and slope parameters are allowed to vary with these characteristics. As such, our analytical model reflects the moderating effects of competitive setting heterogeneity on the intercept and slope of the satisfaction-loyalty association.

Finally, our analytical framework allows us to obtain a unique satisfaction-loyalty regression line for each firm and industry by estimating individual-level parameters (e.g., firm-level or industry-level intercept and slope parameters). By generating various possible curves that can capture competitive setting heterogeneity, instead of one global satisfaction-loyalty curve, our analytical model can effectively handle heterogeneity in the satisfaction-loyalty association, therefore improving the predictive power of satisfaction over loyalty.

Based on these advantages, the analytical model enables us to fill the remaining knowledge gaps in the satisfaction-loyalty relationship, more precisely to explore the true nature of the satisfaction-loyalty association, and to provide a benchmark for other formulations with different levels of competitive settings. By employing this analytical

framework, we expect to obtain generalizable findings about the satisfaction-loyalty association.

CHAPTER 2

EMPIRICAL TESTING OF THE THEORETICAL FRAMEWORK: COMPETITIVE SETTING INFLUENCE ON THE CUSTOMER SATISFACTION AND CUSTOMER LOYALTY ASSOCIATION

In this chapter, we empirically test our theoretical framework developed in Chapter 1 that simultaneously addresses the moderating effects of heterogeneity across different dimensions of competitive settings faced especially by customers, firms, and competitors on the satisfaction-loyalty association. We estimate a 3-level hierarchical linear model formulation calibrated on data from the nationally representative ACSI database (Fornell et al. 1996), and several customer, firm, and industry characteristics.

Since differences in customer, firm and industry characteristics lead to dramatically different competitive settings faced by customers, firms and competitors, this competitive setting heterogeneity is likely to result in significant variations in customer consumption experiences, and hence, different levels of customer satisfaction, customer loyalty, and sensitivity of the strength of the satisfaction-loyalty association. Our theoretical framework addresses this issue by simultaneously incorporating heterogeneity in such levels of competitive settings as customer, firm, and competitor dimensions as potential determinants of the satisfaction-loyalty association.

As discussed in Chapter 1, we develop our theoretical framework by a literature review on the extant marketing literature and theory. Several recent studies have highlighted the effects of competitive setting heterogeneity such as customer, firm, and industry differences on the level of (baseline) loyalty and the sensitivity of the strength of the satisfaction-loyalty association.

More specifically, in reviewing the extant marketing literature and theory on this topic, we propose to examine the effects of the following covariates on the level of loyalty and the sensitivity of the strength of the satisfaction-loyalty association: 1) customer-level covariates, including age, gender, and SES; 2) firm-level covariates, such as firm size, advertising expenditures, and the number of distinct brands/segments; and 3) such industry-level covariates as industry concentration, HHI, industry type, goods versus services, inter-purchase cycle, short versus long inter-purchase cycle, and 3-year industry demand growth and 3-year industry demand variability.

Next, following our theoretical framework, we develop our hypotheses with respect to the effects of these customer-, firm-, and industry-level characteristics on the level of loyalty and the sensitivity of the strength of the satisfaction-loyalty association.

2.1 Hypotheses Development

Consistent with our conceptual framework, we report our hypotheses separately for customer, firm, and industry covariates, as shown in Table G2. We also indicate expected signs of the effects of these covariates in Table G2.

2.1.1 Customer-Level Hypotheses

As discussed in Chapter 1, marketing theory is used to explain the effects of these customer-level covariates on the level of loyalty, which is related to purchasing involvement because such involvement is negatively associated with the level of customer loyalty. That is, a greater level of purchasing involvement leads to higher information gathering and usage, and hence, customers know more about their products/services. This greater awareness of available alternatives results in lower levels of loyalty.

On the other hand, to our knowledge, there has not been empirical work regarding the effects of these characteristics on the sensitivity of the strength of the satisfaction-loyalty relationship (i.e., the sensitivity of a change in loyalty according to a change in satisfaction). However, we expect that differences in these characteristics should influence the sensitivity of the strength of the relationship.

We extend the theory and our expectation to three specific customer characteristics: age, gender, and SES.

2.1.1.1 Age

Based on the purchasing involvement theory, age is positively associated with loyalty (H1a). Older customers are likely to spend less time in their purchase behavior and face less purchase involvement, resulting in a higher level of loyalty.

However, we expect that age will reduce the sensitivity of the strength of the satisfaction-loyalty association (H1b). Loyalty will be high and stable for older customers due to their lower purchase involvement. High levels of loyalty will make consumers less sensitive to changes in satisfaction, due to ceiling effects.

2.1.1.2 Gender

In regard to gender, female customers have been empirically shown to be more loyal because they generally place a higher value on long-term relationships and are likely to be more brand loyal than males (H2a).

In contrast, female customers are expected to be negatively associated with the sensitivity of the strength of the association (H2b). It will be very difficult to significantly increase loyalty levels of these highly loyal female customers by increasing

additional levels of their satisfaction, since their loyalty level is already high and stable, thereby leading to a lower sensitivity of a change in loyalty for a change in satisfaction.

2.1.1.3 SES

We expect customer SES to negatively influence levels of loyalty (H3a). As SES levels (levels of education and income) increase, so does a level of customers' awareness of available alternatives and their purchase involvement. This increased purchase involvement results in a lower of level of loyalty for these higher SES customers.

On the other hand, we expect a positive association between SES and the sensitivity of a change in loyalty according to a change in satisfaction (H3b). Because loyalty is low, we expect increases in satisfaction to lead to measurable increases in loyalty. That is, high SES implies high sensitivity to changes in satisfaction.

2.1.2 Firm-Level Hypotheses

Existing marketing research is much more limited in examining the effects of firm-level characteristics on the level of loyalty and the sensitivity of the strength of the association, since there has not been much empirical work on firm variable effects, unlike customer and industry characteristics. However, marketing research (Anderson and Sullivan 1993; Bryant and Cha 1996) suggests possible effects of these firm-level characteristics on the satisfaction-loyalty association.

As such, we formulate formal hypotheses regarding the impact of firm covariates on the level of loyalty and sensitivity of the strength of the association.

2.1.2.1 Firm Size

Based on the theory of economies of scale, firm size is expected to be positively associated with levels of loyalty (H4a) because the low prices and costs that larger firms

face are likely to increase consumer surpluses, and hence, a higher level of customer loyalty.

We expect that firm size will weaken the sensitivity of the strength of the satisfaction-loyalty association (H4b) because of the logic behind explaining the impact of age on the slope parameter. In other words, it will be very difficult to significantly increase loyalty levels of these highly loyal customers by increasing additional levels of their satisfaction due to their high and stable loyalty, which results in a lower sensitivity of a change in loyalty in line with a change in satisfaction.

2.1.2.2 Advertising

Advertising is expected to decrease the level of customer loyalty because advertising tends to increase customers' awareness of available alternatives and their level of customer purchase involvement, which results in a lower level of loyalty (H5a).

Nonetheless, the sensitivity of a change in loyalty according to a change in satisfaction is expected to be positively associated with advertising, similar to the way in which we explain the impact of customer SES on the sensitivity of the strength of the association (H5b).

2.1.2.3 Number of Brands/Segments

We expect a positive association between the number of brands/segments and the level of loyalty (H6a) because a larger number of distinct brands/segments in a firm's portfolio tends to increase brand image and marketing effectiveness by delivering effective targeting, hence resulting in a higher level of customer loyalty.

However, the number of brands/segments is likely to weaken the sensitivity of the strength of the satisfaction-loyalty relationship due to the same logic used for explaining the effects of firm size on the slope parameter (H6b).

2.1.3 Industry-Level Hypotheses

2.1.3.1 Industry Concentration

Industry concentration has been demonstrated to positively affect customer loyalty because there are limited offerings in more concentrated industries, and hence, customers tend to have less purchase involvement, thereby leading to a higher level of loyalty (H7a).

The sensitivity of the strength of the satisfaction-loyalty association is expected to be weaker, just as a larger firm size weakens the sensitivity of a change in loyalty according to a change in satisfaction (H7b).

2.1.3.2 Industry Type

Regarding industry type, service-oriented industries have shown a higher level of loyalty because customers are likely to be associated with less purchase involvement for services, thereby leading to a higher level of loyalty (H8a).

On the contrary, we expect that the sensitivity of the strength of the satisfaction-loyalty association will be weaker for service-oriented industries (H8b), with the same logic behind H7b.

2.1.3.3 Industry Inter-Purchase Cycle

In terms of the inter-purchase cycle, industries characterized with a longer inter-purchase cycle have been suggested to show a lower level of customer loyalty because

customers are likely to face a higher level of purchase involvement in these categories, leading to a lower level of loyalty (H9a).

However, we expect that longer inter-purchase cycle categories will exhibit a strengthened sensitivity of the strength of the association, similar to the way in which the impact of customer SES on the slope parameter is explained (H9b).

2.1.3.4 Industry Demand Growth and Demand Instability

Unlike these industry characteristics, there has been very limited empirical work with respect to the effects of market demand growth and demand variability. As such, no hypothesis has been formally formulated in regard to the effects of these covariates.

We next detail our sampling framework and describe the datasets assembled and our customer-, firm-, and industry-level variables.

2.2 Sampling Framework

2.2.1 Data and Variables

Our sampling framework is provided by a subset of the ACSI database. One of the most important aspects of the ACSI data is that the data are hierarchical in nature - i.e., customers are nested within firms, and firms are nested into industries. The initial sample contains 15,846 customers, from 66 firms, in 13 different industries (e.g., food processing, beer, soft drinks, tobacco, apparel, athletic shoes, personal care products, personal computers, household appliances, automobiles, parcel delivery-express, scheduled passenger air transportation, and hotels). Over the last 17 years (1994-2011), the ACSI database has surveyed more than 65,000 customers from more than 200 firms, in more than 30 industries per year (Fornell et al. 1996). The ACSI database is at the national level in the United States and the customers, and firms surveyed in the ACSI

database represent roughly 43% of the U.S. GDP. Therefore, the ACSI database is nationally representative.

The ACSI data used in this study are cross-sectional (i.e., multiple firms, across different industries). Specifically, the information on the variables in the ACSI corresponds to the time from January 2004 to December 2004. The ACSI data provide information on individual customers' loyalty (the continuous dependent variable, whose score lies between 0 and 100, measuring customer repurchase intentions), satisfaction (the continuous main covariate whose score ranges between 0 and 100, measuring overall customer satisfaction), and various demographics. The demographics include age (a continuous variable whose range is between 18 and 84), gender (a binary variable indicating 0 for male and 1 for female), income (an ordered categorical variable taking the value of 1 for household income below $20,000, 2 for income between $20,000 and $30,000, 3 for income between $30,000 and $40,000, 4 for income levels between $40,000 and $60,000, 5 for income between $$60,000 and $80,000, 6 for $80,000-$100,000, and 7 for incomes above $100,000), and education (an ordered categorical variable ranging from 1, less than high school, through 5, post-graduate education). Fornell et al. (1996) provide additional details of these customer-level variables.

In addition, as indicated by our customer-level hypotheses, these primary customer-level covariates are posited to influence the sensitivity of the strength of the satisfaction-loyalty association, as well as the level of baseline loyalty. Thus, we also include the interaction terms between satisfaction and these customer-level covariates into the customer-level of our hierarchical model to identify the effects of the customer characteristics on the sensitivity of the strength of the association.

Following the marketing literature (Gruca and Rego 2005; Morgan and Rego 2006), we supplemented this dataset by collecting firm-level data on firm size, advertising expenditures (as measured via advertising-to-sales ratios), R&D expenditures (as measured via R&D-to-sales ratios), the number of distinct brands offered by each firm, and the number of distinct business segments in which a firm operates. These additional firm-level variables were obtained from COMPUSTAT and Hoovers.com databases.

Additionally, also using COMPUSTAT data, we calculated industry concentration (as measured via HHI, a commonly accepted measure of industry concentration with a higher HHI, indicating increased concentration), 3-year industry demand growth (measured by the average of 3-year industry sales growth), and 3-year industry demand variability (measured by the standard deviation of 3-year industry sales growth), using sales revenue data for all firms in the same industry as those reported in the ACSI data. According to the economics literature (Hirschman 1964), HHI is defined as the sum of squares of all firms' market shares in an industry. Finally, we created an industry type dummy using 0 for goods-oriented industries, and 1 for services-oriented industries. Our inter-purchase cycle dummy was defined as 0 for short inter-purchase cycles (i.e., less than 3 months on average) and 1 for long inter-purchase cycles.

2.2.2 Descriptive Statistics and Correlations

Our empirical model testing the conceptual framework incorporates customer-, firm-, and industry-level covariates. An inspection of the correlation table, paired with the fact that our conceptual framework and empirical model includes interaction terms, raises the concern for multicolinearity. In order to minimize this impact, we conducted a factor analysis on the customer-level covariates including age, income and education

(gender was excluded because it is a binary dummy variable). Based on the rotated component matrix for these variables, they are grouped into two customer-level factor score variables such as age and SES (reflecting both income and education). We also conducted a factor analysis on the five firm-level covariates and obtained 3 firm-level factor score variables such as firm size (capturing both firm assets and R&D expenditures), firm advertising efforts (representing advertising expenditures), and differentiation/diversification (capturing the number of distinct brands and business segments).

Tables G3 through G5 summarize the descriptive statistics for all original customer-, firm-, and industry-level covariates. Tables G6, G7, and G8 provide correlations for all transformed customers-, firm-, and industry-level metrics described above. As it can be observed, and as a consequence of the transformations performed, all correlations reported are relatively small, suggesting that multicolinearity is likely to be of no concern.

We next provide the specifications of our empirical 3-level hierarchical model formulation.

2.3 Model

The primary objective of this chapter is to empirically reexamine the satisfaction-loyalty relationship while adjusting for different competitive settings faced by customers, firms, and competitors. With regard to this goal, our conceptual framework is developed to simultaneously incorporate the effects of heterogeneity in customer-, firm-, and industry-level characteristics on the satisfaction-loyalty association: the level of baseline loyalty (intercept α) and the sensitivity of the strength of the satisfaction-loyalty

relationship (slope β) of the satisfaction-loyalty curve (or association). This research question, as well as our data, is hierarchical in nature since customers are nested into firms, and firms are nested into industries.

To test our hypotheses in line with our conceptual framework regarding the effects of customer-, firm-, and industry-level characteristics on the level of baseline loyalty and the sensitivity of the strength of the association summarized above, we estimate a 3-level Hierarchical Linear Model (HLM). Our empirical HLM formulation incorporates customer-level moderators via interaction terms and firm- and industry-level moderators in a nested structure. Anderson et al. (2004) and Gruca and Rego (2005) provide good examples of HLM applications in marketing. As stated, our empirical model includes customer, firm and industry levels. In this 3-level formulation, parameters α and β are modeled as dependent on customer, firm, and industry characteristics (i.e., the different competitive settings faced by customers, firms, and competitors).

2.3.1 Customer-Level

Our HLM model is based upon a simple satisfaction-loyalty equation:

$$\text{Loyalty}_{ijk} = \alpha_{jk} + \beta_{jk}\text{Satisfaction}_{ijk} + \varepsilon_{ijk}, \qquad \varepsilon_{ijk} \sim N(0, \sigma_{\varepsilon}^2), \tag{2.1}$$

where α_{jk} and β_{jk} are intercept and slope parameters for firm *j* in industry *k*, and Loyalty_{ijk} denotes customer *i*'s loyalty for firm *j* in industry *k* and $\text{Satisfaction}_{ijk}$ denotes customer *i*'s satisfaction for firm *j* in industry *k*. Then, the model incorporates heterogeneity in the 3 levels of competitive settings (such as customer, firm, and industry levels) into this simple equation by allowing both α and β to vary with customer-, firm-, and industry-level characteristics.

More specifically, we incorporate heterogeneity in the customer dimension of competitive settings into the 1st- or customer-level of our HLM model via:

$$\begin{aligned}\text{Loyalty}_{ijk} = &\left(\alpha_{0jk} + \alpha_{1jk}\text{Age}_{ijk} + \alpha_{2jk}\text{Gender}_{ijk} + \alpha_{3jk}\text{SES}_{ijk}\right) + \\ &\left(\beta_{0jk} + \beta_{1jk}\text{Age}_{ijk} + \beta_{2jk}\text{Gender}_{ijk} + \beta_{3jk}\text{SES}_{ijk}\right) \times \text{Satisfaction}_{ijk} + \varepsilon_{ijk}, \\ &\varepsilon_{ijk} \sim N(0, \sigma_{\varepsilon}^2), \end{aligned} \tag{2.2}$$

where customer *i*'s loyalty for firm *j* in industry *k* is a function of demographics, such as age (a factor score variable representing age), gender (a binary variable indicating 0 for male and 1 for female), and SES (i.e., a factor score variable representing both income and education), and the association between satisfaction and these demographics. The moderating effects of customer characteristics on loyalty are operationalized as interaction terms between satisfaction and the demographic variables in the regression. Parameter α_{0jk} captures the level of baseline loyalty and parameter β_{0jk} represents the sensitivity of the strength of the satisfaction-loyalty association (i.e., sensitivity of a change in loyalty according to a change in satisfaction or sensitivity of translating satisfaction investments into loyalty). Also, parameters α_{cjk}, c=1, 2, 3 represent the direct impact of such individual customer characteristics as age, gender, and SES on the level of baseline loyalty, whereas parameters β_{cjk}, c=1, 2, 3 represent the moderating impact of customer characteristics on the level of loyalty since these customer characteristics influence loyalty via satisfaction.

As a result, we are able to incorporate differences in the customer dimension of competitive settings into the 1st-level of our 3-level hierarchical model.

2.3.2 Firm-Level

Following the hierarchy in the theoretical framework and data, we next model the baseline loyalty and sensitivity of the strength of the satisfaction-loyalty association as a function of firm-level covariates. We incorporate the previously detailed the 3 firm-level factor score covariates into the 2nd- or firm-level of our HLM model (whose firm-level covariance matrix is provided in Appendix A) via:

$$
\begin{aligned}
\alpha_{0jk} &= \pi_{00k} + \pi_{01k}\text{Size}_{jk} + \pi_{02k}\text{Advertising}_{jk} + \pi_{03k}\text{No. Brands/Segments}_{jk} + r_{0jk}, \\
\alpha_{1jk} &= \pi_{10k} + r_{1jk}, \\
\alpha_{2jk} &= \pi_{20k} + r_{2jk}, \\
\alpha_{3jk} &= \pi_{30k} + r_{3jk}, \\
\beta_{0jk} &= \pi_{40k} + \pi_{41k}\text{Size}_{jk} + \pi_{42k}\text{Advertising}_{jk} + \pi_{43k}\text{No. Brands/Segments}_{jk} + r_{4jk}, \quad (2.3) \\
\beta_{1jk} &= \pi_{50k} + r_{5jk}, \\
\beta_{2jk} &= \pi_{60k} + r_{6jk}, \\
\beta_{3jk} &= \pi_{70k} + r_{7jk}, \\
\underset{\sim}{r} &\sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{r}}),
\end{aligned}
$$

where Size denotes firm size, Advertising denotes firm advertising expenditures, and No. Brands/Segments reflects the number of distinct brands and business segments (i.e., Differentiation/Diversification), and the firm-level covariance matrix ($\Sigma_{\underset{\sim}{r}}$) is specified in Appendix A.

This stage is able to incorporate the moderating effects of firm characteristics on the satisfaction-loyalty association. For instance, the parameters π_{0fk}, f =1, ..., 3 reflect the effects of these firm-level covariates on the level of baseline loyalty, and the parameters π_{4fk}, f =1, ..., 3 capture the effects of the covariates on the sensitivity of the strength of the satisfaction-loyalty association. Therefore, we are able to incorporate heterogeneity in the firm dimension of competitive settings into this stage.

2.3.3 Industry-Level

Finally, we also model the baseline loyalty and the sensitivity of the strength of the satisfaction-loyalty association as a function of the five previously summarized industry covariates in order to explore the moderating effects of the industry characteristics on the satisfaction-loyalty association. We incorporate these industry-level covariates into the 3rd- or industry-level of my HLM model via:

$$
\begin{aligned}
\pi_{00k} &= \gamma_{000} + \gamma_{001}\text{Concentration}_k + \gamma_{002}\text{Service}_k + \gamma_{003}\text{Long}_k \\
&\quad + \gamma_{004}\text{Demand Growth}_k + \gamma_{005}\text{Demand Instability}_k + \nu_{00k}, \\
\pi_{01k} &= \gamma_{010} + \nu_{01k}, \\
\pi_{02k} &= \gamma_{020} + \nu_{02k}, \\
\pi_{03k} &= \gamma_{030} + \nu_{03k}, \\
\pi_{10k} &= \gamma_{100} + \nu_{10k}, \\
\pi_{20k} &= \gamma_{200} + \nu_{20k}, \\
\pi_{30k} &= \gamma_{300} + \nu_{30k}, \\
\pi_{40k} &= \gamma_{400} + \gamma_{401}\text{Concentration}_k + \gamma_{402}\text{Service}_k + \gamma_{403}\text{Long}_k \\
&\quad + \gamma_{404}\text{Demand Growth}_k + \gamma_{405}\text{Demand Instability}_k + \nu_{40k}, \\
\pi_{41k} &= \gamma_{410} + \nu_{41k}, \\
\pi_{42k} &= \gamma_{420} + \nu_{42k}, \\
\pi_{43k} &= \gamma_{430} + \nu_{43k}, \\
\pi_{50k} &= \gamma_{500} + \nu_{50k}, \\
\pi_{60k} &= \gamma_{600} + \nu_{60k}, \\
\pi_{70k} &= \gamma_{700} + \nu_{70k}, \\
\underset{\sim}{\nu} &\sim N(\underset{\sim}{0}, \Sigma_{\nu}),
\end{aligned}
\tag{2.4}
$$

where Concentration denotes the degree of industry concentration measured by HHI, Service is a binary variable defined as 0 for goods-oriented industries and 1 for services-oriented industries, Long is a binary variable indicating 0 for short inter-purchase cycles and 1 for long inter-purchase cycle, and Demand Growth and Demand Instability represent the average of 3-year industry sales growth and the standard deviation of 3-year

industry sales growth, respectively, and the full specification of the industry-level covariance matrix ($\Sigma_{\underline{v}}$) is provided in Appendix A.

Again, the parameters γ_{00m}, m=1, …, 5 capture the effects of these industry-level covariates on the level of baseline loyalty, and the parameters γ_{40m}, m=1, …, 5 represent the impact of these industry characteristics on the sensitivity of the strength of the association. By doing so, heterogeneity in the industry dimension of competitive settings is incorporated into the 3rd-level of our HLM formulation.

As shown above, this 3-level HLM model generates a unique regression line for each firm and each industry. Therefore, our HLM model is able to simultaneously incorporate heterogeneity in customer, firm, and industry characteristics into our analysis of the relationship between customer satisfaction and customer loyalty. As a result, our 3-level HLM is effectively able to handle heterogeneity with regard to the satisfaction-loyalty association, which will improve the predictive power of customer satisfaction over customer loyalty.

2.4 Empirical Analysis

We estimate our empirical 3-level hierarchical linear model – equations (2.2) through (2.4) above – using the HLM software package and methodology. For additional details about various estimation methods including empirical Bayes, generalized least squares, and maximum likelihood algorithm methods, see Raudenbush and Bryk (2002).

We report our results as a series of nested models, from simpler customer-level covariates only, to formulations with more complex customer- and firm-level covariates, to the full model specification including customer-, firm- and industry-level covariates. In doing so, we reassure the stability of our findings and gain insights into the variance

partitioning across the three different levels of covariates. Table G9 summarizes the results of our empirical analyses, as well as the degree of fit and variance partitioning across the different levels of our 3-level hierarchical linear model.

2.4.1 Model Comparison and Model Fit

From the perspective of the goodness of fit of our 4 empirical models, Model 1 (customer-level covariates only, although variance is partitioned across customer, firm, and industry) fits very well, as it yields the smallest AIC. Between Model 2 (incorporating customer- and firm-level covariates) and Model 3 (incorporating customer-, firm-, and industry-level covariates), Model 3 – the full 3-level HLM – fits the data slightly better, at least based on the AIC criteria. It is important to note that the number of parameters that need to be estimated for Model 3 is 166 while that for Model 1 is 81. However, from an examination of the log-likelihood function (i.e., a measure of fit not penalized for the number of additional parameters estimated), Model 3 exhibits a better fit than Model 1. Also, in terms of the pseudo R^2 values – i.e., traditional measures of predictive power – of these models (See Appendix F for computational details about these pseudo R^2 values), Model 3 provides the highest predictive power among the HLM models, as indicated by Table G9. This suggests that the inclusion of the additional parameters significantly improves the fit over Model 1, as well as the other HLM models. In fact, Model 3 improves the predictive power of customer satisfaction over customer loyalty from 37% (the R^2 for the case - only loyalty is explained by satisfaction) to 43.8%.

Therefore, we believe that these results provide us with a reasonable assumption to test our hypotheses, based on the coefficient estimates obtained from the full 3-level hierarchical linear model.

2.4.2 Parameter Estimates and Interpretation

As shown in Table G10, the sign of the coefficient estimates for the customer-level covariates is generally consistent with what our customer-level hypotheses predict. Although the sign of the effects of age and gender on the sensitivity of the strength of the satisfaction-loyalty association (the slope estimates) is opposite to these hypotheses, these estimates are statistically insignificant.

In terms of statistical significance, only SES significantly increases the sensitivity of the strength of the association, indicating that the sensitivity of a change in loyalty for higher SES customers will be stronger, along with a change in their satisfaction level. Age and gender increase both the baseline loyalty (intercept) and the sensitivity of the strength of the satisfaction-loyalty association (slope). However, SES decreases the intercept, but increases the slope, which is a trade-off pattern between the intercept and slope because the signs for these estimates are opposite.

At the firm-level covariates, the sign of these coefficient estimates is the same as that of our firm-level hypotheses. Also, several firm-level covariates are statistically significant. For example, firm size and differentiation/diversification are statistically significant. Firm size and differentiation/diversification significantly increase the level of baseline loyalty, whereas advertising expenditures reduce baseline loyalty.

Firm size and differentiation/diversification significantly weaken the sensitivity of the strength of the satisfaction-loyalty association, whereas advertising efforts strengthen the sensitivity of a change in loyalty according to a change in satisfaction investments. We also find a clear trade-off pattern between the intercept and slope for my firm-level estimates.

At the industry-level covariates, the sign of these industry-level coefficient estimates also correspond to what our industry-level hypotheses predict. All of the industry-level covariates are statistically significant. Baseline loyalty tends to be significantly higher for more concentrated, services-oriented, and higher demand-growing and unstable industries, whereas industries characterized by longer inter-purchase cycles are likely to exhibit significantly lower levels of baseline loyalty.

The sensitivity of translating satisfaction investments into loyalty will be stronger for longer inter-purchase cycle categories, while the sensitivity will be lower for less competitive, services-oriented, and higher demand-growing and unstable categories. These industry-level estimates provide additional evidence for the trade-off pattern between the intercept and slope.

In summary, as Table G10 indicates, the customer-, firm-, and industry-level coefficient estimates are generally consistent with the corresponding hypotheses. Several customer-, firm-, and industry-level variables are likely to significantly influence the satisfaction-loyalty association – i.e., the level of baseline loyalty and the sensitivity of translating satisfaction investments into loyalty of the customer satisfaction-customer loyalty curve.

2.4.3 Estimated Heterogeneity and Trade-off Pattern

One of the most dominant empirical findings is a trade-off pattern between the intercept and slope of the satisfaction-loyalty curve – the intercept increases, but the slope decreases or vice versa – which is consistently observable across almost all levels of the coefficient estimates. This +/- trade-off pattern can be explained by a conceptual graph from Jones and Sasser (1995) in Figure G2. A dominant feature in this graph is that the

shape of the satisfaction-loyalty curves varies across different industries, and the shape is likely to depend on the level of industry competition. More specifically, as competition increases, the satisfaction-loyalty curve becomes steeper where the intercept decreases, but the slope increases. To better understand this, if these curves are approximated by linear lines, the trade-off pattern is clearly observed. For example, the intercept is higher, but the slope is lower for relatively less competitive industries, such as airlines (local monopoly in one geographical market), while the intercept is lower, but the slope is higher for more competitive industries, such as automobiles. As such, industry competition is likely to influence the shape of the curves and determine the trade-off pattern.

This trade-off pattern between the intercept and slope across two industries, such as airlines and automobiles, can be empirically identified in our analysis. We were able to obtain the industry-level intercept and slope estimates for these two industries from our analysis, since the HLM method generates firm- and industry-level empirical Bayes residuals for the intercept and slope estimates, as well as other random-effects estimates (See Anderson et al. 2004 and Gruca and Rego 2005 for details). These estimates are presented in Figure G3. As Figure G3 shows, the intercept is higher, but the slope is lower for airlines. On the contrary, the intercept is lower, but the slope is higher for automobiles.

In addition to these industries, we are also able to identify the trade-off pattern between the industry-level intercept and slope for the 13 industries, as indicated by Figure G4 (summarizing heterogeneity in the level of baseline loyalty and sensitivity of the strength of the satisfaction-loyalty association across the 13 different industries) and

Figure G5 (showing the trade-off pattern between the industry-level intercept and slope estimates that are sorted by HHI). As such, our study provides empirical support for Jones and Sasser's (1995) theory that industry competitive conditions are likely to drive the +/- trade-off pattern between the intercept and slope. In order words, competition dictates the shape of the satisfaction-loyalty function.

2.4.4 Variance Decomposition

We conducted a variance-partitioning analysis between levels to identify how much variation is in the satisfaction-loyalty curves between levels (See Appendix B for computational details about this variance-decomposition analysis). As displayed in Table G9, most variation in the curves is associated with customer and industry characteristics, while only a small amount of variation is associated with firm efforts, indicating that firms within an industry will face very similar curves whose shape is likely to be determined by customer characteristics and industry competitive conditions. This finding is also consistent with the Jones and Sasser's idea that industry competitive competition is likely to drive the shape of satisfaction-loyalty curves, and hence, firms within the same industry tend to face very similar satisfaction-loyalty curves.

CHAPTER 3

IDENTIFYING AND CORRECTING FOR ENDOGENEITY IN CUSTOMER SATISFACTION

Chapter 2 established several improved empirical findings about the satisfaction-loyalty relationship. First, we find significant moderating effects of several customer, firm, and industry characteristics. Second, we find a very interesting trade-off relationship between the intercept and slope, indicating decreasing or increasing marginal returns for firms' customer satisfaction investments, and hence, firms' incentives to invest or not in customer satisfaction. Finally, we find that firms within the same industry are likely to face a very similar satisfaction-loyalty curve, based upon customer characteristics and industry conditions.

However, our empirical results from Chapter 2 could be biased due to possible endogeneity in customer satisfaction for the following reason. Firms are likely to optimize levels of customer satisfaction in the marketplace; otherwise, firms would not need to make huge investments in their marketing-mix efforts. Firms are able to optimize their resource allocation or investments in order to maximize customer satisfaction (Anderson and Mittal 2000; Hallowell 1996).

Based on the trade-off pattern between the intercept and slope in satisfaction-loyalty curves indicating firms' incentives to invest or not in satisfaction, and the regulation that firms within the same industry will face a very similar satisfaction-loyalty curve, firms can choose different levels of satisfaction, depending on the shape of their satisfaction-loyalty curve. More specifically, if firms want to invest in customer

satisfaction, how much do they need to invest? Firms may have a decision rule to decide on how much to invest in satisfaction.

For instance, as indicated by Jones and Sasser's conceptual graph in Figure G2, firms within less competitive industries have little incentive to invest in satisfaction. Loyalty (i.e., the level of baseline loyalty) is already high (due to the fact that there are not many alternatives) and the slope – capturing the marginal effects of satisfaction investments on loyalty, or how sensitive a change in loyalty is according to a change in satisfaction investments – is shallow. In contrast, firms within more competitive industries have considerable incentive to invest in satisfaction. In this case, the intercept is lower, but the slope is higher.

Likewise, firms can choose or control different levels of customer satisfaction by deciding on how much to invest in satisfaction, depending on the shape of their satisfaction-loyalty curve. This indicates that firms are likely to obtain a certain level of loyalty by indirectly choosing how much to invest in satisfaction. In other words, firms can choose the optimal level of customer satisfaction, and hence, customer loyalty by deciding how much to invest in satisfaction. Therefore, both consumers and firm decision-making are likely to determine the levels of customer satisfaction. However, our current 3-level HLM assumes that customer satisfaction is exogenous – i.e., a level of customer satisfaction is decided only by consumers. That is, our HLM analysis ignored firm efforts to choose or control the level of customers' satisfaction. As such, customer satisfaction must be treated as an endogenous variable.

In this circumstance, we are forced to control for both endogeneity in customer satisfaction and heterogeneity in competitive settings to obtain the precise estimates of

customer, firm, and industry characteristics. Since a hierarchical model formulation is not an appropriate framework to adjust for endogeneity, we control for both satisfaction endogeneity and competitive settings heterogeneity by utilizing a 3-level hierarchical instrumental variable model: a Two-Stage Least Squares (2SLS) 3-level HLM.

3.1 Identifying Potential Endogeneity in Customer Satisfaction

Since firms can obtain a certain level of loyalty by indirectly choosing how much to invest in satisfaction, such satisfaction needs to be treated as an endogenous variable. In this section, we identify this potential satisfaction endogeneity by providing evidence of the possibility of satisfaction endogeneity.

3.1.1 Evidence on the Relationship between Average Satisfaction and Firm-Level Slope Estimate

As indicated by the trade-off pattern between the intercept and slope in satisfaction-loyalty curves and the restriction that firms within an industry will face similar satisfaction-loyalty curves, firms may "choose" levels of customer satisfaction, depending on the shape of their satisfaction-loyalty curve.

The finding in Chapter 2, such as the trade-off relationship between the intercept and slope, indeed, empirically supports Jones and Sasser's theory. Jones and Sasser draw several curves of the satisfaction-loyalty association across industries and argue that the shape of the satisfaction-loyalty curve should vary across different industries due to different levels of industry competitive conditions. As their conceptual graph shows, the intercept is higher, but the slope is lower for less competitive industries, such as local telephones (in one geographical market). On the contrary, the intercept is lower, but the slope is higher for more competitive industries, such as automobiles.

Following the regulation that firms within the same industry will face a very similar satisfaction-loyalty curve, firms within a less competitive industry such as local telephones will not have many incentives to invest in customer satisfaction. Even slightly satisfied customers will be very loyal. Thus, putting more investments in customer satisfaction is unlikely to be cost effective in this situation because the intercept is high, but more importantly, the slope, capturing the marginal effects of satisfaction investments on loyalty, is lower. Therefore, firms in lower competitive conditions will not significantly invest in customer satisfaction due to the lower marginal impact of satisfaction investments on loyalty, resulting in a lower level of satisfaction, on average.

On the other hand, firms within a very competitive industry such as automobiles will have numerous incentives for investing in customer satisfaction. Since the intercept is lower, but the slope is higher in this case, firms in highly competitive conditions will significantly invest in satisfaction because of this higher marginal impact of customer satisfaction investments. Therefore, firms will find it desirable to increase investments in customer satisfaction, leading to a higher level of customer satisfaction on average.

To identify this positive association between the slope parameter and average levels of customer satisfaction, we explored the association between these two across 66 firms. Since it is possible to obtain firm-level parameter estimates from our 3-level HLM, we first obtained the firm-level intercept and slope parameters for each of the 66 firms. We also computed the average satisfaction score for each of these firms. We then transformed the average satisfactions for these firms using a logistic function in order to alleviate floor and ceiling effect concerns:

$$\text{logit}(\text{SAT}) = \ln\left[\frac{\text{SAT}}{\text{100-SAT}}\right], \tag{3.1}$$

where SAT represents the average satisfaction score.

The correlation between this logit of the average satisfaction and the slope parameter is 0.093. Figure G6 provides a plot of logit(SAT) and the slope, depicting the association between the logit of the average satisfaction and the slope parameter across the 66 firms. This figure shows what seems to be a positive trend in the association. Since three cases observed in the top-left of the graph are outliers (identified by studentized residuals and Cook's distance), we excluded these three observations and computed the correlation between logit(SAT) and the slope. This correlation is 0.167. We also display a plot of logit(SAT) and the slope for 63 firms in Figure G7 where the positive trend on the association is more clearly shown.

The positive correlation and positive trend are indicative of the fact that firms control the levels of customer satisfaction to achieve their optimal level of customer satisfaction where the marginal benefit is the same as the marginal cost. Likewise, firms can "choose" satisfaction levels by investing or not in satisfaction, depending upon industry competitive conditions, and hence, the choice of their satisfaction level is likely to depend on the given competitive conditions. This implies that firms may be trying to control customer satisfaction – the independent variable – to force customer loyalty, the dependent variable, to attain certain levels. As such, we argue that customer satisfaction may be endogenous.

Indeed, this sort of endogeneity has been also identified in the marketing literature. Early research in the choice modeling, in which household purchase choice behavior is modeled using random utility models, assumes that deterministic components of utility, including such firms' marketing activities as price, promotion, and advertising are

exogenous (Guadagni and Little 1983). Recent research in the literature has, however, highlighted that these marketing activities are endogenous. As a result, failure to account for the endogeneity in these marketing-mix variables can bias parameter estimates of marketing mix variables (Chintagunta 2001; Louviere et al. 2005; Villas-Boas and Winer 1999). Villas-Boas and Winer (1999) state that marketing managers establish these marketing-mix variables depending on market information, which is, in part, unobservable to the researcher, but nonetheless affects consumer choice behavior. This creates a situation in which there could be a correlation between the marketing-mix variables and the error terms in the latent utilities.

Since firms can "choose" different levels of customer satisfaction by deciding on how much they invest in customer satisfaction, firms are likely to acquire a certain level of customer loyalty by indirectly choosing their satisfaction investments. The evidence that firms can "choose" levels of customer satisfaction, depending on the shape of their satisfaction-loyalty curve (especially, the slope) suggests the possibility of customer satisfaction endogeneity.

3.1.2 Determinants of Satisfaction

To study how firms set satisfaction levels, we develop a satisfaction hierarchical linear model, in which the dependent variable is customer satisfaction and the same competitive setting heterogeneity (but, only the baseline loyalty is modeled as a function of the same set of the customer-, firm-, and industry-level covariates) as our 3-level HLM is applied. The model is of the form:

$$\text{Satisfaction}_{ijk} = \mu_{0jk} + \mu_{1jk}\text{Age}_{ijk} + \mu_{2jk}\text{Gender}_{ijk} + \mu_{3jk}\text{SES}_{ijk} + \varepsilon_{ijk}, \quad (3.2)$$
$$\varepsilon_{ijk} \sim N(0, \sigma_{\varepsilon}^2),$$

$$\mu_{0jk} = \pi_{00k} + \pi_{01k}\text{Size}_{jk} + \pi_{02k}\text{Advertising}_{jk} + \pi_{03k}\text{No. Brands/Segments}_{jk} + r_{0jk}, \quad (3.3)$$
$$\mu_{1jk} = \pi_{10k} + r_{1jk},$$
$$\mu_{2jk} = \pi_{20k} + r_{2jk},$$
$$\mu_{3jk} = \pi_{30k} + r_{3jk},$$
$$\underset{\sim}{r} \sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{r}}),$$

$$\pi_{00k} = \gamma_{000} + \gamma_{001}\text{Concentration}_k + \gamma_{002}\text{Service}_k + \gamma_{003}\text{Long}_k$$
$$+ \gamma_{004}\text{Demand Growth}_k + \gamma_{005}\text{Demand Instability}_k + \nu_{00k}, \quad (3.4)$$
$$\pi_{01k} = \gamma_{010} + \nu_{01k},$$
$$\pi_{02k} = \gamma_{020} + \nu_{02k},$$
$$\pi_{03k} = \gamma_{030} + \nu_{03k},$$
$$\pi_{10k} = \gamma_{100} + \nu_{10k},$$
$$\pi_{20k} = \gamma_{200} + \nu_{20k},$$
$$\pi_{30k} = \gamma_{300} + \nu_{30k},$$
$$\underset{\sim}{\nu} \sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{\nu}}),$$

where these customer, firm, and industry covariates are as defined earlier and the firm- ($\Sigma_{\underset{\sim}{r}}$) and industry-level ($\Sigma_{\underset{\sim}{\nu}}$) covariance matrices are specified in Appendix C. We also estimate this satisfaction HLM, equations (3.2) through (3.4) using the HLM software package.

Table G11 provides the customer-, firm-, and industry-level coefficient estimates of this model. We predict that factors increasing the slope of the satisfaction-loyalty curve will also lead to higher levels of observed satisfaction. As indicated by Table G11, the pattern of the signs from the satisfaction 3-level HLM model is largely consistent with that from the 3-level HLM slope estimates of Chapter 2. More specifically, the signs for advertising and the industry-level characteristics are consistent with the corresponding 3-level HLM slope estimates. Regarding the customer variables, the signs

of age and gender are the same as the corresponding empirical slope estimates, but are opposite to what marketing theory predicts. This suggests that our prediction that any factors leading to a large slope will also lead to higher levels of observed satisfaction largely holds. Thus, a positive relationship between the slope of the curve and levels of observed satisfaction is determined by firm- and industry-level characteristics, as well as customer characteristics. Since the customer-level variables can be regarded as control variables, this preliminary analysis provides partial evidence that firm and industry factors consistent with a steeper satisfaction-loyalty curve imply a higher level of customer satisfaction. Simply put, factors dictating the slope, and hence, curve also influence satisfaction levels. This, again, suggests that customer satisfaction is endogenous.

3.2 Model Specification and Estimation

Our current analysis on the satisfaction-loyalty association did not address this satisfaction endogeneity issue because we assumed that a given level of customer satisfaction adopted is exogenous, and hence, employed a 3-level hierarchical linear model.

In other words, we only accounted for heterogeneity in 3 dimensions of competitive settings facing customers, firms, and competitors via our 3-level hierarchical model. Although the hierarchical modeling formulation is extremely effective when controlling for heterogeneity across different groups (e.g., firms and industries), it is not effective in adjusting for endogeneity.

3.2.1 Model Specification for Satisfaction Endogeneity Correction

Because we wish to control for both endogeneity in satisfaction and heterogeneity in competitive settings, we develop a multilevel instrumental variable framework generating parameter estimates that are robust to these issues, that is, a 2SLS 3-level HLM.

Following the ACSI model and methodology (Fornell et al. 1996), we construct an instrumental variable for customer satisfaction using the antecedents of customer satisfaction: perceived quality, customer expectations, and perceived value (See Figure G8). Our 2SLS 3-level HLM, which is able to account for the two issues, is defined as following:

$$\begin{aligned}\text{Loyalty}_{ijk} &= \left(\alpha_{0jk} + \alpha_{1jk}\text{Age}_{ijk} + \alpha_{2jk}\text{Gender}_{ijk} + \alpha_{3jk}\text{SES}_{ijk}\right) + \\ &\quad \left(\beta_{0jk} + \beta_{1jk}\text{Age}_{ijk} + \beta_{2jk}\text{Gender}_{ijk} + \beta_{3jk}\text{SES}_{ijk}\right) \times \widehat{\text{Satisfaction}}_{ijk} + \varepsilon_{ijk}, \qquad (3.5)\\ \varepsilon_{ijk} &\sim N(0, \sigma_{\varepsilon}^2),\end{aligned}$$

$$\begin{aligned}\alpha_{0jk} &= \pi_{00k} + \pi_{01k}\text{Size}_{jk} + \pi_{02k}\text{Advertising}_{jk} + \pi_{03k}\text{No. Brands/Segments}_{jk} + r_{0jk}, \qquad (3.6)\\ \alpha_{1jk} &= \pi_{10k} + r_{1jk},\\ \alpha_{2jk} &= \pi_{20k} + r_{2jk},\\ \alpha_{3jk} &= \pi_{30k} + r_{3jk},\\ \beta_{0jk} &= \pi_{40k} + \pi_{41k}\text{Size}_{jk} + \pi_{42k}\text{Advertising}_{jk} + \pi_{43k}\text{No. Brands/Segments}_{jk} + r_{4jk},\\ \beta_{1jk} &= \pi_{50k} + r_{5jk},\\ \beta_{2jk} &= \pi_{60k} + r_{6jk},\\ \beta_{3jk} &= \pi_{70k} + r_{7jk},\\ \underset{\sim}{r} &\sim N(\underset{\sim}{0}, \Sigma_{r}),\end{aligned}$$

$$
\begin{aligned}
\pi_{00k} &= \gamma_{000} + \gamma_{001}\text{Concentration}_k + \gamma_{002}\text{Service}_k + \gamma_{003}\text{Long}_k \\
&\quad + \gamma_{004}\text{Demand Growth}_k + \gamma_{005}\text{Demand Instability}_k + \nu_{00k}, \qquad (3.7)\\
\pi_{01k} &= \gamma_{010} + \nu_{01k},\\
\pi_{02k} &= \gamma_{020} + \nu_{02k},\\
\pi_{03k} &= \gamma_{030} + \nu_{03k},\\
\pi_{10k} &= \gamma_{100} + \nu_{10k},\\
\pi_{20k} &= \gamma_{200} + \nu_{20k},\\
\pi_{30k} &= \gamma_{300} + \nu_{30k},\\
\pi_{40k} &= \gamma_{400} + \gamma_{401}\text{Concentration}_k + \gamma_{402}\text{Service}_k + \gamma_{403}\text{Long}_k \\
&\quad + \gamma_{404}\text{Demand Growth}_k + \gamma_{405}\text{Demand Instability}_k + \nu_{40k},\\
\pi_{41k} &= \gamma_{410} + \nu_{41k},\\
\pi_{42k} &= \gamma_{420} + \nu_{42k},\\
\pi_{43k} &= \gamma_{430} + \nu_{43k},\\
\pi_{50k} &= \gamma_{500} + \nu_{50k},\\
\pi_{60k} &= \gamma_{600} + \nu_{60k},\\
\pi_{70k} &= \gamma_{700} + \nu_{70k},\\
\underset{\sim}{\nu} &\sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{\nu}}),
\end{aligned}
$$

where these customer-, firm-, and industry-level covariates are used as used earlier, and the firm- and industry-level covariance matrices ($\Sigma_{\underset{\sim}{r}}$ and $\Sigma_{\underset{\sim}{\nu}}$) are fully specified in Appendix D. In addition, $\widehat{\text{Satisfaction}}$ represents the predicted customer satisfaction score obtained from regressing customer satisfaction on customer perceived quality, expectations, and perceived value via the following Ordinary Least Squares (OLS) regression model:

$$
\begin{aligned}
\text{Satisfaction}_{ijk} &= \delta_0 + \delta_1\text{Quality}_{ijk} + \delta_2\text{Expectations}_{ijk} + \delta_3\text{Value}_{ijk} + u_{ijk},\\
u_{ijk} &\sim N(0, \sigma_u^2), \qquad (3.8)
\end{aligned}
$$

where Quality, Expectations, and Value represent perceived quality, customer expectations, and perceived value, respectively. Again, following the marketing theory (Fornell et al. 1996), we use only these 3 antecedents of customer satisfaction to compute

predicted customer satisfaction.

3.2.2 Model Estimation and Standard Error Estimate Correction

We estimate our classical 2SLS 3-level HLM in equations (3.5) through (3.8) by utilizing an indirect classical two-step estimation strategy. In this strategy, we use a predicted satisfaction score as an instrumental variable for satisfaction.

The procedure of the estimation of the 2SLS 3-level HLM, equations (3.5) through equation (3.8) above, is as follows. We obtain predictions of the endogenous variable values (i.e., customer satisfaction values) for each customer from OLS regression in equation (3.8). These predicted values, being independent of the covariates of equation (3.5), are used as an instrument. We then use predicted satisfaction in place of actual satisfaction in the 3-level HLM model. We next estimate equations (3.5) through (3.7) using the HLM software package. Standard errors of model parameters are computed using a jackknife procedure, discussed in detail in Appendix E.

3.3 Model Comparison and Empirical Results

We identify two important findings with regard to the magnitude, significance level, and sign of the coefficient and standard error estimates of our 2SLS 3-level HLM, as indicated by Table G12 displaying coefficient estimates from both the 2SLS 3-level HLM and previous 3-level HLM.

First, the magnitude of these estimates have changed from the estimates of our previous 3-level HLM, which indicates that satisfaction endogeneity indeed exists. In terms of statistical significance, several additional customer- and firm-level variables become statistically significant. Some examples of these covariates are the effects of customer age, gender and SES on the level of baseline loyalty. Also, the effects of

advertising expenditures on both the level of baseline loyalty and sensitivity of the strength of the satisfaction-loyalty association become statistically significant, although the influence of industry demand growth becomes insignificant.

However, the pattern of the sign of the estimates from both the models is consistent. Simply put, satisfaction endogeneity is not very severe, even though the endogneity exists. Since endogeneity is unlikely to impact the overall pattern of our empirical findings from Chapter 2, our previous empirical findings – including significant moderating effects of competitive setting heterogeneity on the satisfaction-loyalty association (although several additional customer and firm covariates become significant after the endogeneity correction), a trade-off pattern between the intercept and slope parameters of the curve, and the restriction that firms within the same industry tend to show a very similar satisfaction-loyalty curve – are still valid.

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CHAPTER 4

GENERAL DISCUSSION AND CONCLUSION

4.1 Conclusions

The customer satisfaction-customer loyalty association is one of the most vital relationships for marketing theory and practice due to the marketing effectiveness that these metrics summarize and its implications for firm profitability. Forty years of marketing academic and practitioner research are indicative of the importance of this customer satisfaction-loyalty association. Firms, in fact, invest billions of dollars developing customer satisfaction monitoring systems to better predict how customer satisfaction translates into customer loyalty.

In spite of the magnitude of these investments and marketing academic and practitioner research on the satisfaction-loyalty relationship over the last decades, there still exist numerous knowledge gaps on this topic, including the relatively modest ability of satisfaction to predict loyalty. This is obviously frustrating for marketing practitioners and academics. We argue that competitive setting heterogeneity facing customers, firms, and competitors leads to many possible different settings under which customer satisfaction translates into customer loyalty.

In order to attempt to understand the true association between satisfaction and loyalty, we developed an extensive, yet simple and flexible theoretical framework that simultaneously incorporates heterogeneity across different dimensions of competitive settings faced by customers, firms and competitors, which are believed to be the key drivers of the knowledge gaps. Then, we empirically tested this conceptual framework by estimating a 3-level hierarchical linear model (conducted by the HLM methodology),

utilizing 2004 American Customer Satisfaction Index data and several customer-, firm-, and industry-level characteristics.

Calibration of this 3-level HLM model yielded interesting empirical findings on the satisfaction-loyalty relationship. However, we argued that these empirical results could be biased by endogeneity in customer satisfaction, since firms are likely to optimize levels of customer satisfaction in the marketplace. Our empirical findings (such as a trade-off pattern between the intercept and slope parameters of the satisfaction-loyalty curve and the restriction that firms within the same industry will face a very similar satisfaction-loyalty curve) are indicative of the fact that firms can choose a certain level of customer loyalty by indirectly controlling their investments in satisfaction.

In a subsequent analysis in Chapter 3, we control for both satisfaction endogeneity and competitive setting heterogeneity using a 2SLS 3-level HLM. In addition, we correct for the standard estimates of this model via a jackknife procedure. The 2SLS 3-level HLM enables several additional customer and firm covariates to become statistically significant, while showing that the overall pattern of our empirical findings from Chapter 2 remains valid – i.e., a trade-off pattern between the intercept and slope parameters of the curve and the restriction that firms within the same industry tend to show a very similar satisfaction-loyalty curve.

4.2 Finding, Implications, and Contributions

This study provides several important findings on the linkage between satisfaction and loyalty. First of all, we find significant moderating effects of several customer, firm, and industry characteristics on both the level of loyalty (the intercept) and the sensitivity of a change in loyalty along with a change in satisfaction investments (the slope

parameter). Based upon this finding, managers can identify which customer, firm, and industry characteristics influence the relationship between customer satisfaction and customer loyalty, so that they can formulate appropriate marketing strategies. In other words, this finding indicates that the true nature of the relationship between satisfaction and loyalty is significantly influenced by competitive setting differences.

Second, we find a very interesting trade-off pattern between the intercept and slope on the satisfaction-loyalty association, which suggests decreasing or increasing marginal returns for customer satisfaction investments. As the Jones and Sasser's (1995) theory indicates, competition is likely to drive the shape of satisfaction-loyalty curves and determine this trade-off pattern. This research provides empirical support for this theory.

Third, most of the total variability is accounted for by customer and industry characteristics, while only a small portion of the total variability is accounted for by firm efforts. This suggests that customers, as well as industries are expected to face a variety of satisfaction-loyalty curves. In contrast, firms within an industry are likely to face very similar satisfaction-loyalty curves.

Accordingly, firms can adopt two managerial strategies for loyalty management. First, firms can move their position along a given curve. That is, firms can choose different levels of customer satisfaction by deciding on how much they invest in satisfaction. For example, within a less competitive industry such as local telephones, even slightly satisfied customers will be very loyal. Putting more investments in satisfaction is unlikely to be cost effective. In contrast, within a very competitive industry such as automobiles, firms will find it desirable to increase investments in customer satisfaction. A second strategy is that firms can shift their current satisfaction-

loyalty curve to a new flatter one by choosing new customers. This can provide a way of increasing loyalty without altering the overall level of satisfaction. Marketing managers can achieve this shift by means of firm size and differentiation/diversification because these firm-level characteristics significantly increase the intercept, but decrease the slope parameter, thereby flattening the curve. As such, variation in the shape of the satisfaction-loyalty relationship has strong implications for managerial decision making.

This study contributes to the marketing literature in several ways. First, we extend our understanding of the seminal association between satisfaction and loyalty by incorporating heterogeneity in competitive settings into the association. This incorporation, in fact, enables us to improve the predictive power of satisfaction over loyalty. More specifically, our study is the first research that simultaneously takes a look at the moderating effects of competitive settings heterogeneity faced by customers, firms, and competitors on both the intercept and the slope of the satisfaction-loyalty curve by estimating a 3-level HLM and ACSI data. In doing so, we expand our understanding of how marketing investments in market-based assets (Srivastava et al. 1998) such as customer satisfaction translate into customer loyalty, which in turn, enhances firm performance and value.

Second, the hierarchical and multi-level framework developed in this study allows us to benchmark the relative variability each level accounts for in determining the levels of customer loyalty and also how effectively the firm can map customer satisfaction onto loyalty. The finding that firms within the same industry are likely to face a very similar satisfaction-loyalty curve whose shape is determined by customer characteristics and

industry conditions, is important for benchmarking purposes and also for all stakeholders trying to assess businesses capabilities and skills.

4.3 Limitations and Future Research

In spite of several important contributions of our study, this research has three key limitations. First, our data cover a single year and are limited to only 13 industries. It would be useful to explore a broader range of industries and to do so using time series data. We expect to be able to address this limitation in future studies by utilizing more cross-sectional and more longitudinal data.

Second, our data are likely to be associated with another kind of satisfaction endogeneity. The customer satisfaction and loyalty metrics in the ACSI were collected within the same 2004 survey with no temporal distance. The loyalty metric from the ACSI is a measure of repurchase intentions instead of actual repurchase behavior. In this circumstance, the endogeneity issue (i.e., common method bias), may occur, as indicated by Mittal and Kamakura (2001). Furthermore, the marketing literature indicates that customer loyalty is also able to influence customer satisfaction. In this circumstance, the issue of simultaneous endogeneity (satisfaction affects loyalty while loyalty influences satisfaction) may arise. We could address this simultaneous endogeneity issue by estimating a Bayesian multi-level structural equation model that includes an additional equation where satisfaction becomes a function of loyalty.

Third, a few issues regarding the satisfaction-loyalty association remain unresolved with respect to the linearity, symmetry, magnitude and stability of the marginal returns of this association (Deming 1986; Finkelman et al. 1992; Jones and

Sasser 1995; Kamakura et al. 2002; Oliver 1999; Seiders et al. 2005). Additional research is needed to study these issues.

APPENDIX A

COVARIANCE MATRICES FOR 3-LEVEL HLM

Our 3-level HLM in Chapter 2 simultaneously incorporates the effects of competitive setting heterogeneity in customer-, firm-, and industry-level characteristics on the customer satisfaction-customer loyalty association – i.e., the level of baseline loyalty (the intercept) and the sensitivity of the strength of the association (the slope) of the satisfaction-loyalty curve. More specifically, heterogeneity in firm-level characteristics is incorporated into the 2nd- or firm-level stage of our 3-level HLM via:

$$\begin{pmatrix} \alpha_{0jk} \\ \alpha_{1jk} \\ \alpha_{2jk} \\ \alpha_{3jk} \\ \beta_{0jk} \\ \beta_{1jk} \\ \beta_{2jk} \\ \beta_{3jk} \end{pmatrix} \sim N \left(\begin{pmatrix} \pi_{00k} + \pi_{01k}\text{Size}_{jk} + \pi_{02k}\text{Advertising}_{jk} \\ +\pi_{03k}\text{No. Brands/Segments}_{jk} \\ \pi_{10k} \\ \pi_{20k} \\ \pi_{30k} \\ \pi_{40k} + \pi_{41k}\text{Size}_{jk} + \pi_{42k}\text{Advertising}_{jk} \\ +\pi_{43k}\text{No. Brands/Segments}_{jk} \\ \pi_{50k} \\ \pi_{60k} \\ \pi_{70k} \end{pmatrix}, \Sigma_{\underline{r}} \right), \tag{A.1}$$

where the firm-level covariance matrix ($\Sigma_{\underline{r}}$) is as follows:

$$\Sigma_{\underline{\gamma}} = \begin{bmatrix} \tau_{\gamma 00} & \tau_{\gamma 01} & \tau_{\gamma 02} & \tau_{\gamma 03} & \tau_{\gamma 04} & \tau_{\gamma 05} & \tau_{\gamma 06} & \tau_{\gamma 07} \\ \tau_{\gamma 10} & \tau_{\gamma 11} & \tau_{\gamma 12} & \tau_{\gamma 13} & \tau_{\gamma 14} & \tau_{\gamma 15} & \tau_{\gamma 16} & \tau_{\gamma 17} \\ \tau_{\gamma 20} & \tau_{\gamma 21} & \tau_{\gamma 22} & \tau_{\gamma 23} & \tau_{\gamma 24} & \tau_{\gamma 25} & \tau_{\gamma 26} & \tau_{\gamma 27} \\ \tau_{\gamma 30} & \tau_{\gamma 31} & \tau_{\gamma 32} & \tau_{\gamma 33} & \tau_{\gamma 34} & \tau_{\gamma 35} & \tau_{\gamma 36} & \tau_{\gamma 37} \\ \tau_{\gamma 40} & \tau_{\gamma 41} & \tau_{\gamma 42} & \tau_{\gamma 43} & \tau_{\gamma 44} & \tau_{\gamma 45} & \tau_{\gamma 46} & \tau_{\gamma 47} \\ \tau_{\gamma 50} & \tau_{\gamma 51} & \tau_{\gamma 52} & \tau_{\gamma 53} & \tau_{\gamma 54} & \tau_{\gamma 55} & \tau_{\gamma 56} & \tau_{\gamma 57} \\ \tau_{\gamma 60} & \tau_{\gamma 61} & \tau_{\gamma 62} & \tau_{\gamma 63} & \tau_{\gamma 64} & \tau_{\gamma 65} & \tau_{\gamma 66} & \tau_{\gamma 67} \\ \tau_{\gamma 70} & \tau_{\gamma 71} & \tau_{\gamma 72} & \tau_{\gamma 73} & \tau_{\gamma 74} & \tau_{\gamma 75} & \tau_{\gamma 76} & \tau_{\gamma 77} \end{bmatrix}. \tag{A.2}$$

We incorporate heterogeneity in the industry-level characteristics into the 3rd- or industry-level stage of our 3-level HLM via:

$$\begin{pmatrix} \pi_{00} \\ \\ \pi_{01} \\ \pi_{02} \\ \pi_{03} \\ \pi_{10} \\ \pi_{20} \\ \pi_{30} \\ \pi_{40} \\ \\ \pi_{41} \\ \pi_{42} \\ \pi_{43} \\ \pi_{50} \\ \pi_{60} \\ \pi_{70} \end{pmatrix} \sim N \left(\begin{pmatrix} \gamma_{000} + \gamma_{001}\text{Concentration}_k + \gamma_{002}\text{Service}_k + \gamma_{003}\text{Long}_k \\ +\gamma_{004}\text{Demand Growth}_k + \gamma_{005}\text{Demand Instability}_k \\ \gamma_{010} \\ \gamma_{020} \\ \gamma_{030} \\ \gamma_{100} \\ \gamma_{200} \\ \gamma_{300} \\ \gamma_{400} + \gamma_{401}\text{Concentration}_k + \gamma_{402}\text{Service}_k + \gamma_{403}\text{Long}_k \\ +\gamma_{404}\text{Demand Growth}_k + \gamma_{405}\text{Demand Instability}_k \\ \gamma_{410} \\ \gamma_{420} \\ \gamma_{430} \\ \gamma_{500} \\ \gamma_{600} \\ \gamma_{700} \end{pmatrix}, \Sigma_{\underline{v}} \right), \quad \text{(A.3)}$$

where the industry-level covariance matrix ($\Sigma_{\underline{v}}$) is of the form:

$$\Sigma_{\underline{v}} = \begin{bmatrix} \tau_{v0000} & \tau_{v0001} & \tau_{v0002} & \tau_{v0003} & \tau_{v0010} & \tau_{v0020} & \tau_{v0030} & \tau_{v0040} & \tau_{v0041} & \tau_{v0042} & \tau_{v0043} & \tau_{v0050} & \tau_{v0060} & \tau_{v0070} \\ \tau_{v0100} & \tau_{v0101} & \tau_{v0102} & \tau_{v0103} & \tau_{v0110} & \tau_{v0120} & \tau_{v0130} & \tau_{v0140} & \tau_{v0141} & \tau_{v0142} & \tau_{v0143} & \tau_{v0150} & \tau_{v0160} & \tau_{v0170} \\ \tau_{v0200} & \tau_{v0201} & \tau_{v0202} & \tau_{v0203} & \tau_{v0210} & \tau_{v0220} & \tau_{v0230} & \tau_{v0240} & \tau_{v0241} & \tau_{v0242} & \tau_{v0243} & \tau_{v0250} & \tau_{v0260} & \tau_{v0270} \\ \tau_{v0300} & \tau_{v0301} & \tau_{v0302} & \tau_{v0303} & \tau_{v0310} & \tau_{v0320} & \tau_{v0330} & \tau_{v0340} & \tau_{v0341} & \tau_{v0342} & \tau_{v0343} & \tau_{v0350} & \tau_{v0360} & \tau_{v0370} \\ \tau_{v1000} & \tau_{v1001} & \tau_{v1002} & \tau_{v1003} & \tau_{v1010} & \tau_{v1020} & \tau_{v1030} & \tau_{v1040} & \tau_{v1041} & \tau_{v1042} & \tau_{v1043} & \tau_{v1050} & \tau_{v1060} & \tau_{v1070} \\ \tau_{v2000} & \tau_{v2001} & \tau_{v2002} & \tau_{v2003} & \tau_{v2010} & \tau_{v2020} & \tau_{v2030} & \tau_{v2040} & \tau_{v2041} & \tau_{v2042} & \tau_{v2043} & \tau_{v2050} & \tau_{v2060} & \tau_{v2070} \\ \tau_{v3000} & \tau_{v3001} & \tau_{v3002} & \tau_{v3003} & \tau_{v3010} & \tau_{v3020} & \tau_{v3030} & \tau_{v3040} & \tau_{v3041} & \tau_{v3042} & \tau_{v3043} & \tau_{v3050} & \tau_{v3060} & \tau_{v3070} \\ \tau_{v4000} & \tau_{v4001} & \tau_{v4002} & \tau_{v4003} & \tau_{v4010} & \tau_{v4020} & \tau_{v4030} & \tau_{v4040} & \tau_{v4041} & \tau_{v4042} & \tau_{v4043} & \tau_{v4050} & \tau_{v4060} & \tau_{v4070} \\ \tau_{v4100} & \tau_{v4101} & \tau_{v4102} & \tau_{v4103} & \tau_{v4110} & \tau_{v4120} & \tau_{v4130} & \tau_{v4140} & \tau_{v4141} & \tau_{v4142} & \tau_{v4143} & \tau_{v4150} & \tau_{v4160} & \tau_{v4170} \\ \tau_{v4200} & \tau_{v4201} & \tau_{v4202} & \tau_{v4203} & \tau_{v4210} & \tau_{v4220} & \tau_{v4230} & \tau_{v4240} & \tau_{v4241} & \tau_{v4242} & \tau_{v4243} & \tau_{v4250} & \tau_{v4260} & \tau_{v4270} \\ \tau_{v4300} & \tau_{v4301} & \tau_{v4302} & \tau_{v4303} & \tau_{v4310} & \tau_{v4320} & \tau_{v4330} & \tau_{v4340} & \tau_{v4341} & \tau_{v4342} & \tau_{v4343} & \tau_{v4350} & \tau_{v4360} & \tau_{v4370} \\ \tau_{v5000} & \tau_{v5001} & \tau_{v5002} & \tau_{v5003} & \tau_{v5010} & \tau_{v5020} & \tau_{v5030} & \tau_{v5040} & \tau_{v5041} & \tau_{v5042} & \tau_{v5043} & \tau_{v5050} & \tau_{v5060} & \tau_{v5070} \\ \tau_{v6000} & \tau_{v6001} & \tau_{v6002} & \tau_{v6003} & \tau_{v6010} & \tau_{v6020} & \tau_{v6030} & \tau_{v6040} & \tau_{v6041} & \tau_{v6042} & \tau_{v6043} & \tau_{v6050} & \tau_{v6060} & \tau_{v6070} \\ \tau_{v7000} & \tau_{v7001} & \tau_{v7002} & \tau_{v7003} & \tau_{v7010} & \tau_{v7020} & \tau_{v7030} & \tau_{v7040} & \tau_{v7041} & \tau_{v7042} & \tau_{v7043} & \tau_{v7050} & \tau_{v7060} & \tau_{v7070} \end{bmatrix}. \quad \text{(A.4)}$$

APPENDIX B

VARIANCE PARTITIONING

We conduct variance-partitioning (or decomposition) analysis between the 3 levels to identify how much variation in the satisfaction-loyalty curves is associated between levels. Following Raudenbush and Bryk (2002), the total variance is:

$$\text{Total Variance} = \sigma_{\varepsilon}^2 + \tau_r + \tau_v, \tag{B.1}$$

where $\tau_r = \tau_{r00} + \tau_{r11} + \tau_{r22} + \tau_{r33} + \tau_{r44} + \tau_{r55} + \tau_{r66} + \tau_{r77}$, and $\tau_v = \tau_{v0000} + \tau_{v0101} + \tau_{v0202} + \tau_{v0303} + \tau_{v1010} + \tau_{v2020} + \tau_{v3030} + \tau_{v4040} + \tau_{v4141} + \tau_{v4242} + \tau_{v4343} + \tau_{v5050} + \tau_{v6060} + \tau_{v7070}$.

In other words, the total variance is the sum of the variance over the 1st- or customer-level units, σ_{ε}^2, the variance over the 2nd- or firm-level units (the sum of the diagonal elements of $\Sigma_{\underline{r}}$), τ_r, and the variance over the 3rd- or industry-level units (the sum of the diagonal elements of $\Sigma_{\underline{v}}$), τ_v.

Then, the proportion of variance over the customer level is of the form:

$$\frac{\text{Variance over Customer-Level Units}}{\text{Total Variance}} = \frac{\sigma_{\varepsilon}^2}{\sigma_{\varepsilon}^2 + \tau_{\gamma} + \tau_{v}}. \tag{B.2}$$

The proportion of variance over the firm level is defined as:

$$\frac{\text{Variance over Firm-Level Units}}{\text{Total Variance}} = \frac{\tau_{\gamma}}{\sigma_{\varepsilon}^2 + \tau_{\gamma} + \tau_{v}}. \tag{B.3}$$

The proportion of variance over level-3 (industry) units is defined as:

$$\frac{\text{Variance over Industry-Level Units}}{\text{Total Variance}} = \frac{\tau_{v}}{\sigma_{\varepsilon}^2 + \tau_{\gamma} + \tau_{v}}. \tag{B.4}$$

APPENDIX C

COVARIANCE MATRICES FOR SATISFACTION 3-LEVEL HLM

In this satisfaction 3-level HLM, we incorporate heterogeneity in the firm-level characteristics into the 2nd- or firm-level stage of the satisfaction 3-level HLM via:

$$\begin{pmatrix} \beta_{0jk} \\ \beta_{1jk} \\ \beta_{2jk} \\ \beta_{3jk} \end{pmatrix} \sim N \left(\begin{pmatrix} \pi_{00k} + \pi_{01k}\text{Size}_{jk} + \pi_{02k}\text{Advertising}_{jk} \\ +\pi_{03k}\text{No. Brands/Segments}_{jk} \\ \pi_{10k} \\ \pi_{20k} \\ \pi_{30k} \end{pmatrix}, \Sigma_{\underline{r}} \right), \qquad \text{(C.1)}$$

where the firm-level covariance matrix $\Sigma_{\underline{r}}$ is written as following:

$$\Sigma_{\underline{\gamma}} = \begin{bmatrix} \tau_{\gamma 00} & \tau_{\gamma 01} & \tau_{\gamma 02} & \tau_{\gamma 03} \\ \tau_{\gamma 10} & \tau_{\gamma 11} & \tau_{\gamma 12} & \tau_{\gamma 13} \\ \tau_{\gamma 20} & \tau_{\gamma 21} & \tau_{\gamma 22} & \tau_{\gamma 23} \\ \tau_{\gamma 30} & \tau_{\gamma 31} & \tau_{\gamma 32} & \tau_{\gamma 33} \end{bmatrix}. \qquad \text{(C.2)}$$

Then, we incorporate heterogeneity in the industry-level characteristics into the 3rd- or industry-level stage via:

$$\begin{pmatrix} \pi_{00} \\ \pi_{01} \\ \pi_{02} \\ \pi_{03} \\ \pi_{10} \\ \pi_{20} \\ \pi_{30} \end{pmatrix} \sim N \left(\begin{pmatrix} \gamma_{000} + \gamma_{001}\text{Concetration}_k + \gamma_{002}\text{Service}_k + \gamma_{003}\text{Long}_k \\ +\gamma_{004}\text{Demand Growth}_k + \gamma_{005}\text{Demand Instability}_k \\ \gamma_{010} \\ \gamma_{020} \\ \gamma_{030} \\ \gamma_{100} \\ \gamma_{200} \\ \gamma_{300} \end{pmatrix}, \Sigma_{\underline{\nu}} \right), \qquad \text{(C.3)}$$

where the industry-level covariance matrix $\Sigma_{\underline{\nu}}$ is of the form:

$$\Sigma_{\underset{\sim}{v}} = \begin{bmatrix} \tau_{v0000} & \tau_{v0001} & \tau_{v0002} & \tau_{v0003} & \tau_{v0010} & \tau_{v0020} & \tau_{v0030} \\ \tau_{v0100} & \tau_{v0101} & \tau_{v0102} & \tau_{v0103} & \tau_{v0110} & \tau_{v0120} & \tau_{v0130} \\ \tau_{v0200} & \tau_{v0201} & \tau_{v0202} & \tau_{v0203} & \tau_{v0210} & \tau_{v0220} & \tau_{v0230} \\ \tau_{v0300} & \tau_{v0301} & \tau_{v0302} & \tau_{v0303} & \tau_{v0310} & \tau_{v0320} & \tau_{v0330} \\ \tau_{v1000} & \tau_{v1001} & \tau_{v1002} & \tau_{v1003} & \tau_{v1010} & \tau_{v1020} & \tau_{v1030} \\ \tau_{v2000} & \tau_{v2001} & \tau_{v2002} & \tau_{v2003} & \tau_{v2010} & \tau_{v2020} & \tau_{v2030} \\ \tau_{v3000} & \tau_{v3001} & \tau_{v3002} & \tau_{v3003} & \tau_{v3010} & \tau_{v3020} & \tau_{v3030} \end{bmatrix}. \qquad \text{(C.4)}$$

APPENDIX D

COVARIANCE MATRICES FOR 2SLS 3-LEVEL HLM

Our 2SLS 3-level HLM is the same as our 3-level HLM, except for utilizing the predicted satisfaction we obtain by regressing satisfaction on the antecedents of satisfaction in the 2SLS 3-level HLM. Thus, the firm-level covariance matrix Σ_{γ} can be defined as the following:

$$\Sigma_{\gamma} = \begin{bmatrix} \tau_{\gamma 00} & \tau_{\gamma 01} & \tau_{\gamma 02} & \tau_{\gamma 03} & \tau_{\gamma 04} & \tau_{\gamma 05} & \tau_{\gamma 06} & \tau_{\gamma 07} \\ \tau_{\gamma 10} & \tau_{\gamma 11} & \tau_{\gamma 12} & \tau_{\gamma 13} & \tau_{\gamma 14} & \tau_{\gamma 15} & \tau_{\gamma 16} & \tau_{\gamma 17} \\ \tau_{\gamma 20} & \tau_{\gamma 21} & \tau_{\gamma 22} & \tau_{\gamma 23} & \tau_{\gamma 24} & \tau_{\gamma 25} & \tau_{\gamma 26} & \tau_{\gamma 27} \\ \tau_{\gamma 30} & \tau_{\gamma 31} & \tau_{\gamma 32} & \tau_{\gamma 33} & \tau_{\gamma 34} & \tau_{\gamma 35} & \tau_{\gamma 36} & \tau_{\gamma 37} \\ \tau_{\gamma 40} & \tau_{\gamma 41} & \tau_{\gamma 42} & \tau_{\gamma 43} & \tau_{\gamma 44} & \tau_{\gamma 45} & \tau_{\gamma 46} & \tau_{\gamma 47} \\ \tau_{\gamma 50} & \tau_{\gamma 51} & \tau_{\gamma 52} & \tau_{\gamma 53} & \tau_{\gamma 54} & \tau_{\gamma 55} & \tau_{\gamma 56} & \tau_{\gamma 57} \\ \tau_{\gamma 60} & \tau_{\gamma 61} & \tau_{\gamma 62} & \tau_{\gamma 63} & \tau_{\gamma 64} & \tau_{\gamma 65} & \tau_{\gamma 66} & \tau_{\gamma 67} \\ \tau_{\gamma 70} & \tau_{\gamma 71} & \tau_{\gamma 72} & \tau_{\gamma 73} & \tau_{\gamma 74} & \tau_{\gamma 75} & \tau_{\gamma 76} & \tau_{\gamma 77} \end{bmatrix}. \quad \text{(D.1)}$$

Also, the industry-level covariance matrix Σ_{ν} can be written as:

$$\Sigma_{\nu} = \begin{bmatrix} \tau_{v0000} & \tau_{v0001} & \tau_{v0002} & \tau_{v0003} & \tau_{v0010} & \tau_{v0020} & \tau_{v0030} & \tau_{v0040} & \tau_{v0041} & \tau_{v0042} & \tau_{v0043} & \tau_{v0050} & \tau_{v0060} & \tau_{v0070} \\ \tau_{v0100} & \tau_{v0101} & \tau_{v0102} & \tau_{v0103} & \tau_{v0110} & \tau_{v0120} & \tau_{v0130} & \tau_{v0140} & \tau_{v0141} & \tau_{v0142} & \tau_{v0143} & \tau_{v0150} & \tau_{v0160} & \tau_{v0170} \\ \tau_{v0200} & \tau_{v0201} & \tau_{v0202} & \tau_{v0203} & \tau_{v0210} & \tau_{v0220} & \tau_{v0230} & \tau_{v0240} & \tau_{v0241} & \tau_{v0242} & \tau_{v0243} & \tau_{v0250} & \tau_{v0260} & \tau_{v0270} \\ \tau_{v0300} & \tau_{v0301} & \tau_{v0302} & \tau_{v0303} & \tau_{v0310} & \tau_{v0320} & \tau_{v0330} & \tau_{v0340} & \tau_{v0341} & \tau_{v0342} & \tau_{v0343} & \tau_{v0350} & \tau_{v0360} & \tau_{v0370} \\ \tau_{v1000} & \tau_{v1001} & \tau_{v1002} & \tau_{v1003} & \tau_{v1010} & \tau_{v1020} & \tau_{v1030} & \tau_{v1040} & \tau_{v1041} & \tau_{v1042} & \tau_{v1043} & \tau_{v1050} & \tau_{v1060} & \tau_{v1070} \\ \tau_{v2000} & \tau_{v2001} & \tau_{v2002} & \tau_{v2003} & \tau_{v2010} & \tau_{v2020} & \tau_{v2030} & \tau_{v2040} & \tau_{v2041} & \tau_{v2042} & \tau_{v2043} & \tau_{v2050} & \tau_{v2060} & \tau_{v2070} \\ \tau_{v3000} & \tau_{v3001} & \tau_{v3002} & \tau_{v3003} & \tau_{v3010} & \tau_{v3020} & \tau_{v3030} & \tau_{v3040} & \tau_{v3041} & \tau_{v3042} & \tau_{v3043} & \tau_{v3050} & \tau_{v3060} & \tau_{v3070} \\ \tau_{v4000} & \tau_{v4001} & \tau_{v4002} & \tau_{v4003} & \tau_{v4010} & \tau_{v4020} & \tau_{v4030} & \tau_{v4040} & \tau_{v4041} & \tau_{v4042} & \tau_{v4043} & \tau_{v4050} & \tau_{v4060} & \tau_{v4070} \\ \tau_{v4100} & \tau_{v4101} & \tau_{v4102} & \tau_{v4103} & \tau_{v4110} & \tau_{v4120} & \tau_{v4130} & \tau_{v4140} & \tau_{v4141} & \tau_{v4142} & \tau_{v4143} & \tau_{v4150} & \tau_{v4160} & \tau_{v4170} \\ \tau_{v4200} & \tau_{v4201} & \tau_{v4202} & \tau_{v4203} & \tau_{v4210} & \tau_{v4220} & \tau_{v4230} & \tau_{v4240} & \tau_{v4241} & \tau_{v4242} & \tau_{v4243} & \tau_{v4250} & \tau_{v4260} & \tau_{v4270} \\ \tau_{v4300} & \tau_{v4301} & \tau_{v4302} & \tau_{v4303} & \tau_{v4310} & \tau_{v4320} & \tau_{v4330} & \tau_{v4340} & \tau_{v4341} & \tau_{v4342} & \tau_{v4343} & \tau_{v4350} & \tau_{v4360} & \tau_{v4370} \\ \tau_{v5000} & \tau_{v5001} & \tau_{v5002} & \tau_{v5003} & \tau_{v5010} & \tau_{v5020} & \tau_{v5030} & \tau_{v5040} & \tau_{v5041} & \tau_{v5042} & \tau_{v5043} & \tau_{v5050} & \tau_{v5060} & \tau_{v5070} \\ \tau_{v6000} & \tau_{v6001} & \tau_{v6002} & \tau_{v6003} & \tau_{v6010} & \tau_{v6020} & \tau_{v6030} & \tau_{v6040} & \tau_{v6041} & \tau_{v6042} & \tau_{v6043} & \tau_{v6050} & \tau_{v6060} & \tau_{v6070} \\ \tau_{v7000} & \tau_{v7001} & \tau_{v7002} & \tau_{v7003} & \tau_{v7010} & \tau_{v7020} & \tau_{v7030} & \tau_{v7040} & \tau_{v7041} & \tau_{v7042} & \tau_{v7043} & \tau_{v7050} & \tau_{v7060} & \tau_{v7070} \end{bmatrix}. \quad \text{(D.2)}$$

APPENDIX E

JACKKNIFE PROCEDURE FOR STANDARD ERROR CORRECTION

As suggested by the economics literature (e.g., Ackerberg and Devereux 2009 and Angrist et al. 1999), the conventional standard error estimates of the 3-level HLM model are not correct when implementing 2SLS. No exact analytical formula for the standard error estimates incorporating the 2SLS procedure exists when a 2SLS 3-level HLM model is estimated – although there exists an exact unbiased standard error formula for a usual 2SLS OLS. In order to alleviate the bias for the standard error estimates, we estimate the standard errors of our 2SLS 3-level HLM via a jackknife procedure (see Huber and Stanig 2011).

The procedure generating the bias-corrected jackknife standard error estimates using jackknife resampling (especially, delete-one jackknife resampling) is as follows:

- First, we generate *N* sets (or blocks) of pseudo-data by resampling. For this purpose, we divide the 3-level structure of our dataset – consisting of 15,846 customers from 66 firms within 13 industries – into 100 subgroups (or blocks). Therefore, *N* is 100 in this case.
- For illustration, let $\hat{\alpha}_1$ be the coefficient estimate of α_1 (e.g., the coefficient of age) for a sample of size *N* (i.e., the whole data) obtained from estimating our 2SLS 3-level HLM model, equations (3.5) through (3.8).
- Next, we compute *N* jackknife coefficient estimates of $\hat{\alpha}_1$ obtained by successively taking out one subgroup and re-computing $\hat{\alpha}_1$. Let $\hat{\alpha}_{1(i)}, i = 1, 2, \dots, N$, denote each of these *N* estimates. More specifically, $\hat{\alpha}_{1(1)}$ is the jackknife coefficient estimate of $\hat{\alpha}_1$ obtained by estimating our 2SLS 3-level

HLM to a subsample holding out the first block. $\hat{\alpha}_{1(100)}$ is the one obtained by estimating our model to a subsample taking out the last block. We repeat this run *N* times to obtain the *N* jackknife coefficient estimates of $\hat{\alpha}_1$.

- Let $\hat{\alpha}_{1(\cdot)} = \sum_{i=1}^{N} {\hat{\alpha}_{1(i)}}/{N}$ be the average of these *N* estimates. The i^{th} pseudo-value is defined as:

  $$PV_{(i)} = N\hat{\alpha}_1 - (N-1)\hat{\alpha}_{1(i)}, \quad \text{(E.1)}$$

  where each pseudo-value can be regarded as an estimate of α_1.

- Then, the bias-corrected jackknife estimate of α_1, $\hat{\alpha}_{1\text{jack}}$, is the average of these *N* pseudo-values, which is defined as:

  $$\hat{\alpha}_{1\text{jack}} = PV_{(\cdot)} = \frac{1}{N}\sum_{i=1}^{N}\left(N\hat{\alpha}_1 - (N-1)\hat{\alpha}_{1(i)}\right) = N\hat{\alpha}_1 - (N-1)\hat{\alpha}_{1(\cdot)}. \quad \text{(E.2)}$$

- This suggests that the jackknife standard error of $\hat{\alpha}_{1jack}$, $\text{s.e}\left(\hat{\alpha}_{1\text{jack}}\right)$, is as follows (Efron and Tibshirani 1993):

  $$\text{s.e}\left(\hat{\alpha}_{1\text{jack}}\right) = \sqrt{\frac{1}{N(N-1)}\sum_{i=1}^{N}\left(PV_{(i)} - PV_{(\cdot)}\right)^2} = \sqrt{\frac{N-1}{N}\sum_{i=1}^{N}\left(\hat{\alpha}_{1(i)} - \hat{\alpha}_{1(\cdot)}\right)^2}. \quad \text{(E.3)}$$

- Finally, we obtain the bias-corrected jackknife standard error estimates of the other customer-, firm-, and industry-level covariates via this jackknife procedure described above. Table G12 reports these estimates.

APPENDIX F

PSEUDO R^2 FOR 3-LEVEL HLM

To assess the predictive power of our HLM models, we compute the pseudo R^2 values of these models, since we are unlikely to compute a true R^2 value in HLM models, as suggested by the statistics literature (Snijders and Bosker 1999).

The pseudo R^2 of a current HLM model (Kreft and de Leeuw 1988; Singer 1998) is defined as the following:

$$\frac{(\sigma^2_{\varepsilon\text{NULL}} - \sigma^2_{\varepsilon\text{CURRENT}})}{\sigma^2_{\varepsilon\text{NULL}}}, \tag{F.1}$$

where $\sigma^2_{\varepsilon\text{NULL}}$denotes the customer-level variance of the null model that does not include any covariates, and $\sigma^2_{\varepsilon\text{CURRENT}}$ is the customer-level variance of the current model. For example, we compute the pseudo R^2 for Model 1 in Table G9 via:

$$\frac{(\sigma^2_{\varepsilon\text{NULL}} - \sigma^2_{\varepsilon\text{MODEL1}})}{\sigma^2_{\varepsilon\text{NULL}}}, \tag{F.2}$$

where $\sigma^2_{\varepsilon\text{MODEL1}}$ is σ^2_{ε} in equation (F.3) – the customer-level variance of Model 1, equations (F.3) through (F.5).

Model 1 is of the form:

$$\begin{aligned} \text{Loyalty}_{ijk} = &\left(\alpha_{0jk} + \alpha_{1jk}\text{Age}_{ijk} + \alpha_{2jk}\text{Gender}_{ijk} + \alpha_{3jk}\text{SES}_{ijk}\right) + \\ &\left(\beta_{0jk} + \beta_{1jk}\text{Age}_{ijk} + \beta_{2jk}\text{Gender}_{ijk} + \beta_{3jk}\text{SES}_{ijk}\right) \times \text{Satisfaction}_{ijk} + \varepsilon_{ijk}, \\ &\varepsilon_{ijk} \sim N(0, \sigma^2_{\varepsilon}), \end{aligned} \tag{F.3}$$

$$
\begin{aligned}
\alpha_{0jk} &= \pi_{00k} + r_{0jk}, \\
\alpha_{1jk} &= \pi_{10k} + r_{1jk}, \\
\alpha_{2jk} &= \pi_{20k} + r_{2jk}, \\
\alpha_{3jk} &= \pi_{30k} + r_{3jk}, \\
\beta_{0jk} &= \pi_{40k} + r_{4jk}, \\
\beta_{1jk} &= \pi_{50k} + r_{5jk}, \\
\beta_{2jk} &= \pi_{60k} + r_{6jk}, \\
\beta_{3jk} &= \pi_{70k} + r_{7jk}, \\
\underset{\sim}{r} &\sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{r}}),
\end{aligned}
\tag{F.4}
$$

$$
\begin{aligned}
\pi_{00k} &= \gamma_{000} + \nu_{00k}, \\
\pi_{10k} &= \gamma_{100} + \nu_{10k}, \\
\pi_{20k} &= \gamma_{200} + \nu_{20k}, \\
\pi_{30k} &= \gamma_{300} + \nu_{30k}, \\
\pi_{40k} &= \gamma_{400} + \nu_{40k}, \\
\pi_{50k} &= \gamma_{500} + \nu_{50k}, \\
\pi_{60k} &= \gamma_{600} + \nu_{60k}, \\
\pi_{70k} &= \gamma_{700} + \nu_{70k}, \\
\underset{\sim}{\nu} &\sim N(\underset{\sim}{0}, \Sigma_{\underset{\sim}{\nu}}),
\end{aligned}
\tag{F.5}
$$

APPENDIX G

TABLES AND FIGURES

Table G1 Research on Moderating Effects of Competitive Setting Heterogeneity

		Customer Loyalty Level	Satisfaction-Loyalty Association
Customer Characteristics			
Age		Verhoef & Donkers (2005) (+) (O) Patterson (2007) (+) (S & O) Lambert-Pandraud et al. (2005) (+) (O) Mittal & Kamakura (2001) (+) (O)	N/A
Gender (Male vs. Female)		Verhoef & Donkers (2005) (+) (O) Mittal & Kamakura (2001) (+) (O) Patterson (2007) (NS) (S & O)	N/A
SES	Income	Shankar et al. (2003) (+) (O) Verhoef & Donkers (2005) (+) (O) Keaveney & Parthasarathy (2001) (+) (S)	N/A
	Education	Mittal & Kamakura (2001) (-) (O)	
Firm Characteristics			
Firm Size		N/A	N/A
Advertising		N/A	N/A
No. Brands/Segments		N/A	N/A
Industry Characteristics			
Concentration (HHI)		Anderson (1994) (+) (S)	Anderson (1994) (↓) (S) Gronholdt et al. (2000) (↓) (S) Voss et al. (2010) (↓) (O)
Goods vs. Services		Anderson (1994) (+) (S)	Anderson (1994) (↓) (S) Gronholdt et al. (2000) (↓) (S)
Short vs. Long Cycle		Anderson (1994) (-) (S) Keaveney & Parthasarathy (2001) (-) (S)	Anderson (1994) (↑) (S)
Demand Growth		N/A	N/A
Demand Variability		N/A	N/A

Note: N/A indicates that there exists no research.

Note: ↑ indicates increasing the sensitivity, and ↓ indicates decreasing the sensitivity of the strength of the satisfaction-loyalty link.

Note: S denotes surveyed satisfaction or loyalty (repurchase intention), and O denotes observed loyalty (actual repurchase behavior).

Table G2 Hypotheses Summary

Covariates		Expected Impact on	
		Intercept	Slope
Customer Covariates	Age	+ (H1a)	- (H1b)
	Gender (Male-Female)	+ (H2a)	- (H2b)
	SES	- (H3a)	+ (H3b)
Firm Covariates	Firm Size	+ (H4a)	- (H4b)
	Advertising	- (H5a)	+ (H5b)
	No. Brands/ No. Segments	+ (H6a)	- (H6b)
Industry Covariates	Concentration	+ (H7a)	- (H7b)
	Goods-Services	+ (H8a)	- (H8b)
	Short-Long Cycle	- (H9a)	+ (H9b)
	Demand Growth	*	*
	Demand Instability	*	*

Note: + denotes expected positive/larger association, - denotes expected negative/smaller association, and * indicates no formal hypothesis constructed.

Note: H1a means that age increases so does the level of baseline loyalty, H2b indicates that the slope parameter is lower for females, H7a means that loyalty is expected to be higher in more concentrated industries, and H9a suggests that loyalty is expected to be lower in longer inter-purchase cycle industries.

Table G3 Customer-Level Descriptive Statistics

Customer-Level Variables	Mean	Std. Error	Std. Deviation	Min.	Median	Max.
Loyalty	74.329	0.214	26.908	0	83.016	100
Age	48.030	0.121	15.182	18	48.000	84
Gender	0.596	0.004	0.491	0	1.000	1
Income	4.401	0.016	1.961	1	4.000	7
Education	3.373	0.009	1.112	1	3.000	5
Satisfaction	78.966	0.150	18.913	0	82.639	100
Satisfaction*Age	3,843.754	13.152	1,655.568	0	3,700.000	8400
Satisfaction*Gender	48.027	0.334	42.067	0	64.246	100
Satisfaction*Income	343.331	1.370	172.443	0	344.508	700
Satisfaction*Education	263.269	0.822	103.440	0	262.502	500

Note: The number of observations is 15,846.

Table G4 Firm-Level Descriptive Statistics

Firm-Level Variables	Mean	Std. Error	Std. Deviation	Min.	Median	Max.
Firm Size (natural log)	9.647	0.182	1.481	6.886	9.437	13.529
Advertising-Sales Ratio	0.040	0.005	0.043	0.003	0.026	0.257
R&D-Sales Ratio	0.015	0.002	0.017	0.000	0.009	0.059
No. Brands	17.773	2.538	20.617	1.000	9.000	79.000
No. Segments (natural log)	1.133	0.123	0.998	0.000	0.896	4.159

Note: The number of observations is 66.

Table G5 Industry-Level Descriptive Statistics

Industry-Level Variables	Mean	Std. Error	Std. Deviation	Min.	Median	Max.
Concentration (HHI)	0.206	0.044	0.160	0.063	0.161	0.626
Goods-Service Dummy	0.231	0.122	0.439	0.000	0.000	1.000
Short-Long Cycle Dummy	0.462	0.144	0.519	0.000	0.000	1.000
3-Year Demand Growth	0.074	0.008	0.029	-0.006	0.078	0.118
3-Year Demand Instability	0.046	0.010	0.037	0.014	0.033	0.129

Note: The number of observations is 13.

Table G6 Customer-Level Correlations

Customer-Level Variables	1	2	3	4	5	6	7	8
1. Loyalty	1.000							
2. Age	0.119**	1.000						
3. Gender	0.070**	0.010	1.000					
4. SES	-0.131**	0.000	-0.125**	1.000				
5. Satisfaction	0.608**	0.173**	0.100**	-0.148**	1.000			
6. Satisfaction*Age	-0.050**	0.074**	0.002	-0.098**	-0.078**	1.000		
7. Satisfaction*Gender	0.011	0.002	-0.039**	-0.014	-0.018	0.014**	1.000	
8. Satisfaction*SES	0.011	-0.094**	-0.014	0.036**	0.006**	0.079**	-0.101**	1.000

Note: The number of observations is 15,846.

Note: ** = $p<0.05$

Note: Age and SES are factor score variables created via a factor analysis.
Age=0.999*Age
SES =0.852*Income+0.854*Education

Table G7 Firm-Level Correlations

Firm-Level Variables	1	2	3
1. Firm Size	1.000		
2. Advertising	0.000	1.000	
3. No. Brands/ No. Segments	0.000	0.000	1.000

Note: The number of observations is 66.

Note: ** = $p<0.05$

Note: These firm-level variables are factor score variables that we create via a factor analysis.
Firm Size=0.773*Assets+0.845*R&D
Advertising=0.934* Advertising-Sales Ratio
No. Brands/ No. Segments=0.873*No.Brands+0.926*No.Segments

Table G8 Industry-Level Correlations

Industry-Level Variables	1	2	3	4	5
1. Concentration (HHI)	1.000				
2. Goods-Service Dummy	-0.286	1.000			
3. Short- Long Cycle Dummy	0.025	0.592**	1.000		
4. 3-Year Demand Growth	0.031	-0.429	-0.348	1.000	
5. 3-Year Demand Instability	0.214	-0.293	-0.068	-0.187	1.000

Note: The number of observations is 13.

Note: ** = $p<0.05$

Table G9 Hierarchical Linear Model Estimates

Estimates		Model 0	Model 1	Model 2	Model 3 - Full HLM
Level-1 (Customer)					
Intercept Effects	α_0	10.868**	10.216**	13.482*	-5.671*
Age	α_1		0.332	0.353	0.407
Gender	α_2		0.593	0.641	0.689
SES	α_3		-0.139	-0.165	-0.209
Satisfaction Effects					
Satisfaction	β_0	0.821**	0.824**	0.798**	0.969**
Satisfaction*Age	β_1		0.008	0.009	0.010
Satisfaction*Gender	β_2		0.047*	0.046*	0.037
Satisfaction*SES	β_3		0.025**	0.028**	0.026**
Level-2 (Firm)					
Firm Size	π_{01}			3.866*	5.356**
Advertising	π_{02}			-1.198	-2.665
No. Brands/ No. Segments	π_{03}			9.419*	12.343**
Firm size	π_{41}			-0.050**	-0.065**
Advertising	π_{42}			0.015	0.028
No. Brands/ No. Segments	π_{43}			-0.066**	-0.097**
Level-3 (Industry)					
Concentration (HHI)	γ_{001}				20.330**
Goods-Services Dummy	γ_{002}				38.338**
Short- Long Cycle Dummy	γ_{003}				-24.033**
3-Year Demand Growth	γ_{004}				14.559**
3-Year Demand Instability	γ_{005}				17.099**
Concentration (HHI)	γ_{401}				-0.161**
Goods-Services Dummy	γ_{402}				-0.358**
Short- Long Cycle Dummy	γ_{403}				0.215**
3-Year Demand Growth	γ_{404}				-0.127**
3-Year Demand Instability	γ_{405}				-0.177**
Variance Partitioning					
Level-1 (Customer) (%)		54.923	56.297	43.765	52.249
Level-2 (Firm) (%)		10.742	11.072	5.207	6.433
Level-3 (Industry) (%)		34.335	32.631	51.028	41.318
Log-Likelihood Value	*lnL*	-70,380.3	-70,233.6	-70,223.3	-70,212.0
No. of Parameters	*k*	9	81	156	166
AIC[1]		140,778.7	140,629.3	140,758.6	140,756.1
Pseudo R^2 (%)		43.074	43.772	43.800	43.813

Note: ** = $p<0.05$, * = $p<0.10$

[1] denotes Akaike Information Criterion values computed via *-2lnL+2k*

Table G10 Full HLM Estimates Versus Hypotheses Prediction

Estimates		Model 3	Prediction
Level-1 (Customer)			
Intercept Effects	α_0	-5.671*	
Age	α_1	0.407	(+)
Gender	α_2	0.689	(+)
SES	α_3	-0.209	(-)
Satisfaction Effects			
Satisfaction	β_0	0.969**	
Satisfaction*Age	β_1	0.010	(-)
Satisfaction*Gender	β_2	0.037	(-)
Satisfaction*SES	β_3	0.026**	(+)
Level-2 (Firm)			
Intercept Effects			
Firm Size	π_{01}	5.356**	(+)
Advertising	π_{02}	-2.665	(-)
No. Brands/ No. Segments	π_{03}	12.343**	(+)
Satisfaction Effects			
Firm size	π_{41}	-0.065**	(-)
Advertising	π_{42}	0.028	(+)
No. Brands/ No. Segments	π_{43}	-0.097**	(-)
Level-3 (Industry)			
Intercept Effects			
Concentration (HHI)	γ_{001}	20.330**	(+)
Goods-Services Dummy	γ_{002}	38.338**	(+)
Short- Long Cycle Dummy	γ_{003}	-24.033**	(-)
3-Year Demand Growth	γ_{004}	14.559**	
3-Year Demand Instability	γ_{005}	17.099**	
Satisfaction Effects			
Concentration (HHI)	γ_{401}	-0.161**	(-)
Goods-Services Dummy	γ_{402}	-0.358**	(-)
Short- Long Cycle Dummy	γ_{403}	0.215**	(+)
3-Year Demand Growth	γ_{404}	-0.127**	
3-Year Demand Instability	γ_{405}	-0.177**	

Note: ** = $p<0.05$, * = $p<0.10$

Table G11 Satisfaction HLM Estimates

Estimates		SAT HLM	Empirical Prediction[1]	Theoretical Prediction[2]
Level-1 (Customer)				
Intercept	μ_0	75.943**		
Age	μ_1	2.708**	(+)	(-)
Gender	μ_2	3.042**	(+)	(-)
SES	μ_3	-2.248**	(+)	(+)
Level-2 (Firm)				
Firm Size	π_{01}	0.150	(-)	(-)
Advertising	π_{02}	1.233**	(+)	(+)
No. Brands/ No. Segments	π_{03}	0.583	(-)	(-)
Level-3 (Industry)				
Concentration (HHI)	γ_{001}	-0.395	(-)	(-)
Goods-Services Dummy	γ_{002}	-0.480	(-)	(-)
Short- Long Cycle Dummy	γ_{003}	0.354	(+)	(+)
3-Year Demand Growth	γ_{004}	-3.635**	(-)	?
3-Year Demand Instability	γ_{005}	-0.162	(-)	?

Note: ** = $p<0.05$, * = $p<0.10$

Note: ? indicates that no formal hypothesis is constructed.

[1] Denotes predictions based upon the empirical slope (β) estimates in Table G10

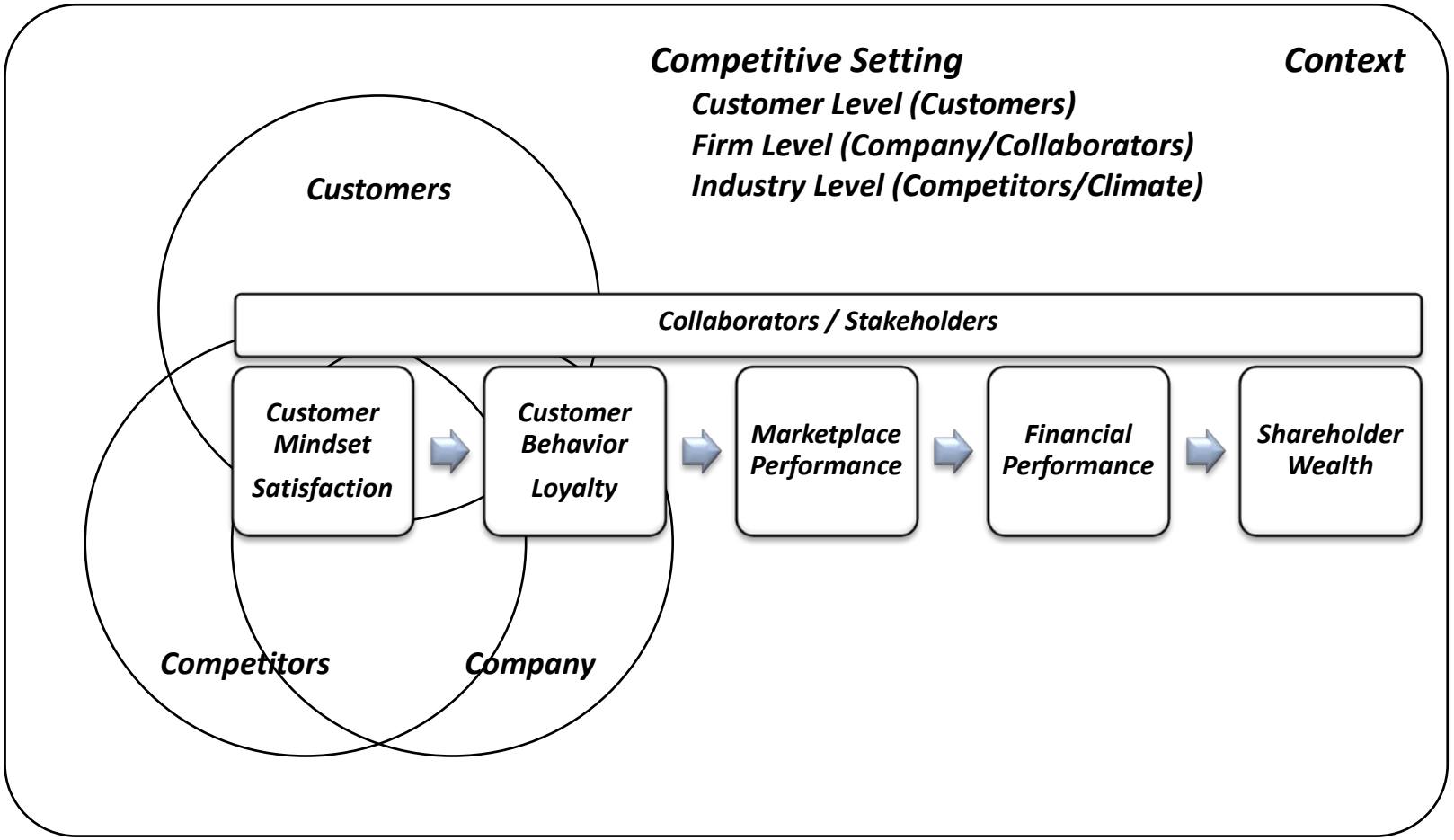
[2] Denotes predictions based upon the slope hypotheses in Table G2

Table G12: Estimates of Full HLM and 2SLS Full HLM

Estimates		Full HLM	Full 2SLS HLM	Prediction
Level-1 (Customer)				
Intercept Effects	α_0	-5.671*	-6.982	
Age	α_1	0.407	0.832**	(+)
Gender	α_2	0.689	0.632**	(+)
SES	α_3	-0.209	-1.207**	(-)
Satisfaction Effects				
Satisfaction	β_0	0.969**	1.010**	
Satisfaction*Age	β_1	0.010	0.004	(-)
Satisfaction*Gender	β_2	0.037	0.016	(-)
Satisfaction*SES	β_3	0.026**	0.038**	(+)
Level-2 (Firm)				
Intercept Effects				
Firm Size	π_{01}	5.356**	9.389**	(+)
Advertising	π_{02}	-2.665	-3.305**	(-)
No. Brands/ No. Segments	π_{03}	12.343**	10.639*	(+)
Satisfaction Effects				
Firm size	π_{41}	-0.065**	-0.107**	(-)
Advertising	π_{42}	0.028	0.034**	(+)
No. Brands/ No. Segments	π_{43}	-0.097**	-0.087*	(-)
Level-3 (Industry)				
Intercept Effects				
Concentration (HHI)	γ_{001}	20.330**	20.663**	(+)
Goods-Services Dummy	γ_{002}	38.338**	43.926**	(+)
Short- Long Cycle Dummy	γ_{003}	-24.033**	-30.807**	(-)
3-Year Demand Growth	γ_{004}	14.559**	9.348	
3-Year Demand Instability	γ_{005}	17.099**	14.501**	
Satisfaction Effects				
Concentration (HHI)	γ_{401}	-0.161**	-0.165**	(-)
Goods-Services Dummy	γ_{402}	-0.358**	-0.423**	(-)
Short- Long Cycle Dummy	γ_{403}	0.215**	0.283**	(+)
3-Year Demand Growth	γ_{404}	-0.127**	-0.084	
3-Year Demand Instability	γ_{405}	-0.177**	-0.164**	

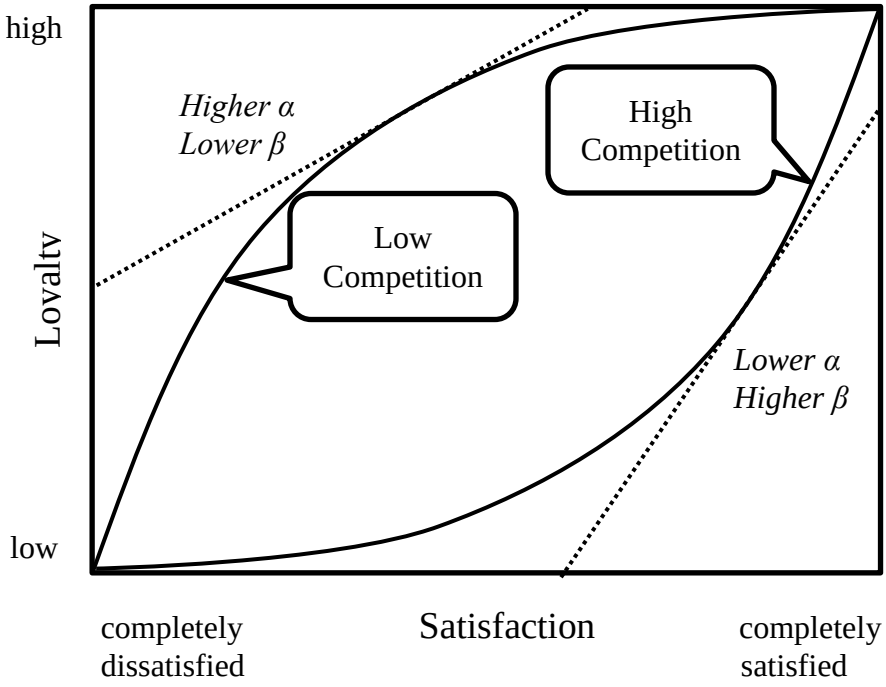
Note: ** = $p<0.05$, * = $p<0.10$

Figure G1 Augmented Value Chain



Note: Adopted from Srivastava et al. (1998) conceptual framework

Figure G2 Competitive Conditions and the Shape of Curves



Note: Adopted from Jones and Sasser (1995) conceptual graph

Figure G3 Trade-off Pattern between Intercept and Slope for Airlines and Automobiles

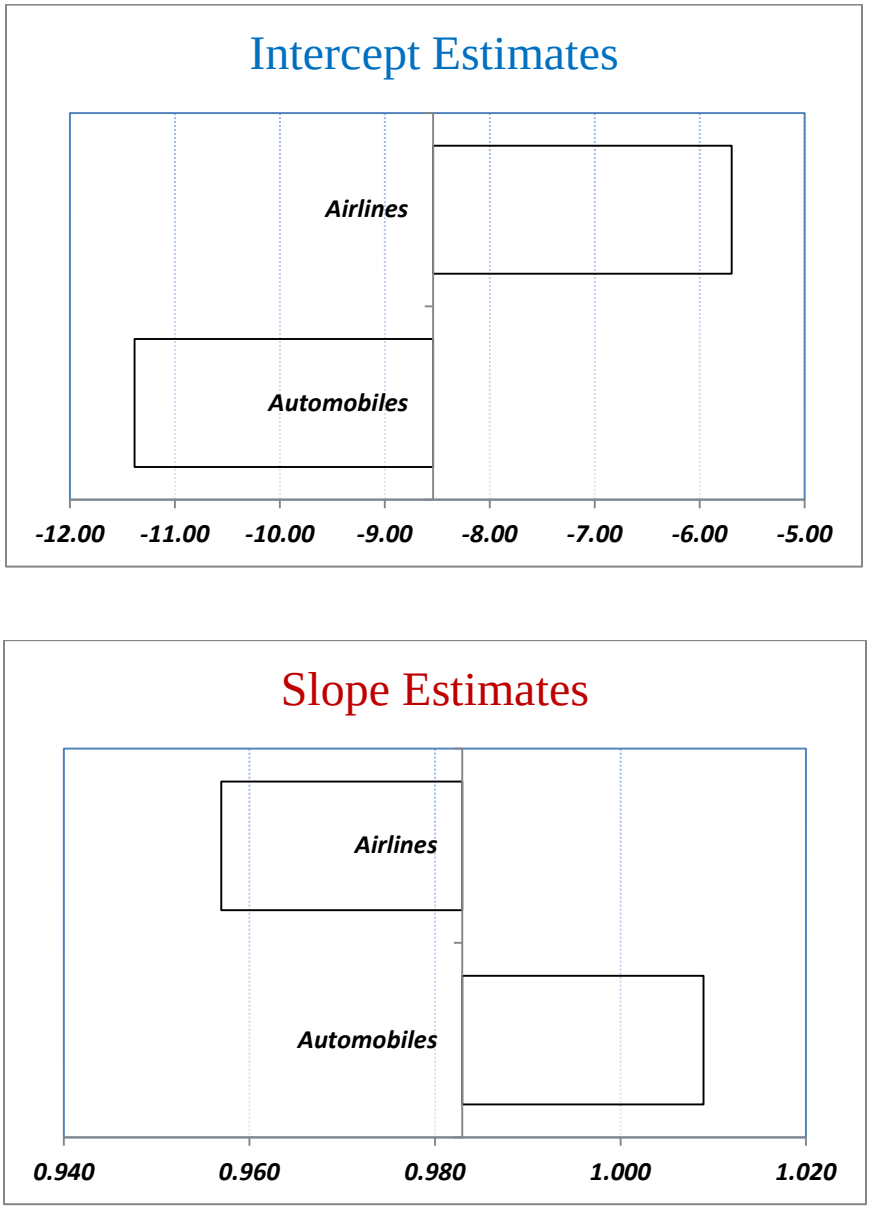
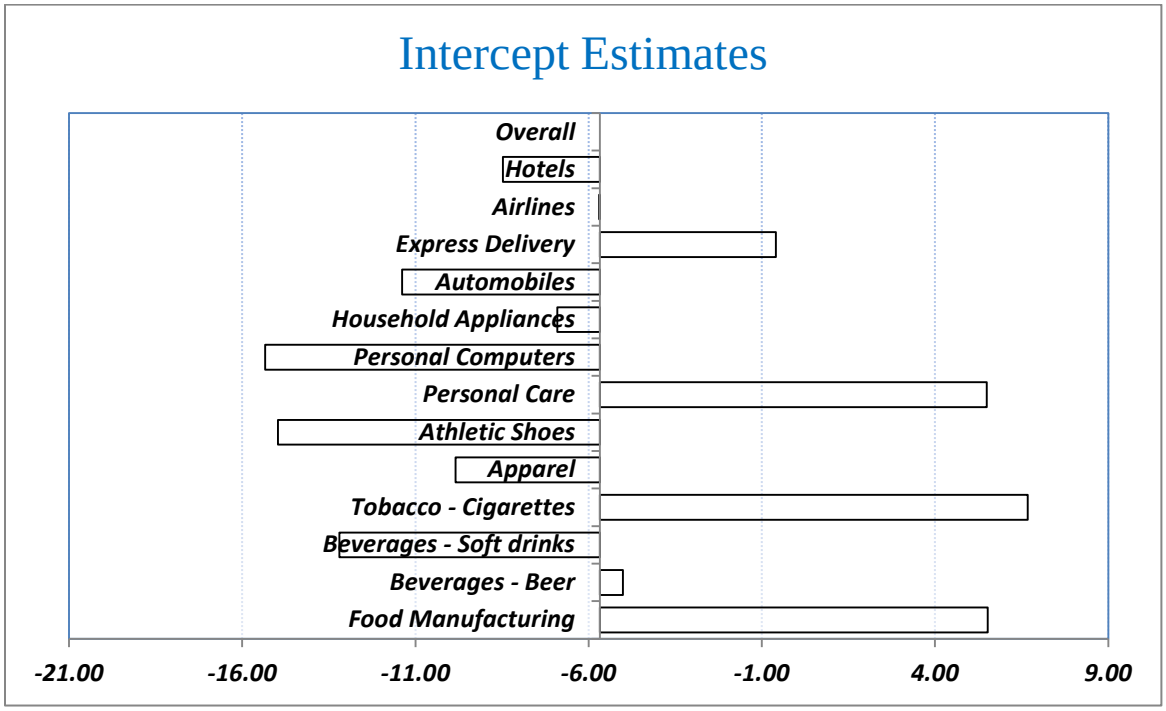


Figure G4 Industry-Level Intercept and Slope Estimates



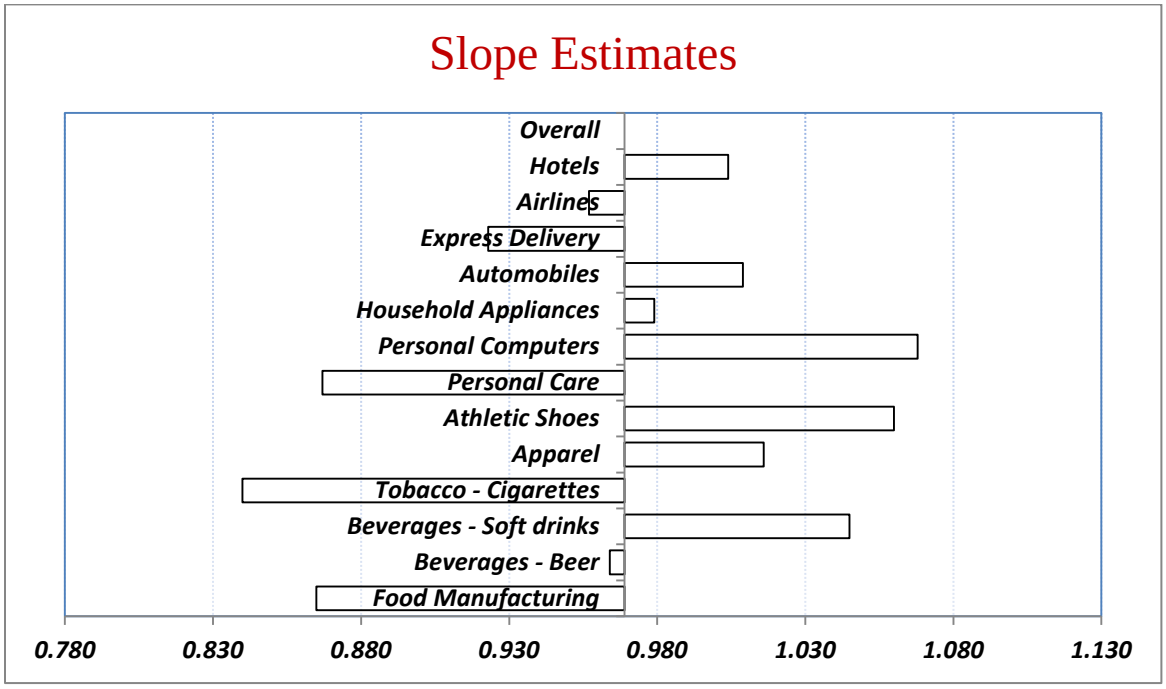


Figure G5 Trade-off Pattern in Industry-Level Estimates for α_0 and β_0 Sorted by HHI

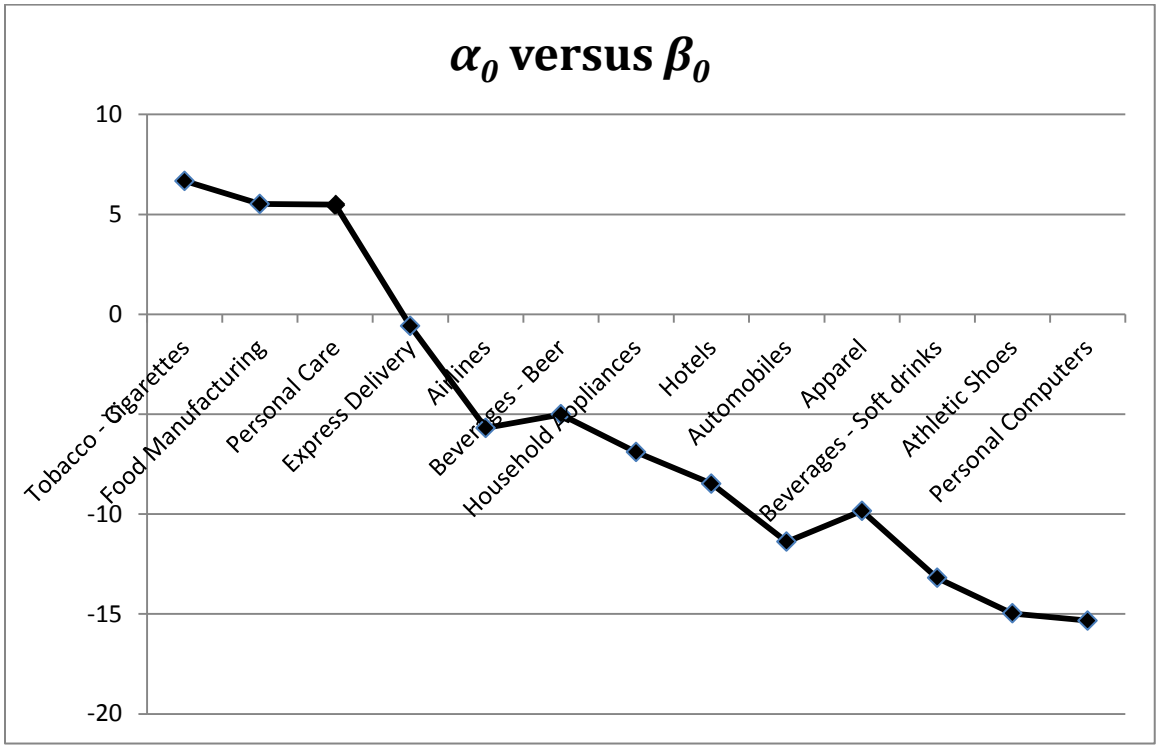


Figure G6 Logit(Satisfaction) Versus Firm-Level Slope (66 Firms)

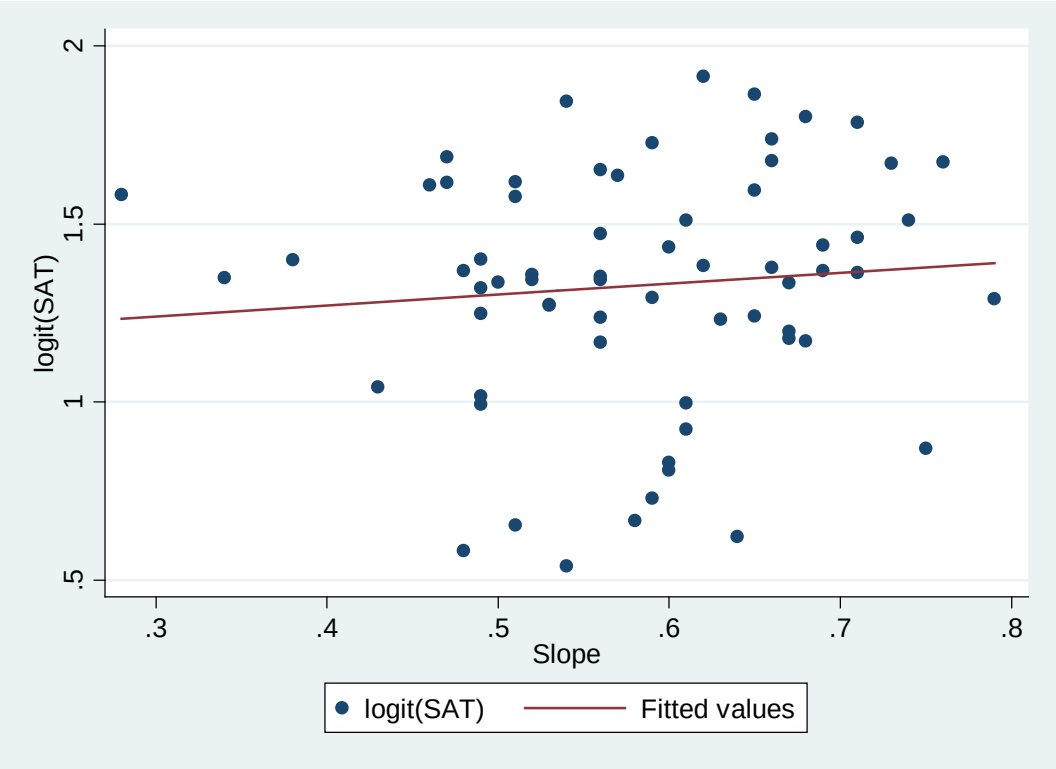


Figure G7 Logit(Satisfaction) Versus Firm-Level Slope (63 Firms)

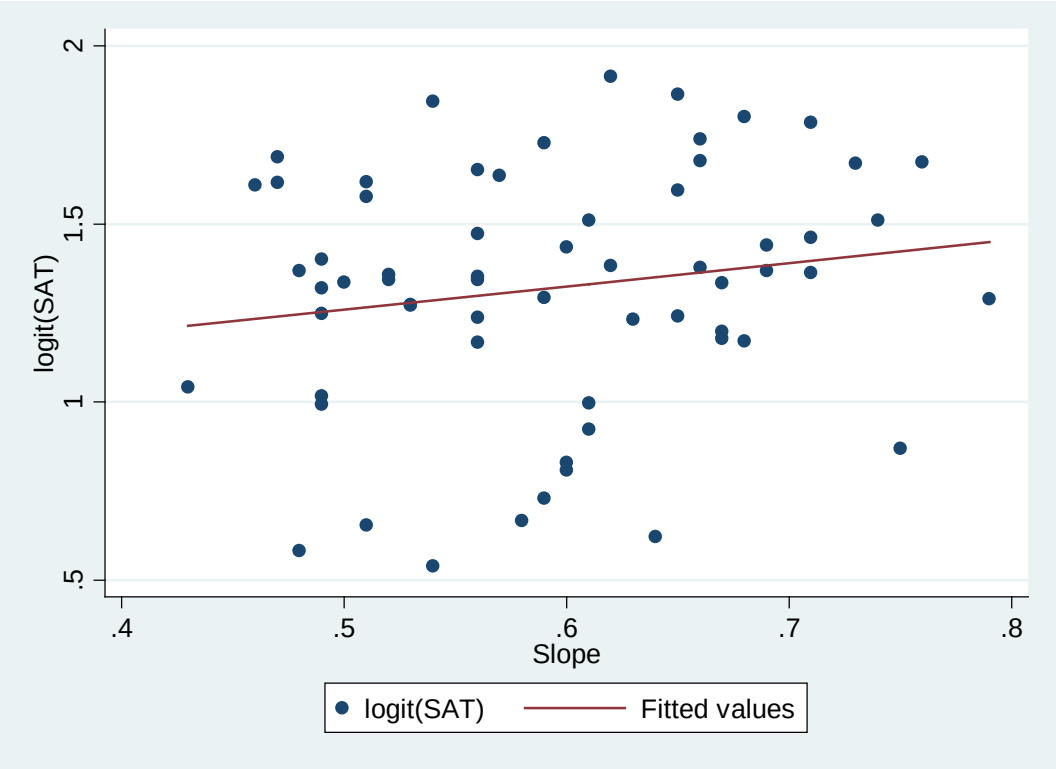
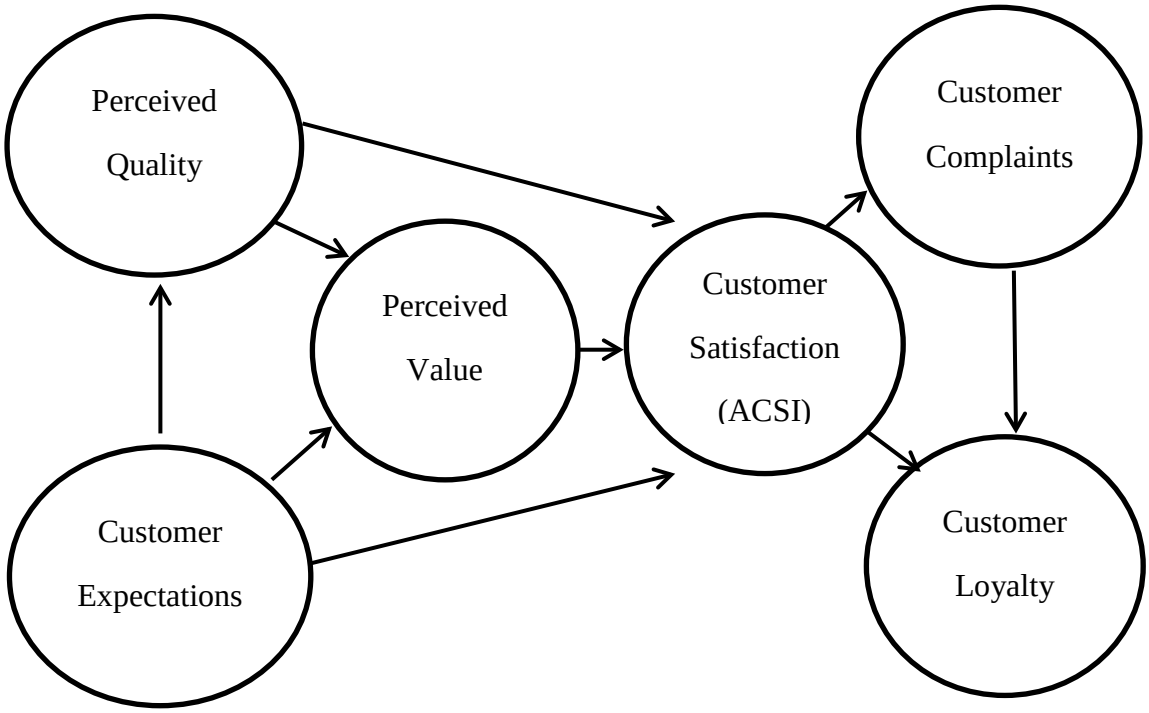


Figure G8 Structure of ACSI



Note: Adopted from Fornell et al. (1996)

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