Relevance of Customer Satisfaction Measures in a Setting with Multiple Customer Groups: Evidence from a Health Insurance Company

Clara Xiaoling Chen

University of Illinois at Urbana-Champaign
Champaign, IL 61820
cxchen@uiuc.edu

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Abstract

This study examines the following research question in a setting with multiple customer groups: What determines the relevance of customer satisfaction measures? I obtain a proprietary database from a leading health insurance company that measures satisfaction levels of multiple customer groups, including: (a) clients that purchase insurance plans for their employees, (b) patients who use the insurance plans, and (c) doctors who provide medical services. I measure relevance in this context as the strength of the relation between different customer satisfaction measures and future revenues. Using structural equation modeling on the 51 markets of the research site over a 20-quarter period, I find that future revenues are positively associated with client satisfaction and doctor satisfaction but negatively associated with patient satisfaction. The result is driven by conflicting interests between clients and patients. I also find that the extent to which a customer group influences the purchasing decision affects the relevance of customer satisfaction measures. Finally, I find that customer bargaining power enhances the relevance of customer satisfaction measures. This study contributes to our understanding of the performance consequences of nonfinancial value drivers and has implications for resource allocation, performance evaluation, and compensation practices within firms.

I. Introduction

A growing body of literature suggests that nonfinancial performance measures are leading indicators of financial performance. In particular, customer satisfaction is one of the most important and most widely studied nonfinancial measures (e.g., Banker, Potter, and Srinivasan, 2000; Behn and Riley, 1999; Foster and Gupta, 1997; Ittner and Larcker, 1998a; Smith and Wright, 2004). For example, a survey of senior executives from 148 financial services firms showed that customer relations are ranked as the most important driver of firm's long-term organizational success. In comparison, short-term financial performance was only ranked the fifth most important (Ittner and Larcker, 2001). Because of the perceived importance of customer satisfaction measures, most companies allocate a substantial amount of resources to measure customer satisfaction and managers rely on these measures to make operational decisions. In addition, Ittner, Larcker, and Rajan (1997) find that 37% of firms using nonfinancial measures in their executive bonus contracts include customer satisfaction measures. Given the resources devoted to customer satisfaction and the economic consequences, it is critical to understand the relation between customer satisfaction and future financial performance.

Prior research has provided mixed evidence on the relation between customer satisfaction and future financial performance. Several studies have found a positive relation between customer satisfaction and future financial performance (Ittner and Larcker, 1998a; Behn and Riley, 1999; Banker, Potter and Srinivasan, 2000; Bernhardt, Donshu and Kennett, 2000; Smith and Weight, 2004). However, other studies have found that the financial impact of customer satisfaction varies across industries and firms (Anderson, Fornell and Rust, 1997; Ittner and Larcker, 1998a). Although researchers have conjectured that contextual factors may contribute to

the mixed findings (Ittner and Larcker, 1998a; Lambert, 1998), little empirical evidence exists on whether and how contextual factors affect the satisfaction-performance linkage.

In addition, the prior literature on customer satisfaction has focused exclusively on settings with a single customer group. However, in reality, companies often deal with multiple customer groups and therefore it is challenging to determine which customer satisfaction measure generates the greatest benefits for financial performance. The term "customer" includes consumers (i.e., end users of products and services), clients (i.e., organizations that dictate or influence the choice of end users), distributors, and any other party that an organization serves (Kohli and Jaworski, 1990). For example, an insurance company interacts both with clients that purchase the insurance plans for their employees and patients who use the insurance plans. A distributor in a supply chain conducts business with redistributors, retailers, and end consumers. Outsource service providers should not only establish good relationships with clients, who typically negotiate outsourcing deals, but also understand the needs and preferences of end users of the services (Feeny, Lacity, and Willcocks, 2005). Prior literature provides little guidance as to which customer satisfaction measure is most strongly associated with future financial performance in such settings.

To address these limitations of prior research, this study focuses on a setting where an organization serves multiple customer groups and examines the following research question: What determines the relevance of customer satisfaction measures? A single customer group study may show that the relation between customer satisfaction measures and future financial performance is stronger or weaker in some groups of firms, but firm-level analysis of cross-sectional data unavoidably suffer from omitted variables and endogeneity problems. One way to overcome the limitations of firm-level cross-sectional analysis is to examine a setting where

different measures are available for the same firm, which characterizes the current research setting. This setting enables me to perform a cleaner test of the determinants of the relevance of customer satisfaction measures and ultimately shed light on a fundamental question in management accounting research: What makes non-financial performance measures more relevant?

I obtain a unique database from a leading specialty health benefit plan provider (hereafter "HBP") that measures satisfaction levels of multiple customer groups: (1) clients that purchase insurance plans for their employees; (2) patients who use the insurance plans; and (3) doctors who provide medical services. Due to increased competition in the health insurance sector, enhancing customer satisfaction is a key element of HBP's strategy. Consequently, the company builds its performance measurement and incentive system around a business model that contains hypothesized links between financial performance and various satisfaction measures.

As a non-profit organization, HBP's primary objective is revenue growth rather than profit maximization. Therefore, I measure relevance in this context as the strength of the relation between various customer satisfaction measures and future revenues. I hypothesize that the relevance of customer satisfaction measures in a setting with multiple customer groups depends on the extent to which a customer group influences the purchasing decision. The current research setting is characterized by a two-tier customer structure, where services are provided to one party (the patients), but purchasing decisions are to a large extent made by another party (the clients). Since clients tend to have greater influence on the purchasing decision than patients, I predict that client satisfaction, in general, is more relevant than patient satisfaction. However, a more precise test would be to examine the effect of the variation in the purchasing influence of clients vs. patients on the relevance of satisfaction measures. The research site provides a unique

measure to proxy for such variation. HBP serves two different types of patients: voluntary and non-voluntary patients. Non-voluntary patients do not have much purchasing influence because their employers make the purchasing decision and payment for them. In contrast, voluntary patients have much greater purchasing influence because they pay a portion or all of the insurance premiums and have the option to choose among different insurance products. I predict that the relevance of patient (client) satisfaction increases (decreases) in the proportion of voluntary patients.

In addition, drawing on the economics literature, I hypothesize that the relation between customer satisfaction and future financial performance should be more pronounced in settings where customers have greater bargaining power (Porter, 1980). Using HBP's market penetration rate as a proxy for its market power and a reverse measure of the bargaining power of its customers, I predict that customer satisfaction measures have greater effects on future revenues when the market penetration rate is low.

I test my hypotheses using structural equation modeling on the 51 markets of HBP over a 20-quarter period from 2000-2004. I find that, as predicted by HBP's business model, client satisfaction and doctor satisfaction are positively associated with future revenues. The performance impact of customer satisfaction measures is economically significant: 10% increase in client satisfaction leads to 18.2% increase in future revenues, whereas 10% increase in doctor satisfaction leads to 15.9% increase in future revenues. However, contrary to the business model, patient satisfaction is negatively associated with future revenues. This result is consistent with my hypothesis that client satisfaction is generally more relevant than patient satisfaction. More importantly, this result, driven by a negative relation between patient satisfaction with coverage and client satisfaction, suggests a misalignment of interests between clients and patients. This is

consistent with the health care literature, which suggests that patients and clients often have conflicting objectives in that patients prefer comprehensive coverage with the least out-of-pocket disbursements, whereas clients give priority to cost containment (Mascarenhas, 1993). Since clients tend to have greater purchasing influence than patients, the preferences of clients dominate those of the patients.

As predicted, I find that patient satisfaction is more relevant in markets with a higher percentage of voluntary patients, whereas client satisfaction is more relevant in markets with a lower percentage of voluntary patients. Specifically, in the markets with a higher percentage of voluntary patients, the relation between patient satisfaction and future revenues becomes significantly positive: 10% increase in patient satisfaction translates into 7.53% increase in future revenues. This result lends further support to the argument that customer purchasing influence affects the relevance of satisfaction measures.

Finally, consistent with my hypothesis, I find that client satisfaction, patient satisfaction, and doctor satisfaction are more strongly associated with future revenues in markets with lower market penetration rates, where customers tend to have greater bargaining power.

This study is important from both research and practical perspectives. From a research perspective, this study makes several contributions. First, this is the first study to examine the performance consequences of satisfaction levels of different customer groups simultaneously. While most studies in the prior literature ignore interactions among various nonfinancial value drivers, the dataset allows me to explore these interactions and potential tradeoffs among different value drivers.

Second, the contingent effects documented in this study contribute to our understanding of the reasons for the mixed evidence on the relationship between customer satisfaction and

future financial performance. By showing that customer bargaining power, an important aspect of competition, affects the relevance of customer satisfaction, this study extends a stream of research that examines the effect of competition on the usefulness of accounting information and management controls (Hansen, 1998; Khandwalla, 1972; Krishnan, 2005).

Third, this study contributes to an emerging literature that empirically tests business models that involve financial and non-financial performance measures linked to firm-specific strategies (e.g., Campbell, Datar, Kulp, and Narayanan, 2004; Malina and Selto, 2001, 2004; Rucci, Kirn, and Quinn, 1998). The results challenge several assumptions in the managers' maintained business model and demonstrate variations of the business model in different markets, which highlights the importance of validating hypothesized links in a firm's performance measurement system (Campbell et al., 2004; Ittner and Larcker, 1998b; Kaplan and Norton, 1996, 2000).

From a practical perspective, a better understanding of the complex relations between non-financial measures and future financial performance can help companies improve their business models. For firms that have multiple customer groups, the results indicate that managers should consider which customer group has greater influence on the purchasing decision. By specifying the varying importance of nonfinancial performance measures under different operating environments, the results of this study enable a more refined interpretation of performance measures. These insights allow managers to use nonfinancial measures more effectively in their decisions concerning resource allocation, performance evaluation, and compensation practices.

The remainder of the paper is organized as follows. Section II discusses the research site. Section III reviews the literature and develops the hypotheses. Section IV describes the data,

measures, and empirical research design. Section V presents the results. Section VI concludes and suggests directions for future research.

II. Research Site

This study's research site, HBP, is a leading specialty health benefit plan provider.[1] It was established as a non-profit organization to provide high-quality, cost-effective specialty health care benefits. As companies and government agencies recognized the need to include this type of specialty health care in their employees' benefits packages, HBP experienced rapid growth and strong partnerships with doctors. HBP now provides a variety of flexible health insurance plans and operates nationwide. It has approximately 30,000 clients, including about 250 Fortune 500 companies that purchase health insurance plans for their employees. HBP has a network of over 25,000 doctors and over 3,000 employees. In 2004, the firm had gross revenues of about $3.5 billion.

HBP offices in different markets are grouped into eight geographic divisions, each with its own division manager. Managers are accountable for revenues in the regions that they manage. Offices in different markets are homogeneous in many aspects of their operations including organization structure, products and services provided, business cycle, and performance measurement and incentive system, but they vary in size, geographic location, market competition, and patient mix. To the extent that large clients have employees in multiple markets, some interdependence exists between the different markets. HBP faces a number of national and regional competitors for the services they provide and the market has become more competitive and more vertically integrated since the 1990s. For example, a large HMO

[1] Under a confidentiality agreement, I have permission from the research site to use the company information with disguise to ensure the anonymity of the company.

purchased one of HBP's competitors to expand into this specialty health care area in order to supplement their medical plan offering. This is consistent with a broad trend in the health care industry, which is characterized by increasing vertical integration of health care delivery organizations with both upstream and downstream activities (Abernethy et al., 2005).

As a non-profit organization, HBP's primary objective has always been growth. It seeks to serve as many customers as possible in a sustainable manner. In an increasingly competitive and vertically integrated market, HBP believes two factors are the most important drivers of growth. First, meeting or exceeding satisfaction goals promotes growth both by generating more revenue from existing customers and by maintaining HBP's strong reputation in the marketplace. Second, reducing administrative costs promotes growth by resulting in more competitive pricing for prospective and renewing customers. To motivate employees to create growth in the early 1990s, HBP implemented bonus plans that include customer satisfaction as an important factor. Consistent with their dual strategy, HBP gives satisfaction goals and cost goals equal weights in the bonus plans. The satisfaction measures for each of the three customer groups served (doctors, patients, and clients) also are given equal weights to convey the message that each customer group is equally important to HBP. **Appendix A** provides details of the bonus plan for all employees. So far the performance measurement system and incentive system seem to have successfully supported HBP's strategy. The firm has achieved high satisfaction scores among clients, patients, and doctors, and has enjoyed spectacular revenue growth in the last decade.

III. Literature Review and Hypothesis Development

A growing body of literature on nonfinancial performance measures shows that some nonfinancial performance measures are leading indicators of future financial performance (e.g.,

Amir and Lev, 1996; Banker et al., 2000; Ittner and Larcker, 1998a; Nagar and Rajan, 2001; Said, HassabElnaby, and Wier, 2003). While financial performance measures are predominantly short-term and backward-looking in nature, nonfinancial performance measures such as quality and customer satisfaction are future-oriented. They drive future financial performance and, hence, help managers focus their attention on the long-term aspects of the business (e.g., Banker et al., 2000; Hemmer, 1996; Ittner and Larcker, 1998a, 1998b, 2001, 2003; Kaplan and Norton 1992, 1996).

In particular, customer satisfaction, one of the most widely used nonfinancial measures, has attracted significant attention from researchers and practitioners alike. Prior studies have predominantly documented positive associations between customer satisfaction and future financial performance (Behn and Riley, 1999; Ittner and Larcker, 1998a; Banker et al., 2000; Bernhardt et al., 2000; Smith and Wright, 2004; Dikolli, Kinney, and Sedatole, 2005). For instance, Ittner and Larcker (1998a) find positive relationships between customer satisfaction and future financial performance at the customer level (in a telecommunications firm), the business division level (in the banking industry), and the firm level (using the American Customer Satisfaction Index). This is consistent with findings in the marketing literature, which suggests that higher customer satisfaction increases customer retention (Fornell, 1992), reduces price elasticities (Anderson, Fornell and Lehmann, 1994), lowers marketing costs (Anderson et al., 1994; Zeithaml, 2000), and increases repurchase and referral intentions (Anderson and Sullivan 1993; Cronin and Taylor 1992), all of which should improve financial performance.

As a non-profit organization, HBP's primary objective is revenue growth rather than profit maximization. Therefore, I measure financial performance in this context with future revenues. Consistent with the above findings, HBP builds its business model and performance

measurement system on the assumption that higher client, patient, and doctor satisfaction lead to greater revenues in the future. My first set of hypotheses is therefore based on HBP's maintained business model (**Figure 1**). Specifically,

H1a: Client satisfaction measures are positively associated with future revenues.

H1b: Patient satisfaction measures are positively associated with future revenues.

H1c: Doctor satisfaction measures are positively associated with future revenues.

Compared with a large stream of literature in financial accounting research that investigates the value-relevance of financial metrics such as earnings, management accounting research that examines the relevance of nonfinancial metrics has been limited and sparse. Most prior studies focus on settings where constructing a nonfinancial metric is relatively straightforward. For example, the customer satisfaction literature has concentrated on settings where there is only one set of customer responses. However, in reality, constructing relevant customer satisfaction measures may present a challenge because the term "customer" is broadly defined, including clients, users, distributors, and any other party that an organization serves (Kohli and Jaworski, 1990). Many firms serve consumers (i.e., end users of products and services) as well as clients (i.e., organizations that may dictate or influence the choice of end users). For example, executives of several packaged goods distributors indicate that it is critical for their organizations to understand the needs and preferences not just of end consumers but also retailers through whom their products are sold (Kohli and Jaworski, 1990). Niraj, Gupta and Narasimhan (2001) make a similar point and build a detailed activity-based cost model to understand the behavior of costs and profits associated with different types of customers in a supply chain. In the health care industry to which the research site belongs, organizations unavoidably deal with multiple customer groups because services are provided to one party (the

patients), but purchasing decisions are often made by another party (employers of the patients, i.e., HBP's clients) (Mascarenhas, 1993). Prior research provides little guidance as to which satisfaction measure is more closely associated with future financial performance in these settings.

I propose that the performance consequences of various customer satisfaction measures in a setting with multiple customer groups depend on the purchasing influence of each customer group. Although the purchasing decision is made jointly in any two-tiered customer structure that characterizes the current research setting, there is variation in the influence of the client vs. the end-consumer. Since clients tend to have greater influence on the purchasing decision than patients, I predict that client satisfaction, in general, is more relevant than patient satisfaction. However, a cleaner test would be to examine the effect of the variation in the purchasing influence of clients vs. patients on the relevance of satisfaction measures. The research site provides a unique measure to proxy for such variation. HBP serves two different types of patients: voluntary and non-voluntary patients. While non-voluntary patients do not have much purchasing influence because their employers make the purchasing decision and payment for them, voluntary patients have much greater purchasing influence because they pay a portion or all of the insurance premiums and have the option to choose among different products offered in their benefits packages. Since patients have greater purchasing influence in markets with a larger proportion of voluntary patients, patient satisfaction should be more important in those markets than in the markets with a smaller percentage of voluntary patients. Conversely, client satisfaction should be more important in the markets with a smaller percentage of voluntary patients than in those markets with a larger percentage of voluntary patients. Thus, I posit the following hypotheses:

H2a: Client satisfaction is more strongly associated with future revenues than patient satisfaction.

H2b: The proportion of voluntary patients increases the strength of relationship between patient satisfaction and future revenues.

H2c: The proportion of voluntary patients decreases the strength of relationship between client satisfaction and future revenues.

As mentioned above, prior studies have demonstrated variations in the relation between customer satisfaction and financial performance. For example, Anderson et al. (1997) find that the positive effects of customer satisfaction are more prominent in manufacturing firms than in service firms. Ittner and Larcker (1998a) find customer satisfaction to be positively associated with market values in the manufacturing and financial service industries, but negatively associated with market values in the retail industry.

Contingency theory suggests that an organization must be aligned with its environment to achieve optimal performance (Chenhall, 2004). Consistent with this, researchers argue that the relevance of financial or non-financial measures should be affected by contextual factors (e.g., Shevlin, 1996). Nagar and Rajan (2005)'s study of retail banks, for example, found that a nonfinancial measure, cross-sell ratio, is more critical for banks that emphasize the sales of new products as their strategy. Along the same lines, the mixed results on the satisfaction-performance linkage imply that customer satisfaction is effective in improving future financial performance of service firms only under certain situations. Though prior studies have documented variations in the relation between customer satisfaction and financial performance, little empirical evidence exists on contextual factors that moderate the positive effects of customer satisfaction on future financial performance.

The economics literature suggests that customer bargaining power is one contingency factor that might account for cross-sectional differences in the relation between customer satisfaction and future financial performance. Customer bargaining power, one of the fives forces of competition, is the impact that customers have on a company (Porter, 1980). Porter outlines the determinants of customer bargaining power, including customer concentration, customer volume, customer switching costs relative to firm switching costs, brand loyalty, customer price sensitivity, threat of backward integration, and customer information. When satisfaction level is low, customers with greater bargaining power may easily switch to alternative providers because they are more likely to get favorable trade terms with alternative providers. In contrast, customers with little bargaining power are more likely to stay with the current provider even if they are not perfectly satisfied. For example, Jones, Mothersbaugh, and Beatty (2000) show that customer switching costs, an important determinant of customer bargaining power, moderate the relationship between customer satisfaction and repurchase intentions.

I use HBP's market penetration rate as a proxy of HBP's market power in each market and a reverse measure of customer bargaining power. In the words of the VP of Marketing,

> *"In the markets where we don't have a big market share, our brand is not well-known, the market is not mature, and employee benefits are not a big concern for local employers. Since we haven't established relationships with clients, clients will shop mainly on price."*

Where market penetration is low, the bargaining power of clients is likely to increase for two reasons. First, clients are price sensitive, increasing the potential sources of supply and available substitutes. Since HBP competes on quality of service rather than price, it is more difficult for HBP to retain price-sensitive clients if they are not satisfied. Second, lack of brand loyalty and established relationships with clients lower switching costs for clients. Similarly, the bargaining

power of doctors is likely to increase in low penetration markets because doctors tend to have a smaller percentage of patients with HBP coverage in these markets, which decreases the switching costs for them. In addition, lack of brand loyalty and established relationships with HBP further lower switching costs for the doctors. Finally, low market penetration means lower brand loyalty, so patients also are more price sensitive and more likely to defect when dissatisfied, which increases the relevance of patient satisfaction. Conversely, in those markets where HBP achieves a high market penetration rate, it has greater market power, more established brand loyalty, and more mature relationships with existing clients, patients, and doctors, which significantly lower customer bargaining power.

Thus, I posit the following hypotheses:

H3a: HBP's market penetration rate decreases the strength of the relation between client satisfaction and future revenues.

H3b: HBP's market penetration rate decreases the strength of the relation between doctor satisfaction and future revenues.

H3c: HBP's market penetration rate decreases the strength of the relation between patient satisfaction and future revenues.

IV. Sample, Variables, and Research Design

Sample

The sample consists primarily of quarterly data obtained from HBP on financial and satisfaction measures for 51 markets over 20 quarters, from the first quarter of 2000 through the fourth quarter of 2004. I supplement these data with market penetration and patient mix information obtained from the HBP Marketing department. In addition, I collect quarterly data from the Bureau of Economics Analysis on economic conditions in the states during the same period. To gain familiarity with the business environment of HBP, I spent two days at the firm's

national headquarters discussing the project with the CFO and managers in the Customer Service Department. I also had numerous phone and email discussions with the CFO, VP Marketing, and Customer Service managers and employees during the data collection period. Finally, I reviewed internal company documents about the performance measurement and incentive system.

Variables

Client Satisfaction

The firm measures client satisfaction for a stratified random sample of clients purchasing a health plan each quarter. The survey is administered by email for all clients with an email address and via mail for the remainder of clients. The average initial sample size is 2,500 each quarter and the average final sample size is 650, resulting in an average response rate of 26%. The firm measures client satisfaction based on a questionnaire. To maintain comparability across time, I retain 18 questions that are common throughout the 20 quarters in the sample period. Panel A of **Table 1** presents results of a principal component factor analysis using oblique rotation, allowing the factors to be correlated.[2] The factor loadings suggest two dimensions of client satisfaction. I label the first factor "Client satisfaction with customer service." The second factor captures "Client satisfaction with value." Given that these two factors emerge consistently as separate dimensions across divisions and over time, I construct weighted indexes for these two client satisfaction dimensions using factor loadings and treat them as observed variables in the structural equation modeling (SEM) analysis.

Patient Satisfaction

The firm measures patient satisfaction for a random sample of patients who use their health care benefits within each quarter. This survey is administered via mail. The initial sample size averages 3,500 each quarter and the final sample size averages 630, yielding an average

response rate of 18%. The firm measures customer satisfaction based on a questionnaire. I retain 20 questions that are common throughout the 20 quarters in the sample period for comparability purposes. Panel B of **Table 1** presents the results of principal component factor analysis using oblique rotation. Three dimensions of patient satisfaction emerge from the analysis. The first factor is "Patient satisfaction with coverage"; the second factor is "Patient satisfaction with quality of service"; and the third factor is "Patient satisfaction with convenience." I construct weighted indexes for the three dimensions of patient satisfaction based on factor loadings and treat them as measures of patient satisfaction in the subsequent SEM analysis.

Doctor Satisfaction

The firm measures doctor satisfaction for a random sample of doctors who contract with HBP each quarter. The survey is administered via mail. The average initial sample size is 2,400 and the average final sample size is 936, resulting in an average response rate of 39%. The firm measures doctor satisfaction using a questionnaire with 15 questions. Panel C of **Table 1** presents the results of principal component factor analysis with oblique rotation, which yields two dimensions of doctor satisfaction. The first dimension assesses doctors' absolute satisfaction level with HBP's service and support, and the second dimension assesses their relative satisfaction level with HBP's services and support when comparing HBP with other plans that they participate in. I label these two dimensions as "Absolute doctor satisfaction" and "Relative doctor satisfaction" respectively, construct factor-score-weighted indexes for the two dimensions, and treat them as indicators of doctor satisfaction in the SEM analysis.

[2] The Varimax rotation method, which assumes orthogonality between the factors, yields similar results.

Financial Performance. I operationalize financial performance as the natural logarithm of quarterly sales revenue for each market.

Market Penetration Rate. I measure market penetration rate for each market by the percentage of the population that are HBP patients.

Percentage of Voluntary Patients. I measure percentage of voluntary patients for each market by dividing the number of voluntary patients by the total number of HBP patients. I obtain this data for 16 quarters from 2001 through 2004.

Economic Conditions. General economic conditions have a direct impact on financial performance of firms in the health care industry. Good economic conditions enable employers to spend more money on health care benefits for their employees and allow voluntary patients to purchase optional health care insurance. Therefore, I control for economic conditions, as measured by quarterly state personal income. This measure tracks the level of personal income received by people who live or work in a state and is often used as a measure of state-level economic conditions. I collect this data from the website of the Bureau of Economic Analysis (www.bea.gov).

Past Performance. I include past performance to control for time-series trends as well as to examine whether the satisfaction measures provide incremental information on future performance (Ittner and Larcker, 1998a). I measure past performance with a one-year lag to control for seasonality in the insurance business. Specifically, I observe a big increase in revenues in the fourth quarter of each year because clients tend to accelerate costs for tax purposes through prepayment of medical benefits insurance.

Research Design

I analyze the data using structural equation modeling (SEM). Researchers in management accounting have called for greater use of SEM in management accounting research (Shields, 1997; Shields and Shields, 1998; Smith and Langfield-Smith, 2004). SEM overcomes two limitations of OLS regressions: (1) the assumption that all constructs are free of measurement error; and (2) the inability to estimate multiple and interrelated dependent relations among variables. This study uses SEM to test the validity of the HBP model in Figure 1. SEM allows me to explicitly model the measurement error in latent variables (Bollen, 1989). This is necessary in the current research setting because customer satisfaction, like many nonfinancial performance measures, is a "soft" measure that potentially contains considerable measurement error (Ittner and Larcker, 2003). SEM also permits simultaneous estimation of the relations between satisfaction levels of different customer groups and financial performance. Using SEM, I first test the business model underlying HBP's performance measurement system. I then examine whether the model varies across different competitive environments.

Prior research suggests that the length of lag between customer satisfaction and future financial performance varies across firms. For example, Banker et al. (2000) document a six-month lead-lag relation between customer satisfaction and financial performance in the hospitality industry, whereas Bernhardt et al. (2000) detect a one-year lag in the fast-food restaurant industry. In the current research setting, the contracts between HBP and its clients, doctors, and patients provide some information about the lags. Most clients have two-year contracts with HBP and most patients have one-year contracts with HBP. All doctors have evergreen contracts with HBP, which allow either party to terminate the contract with ninety

days of notice. Consistent with this, I use 8-quarter lags for client satisfaction, 4-quarter lags for patient satisfaction, and 1-quarter lags for doctor satisfaction.

Another design choice is the functional form. There has been considerable debate on the appropriate functional form of the relation between customer satisfaction and financial performance (Ittner and Larcker, 1998a; Lambert, 1998). Banker et al. (2000) argues that, because of the decaying effect of nonfinancial measures over time, the permanent effect assumption of the changes model are violated. The levels model is therefore more appropriate because residuals from the levels model will have a lower autocorrelation than the changes model. Following Banker et al. (2000), I use a levels model with a lagged dependent variable.

V. Results

Descriptive Statistics

Panel A of **Table 2** provides descriptive statistics on the satisfaction variables. The satisfaction measures are elicited with 5-point scales, where 1 indicates "Poor" and 5 indicates "Excellent". Panel B of **Table 2** provides descriptive statistics on the other variables. The descriptive statistics indicate that many variables are highly skewed. In order to obtain more normal distributions, I apply a logarithmic transformation to each independent and dependent variable.

Table 3 presents Pearson correlations (after applying the logarithmic transformation) among the variables. These results indicate that the correlations generally are consistent with the hypotheses. The correlations between client satisfaction measures and revenues are positive, and so are the correlations between the doctor satisfaction measures and revenues. The only exception is patient satisfaction, where the correlations between two measures of patient

satisfaction (satisfaction with quality of service and satisfaction with convenience) and revenues are insignificant and the correlation between a third measure of patient satisfaction (satisfaction with coverage) and revenues is significantly negative. I also find patient satisfaction with coverage to be negatively correlated with client satisfaction with value ($r = -0.088$, $p < 0.05$). These initial results suggest potential trade-offs between patient satisfaction and client satisfaction.

SEM Analysis of the HBP Model

I estimate the SEM models using AMOS 5.0. Before the parameter estimates can be interpreted, it is important first to test the measurement model in order to demonstrate that each proxy measure has a positive and statistically significant relationship with its construct. In the measurement model, the relation between a latent variable, ξ_i, and a survey item that comprises it, x_j, is $x_j = \lambda_{ij} \xi_i + \delta_{ij}$, where λ_{ij} is the loading, or degree of association between the latent variable and the manifest variable, and δ_{ij} is the measurement error associated with the survey item. To identify the variance of the latent variables, I fix the loading of the item that I expect a priori to best represent the construct at one. The error variance of each indicator variable is the expected error (1-Cronbach's alpha) of the measure multiplied by the variance of the measure. **Table 4** presents maximum likelihood coefficient estimates of the measurement model. Maximum likelihood methods perform well when data deviates from multivariate normality or are based on ordinal scales (Boomsma and Hoogland, 2001; Distefano, 2001).

The standardized estimated loadings (λs) of survey items on latent constructs have the expected sign, are large enough to provide confidence that they measure common latent constructs, and are statistically significant ($p < 0.001$, two-tailed). Overall model fit is adequate, as indicated by three goodness-of-fit measures: the Chi-square/degree of freedom (CMIN/DF) (=

4.66; < 5), the comparative fit index (CFI) (= 0.923; > 0.90), and the root mean square error of approximation (RMSEA) (= 0.063; < 0.08) (Hu and Bentler, 1999; Fan et al., 1999; Smith and Langfield-Smith. 2004).[3]

Table 5 (Column 1) and **Figure 2** present coefficient estimates of the structural model for the relation between satisfaction levels of multiple customer groups and future revenues. The model exhibits adequate model fit by the Chi-square/degrees of freedom (CMIN/DF) (= 4.19; < 5), the comparative fit index (CFI) (= 0.948; >0.90), and the root mean square error of approximation (RMSEA) (= 0.054; < 0.08). Overall, the evidence suggests that satisfaction levels of various customer groups are related to future revenues after controlling for past financial performance and general economic conditions.

The results indicate that, consistent with H1a, client satisfaction is positively associated with future revenues ($\gamma = 0.546$, $z = 3.249$). Also consistent with H1c, the coefficient on doctor satisfaction is significantly positive ($\gamma = 0.478$, $z = 3.703$). However, contrary to H1b, which predicts a positive relationship between patient satisfaction and future revenues, the coefficient on patient satisfaction is significantly negative ($\gamma = -0.995$, $z = -2.665$). I also find a negative correlation between client satisfaction and patient satisfaction ($r = -0.081$, $p < 0.10$), contrary to the expectations underlying the managers' hypothesized business model. These results imply that the interests of patients and clients are probably misaligned. This is consistent with the health care literature, which suggests that patients and clients often have conflicting objectives. Patients prefer comprehensive coverage with the least out-of-pocket disbursements. Clients, on the other

[3] Chi-square/degrees of freedom (CMIN/DF) is the model chi-square fit index divided by degrees of freedom in order to correct for sample size. Values of CMIN/DF less than 5 are considered adequate fit. The comparative fit index (CFI) compares the existing model fit with a null model that assumes the latent variables in the model are uncorrelated. By convention, CFI should be equal to or greater than 0.90 to accept the model. The root mean square error of approximation (RMSEA) corrects the Chi-square statistic for sample size as well as model complexity. By

hand, give priority to cost containment (Mascarenhas, 1993). Since clients tend to have greater purchasing influence than patients, their preferences dominate those of the patients. Thus, consistent with H2a, client satisfaction is more strongly associated with future revenues than patient satisfaction. The correlation between doctor satisfaction and patient satisfaction is positive but insignificant (r = 0.039). Finally, as expected, past revenues and general economic condition are important predictors of current revenues.

SEM Multi-Group Analysis

H2b predicts that in those markets with a larger proportion of voluntary patients, patients have greater purchasing influence and therefore patient satisfaction should be more important than in the markets with a smaller proportion of voluntary patients. Conversely, H2c predicts client satisfaction to be more important in the markets with a smaller percentage of voluntary patients than in the markets with a large percentage of voluntary patients. To test these hypotheses, I partition my sample based on the percentage of voluntary patients. The subsample of 204 cases with percentage of voluntary patients greater (lower) than 37.65% (median) represents a setting where patients have more (less) purchasing influence. I test H2 by estimating a model that allows the structural model (SM) to differ between the two sub-groups while assuming the same measurement model (MM). To establish the appropriateness of a fixed MM, I first test whether differences exist in the factor loadings between the two groups. Allowing the MM to vary freely between the two groups does not significantly improve model fit (ΔX^2 = 5.210, Δdf = 4) (Bagozzi and Yi, 1988). On the other hand, allowing the SM to vary between the two groups significantly improves model fit compared to a model fixing the SM to be equal (ΔX^2

convention, there is adequate model fit if RMSEA is less than or equal to 0.08 (Hu and Bentler, 1999; Fan et al., 1999).

= 23.612, Δdf = 5), suggesting that HBP's overall business model differs significantly across the two sub-samples.

Table 5 (Columns 2 and 3) and **Figures 3** and **4** summarize the results of this analysis. Consistent with H2b and H2c, I find that client satisfaction is more relevant in the sub-sample with a lower percentage of voluntary patients, whereas patient satisfaction is more relevant in the sub-sample with a higher percentage of voluntary patients. The coefficient for client satisfaction is insignificant (γ = 0.501, z = 1.581) in the subsample with a high percentage of voluntary patients, but is significantly positive (γ = 0.716, z = 2.310) in the subsample with a low percentage of voluntary patients. The Lagrange Multiplier (LM) test of the null hypothesis that these two parameters are the same can be rejected (X^2 = 2.729, df = 1, $p < 0.10$). Similarly, the coefficient for patient satisfaction is significantly negative in the subsample with a low percentage of voluntary patients (γ = –1.598, z = -3.542), but becomes positive and marginally significant (γ = 0.226, z = 1.653) in the subsample with a high percentage of voluntary patients. These two coefficients are statistically different (X^2 = 6.821, df = 1, $p < 0.01$). These results indicate that, consistent with H2, customer purchasing influence affects the relevance of customer satisfaction measures in a setting with multiple customer groups.

H3 propose that the associations between satisfaction measures and future revenues are stronger in those markets where HBP has a low market penetration rate. To test these hypotheses, I partition my sample at the median market penetration rate (9.67%) and estimate the HBP model across the two sub-samples. I find that allowing the MM to vary freely between the two sub-samples does not significantly improve model fit (ΔX^2 = 6.989, Δdf = 4), which justifies using a fixed MM in the multi-group analysis. However, allowing the SM to vary between the

two sub-samples improves model fit compared to a fully constrained model (ΔX^2 = 25.370, Δdf = 5), which indicates that HBP's business model differs significantly across the two sub-samples.

Table 5 (Columns 4 and 5) and **Figures 5** and **6** present results for the two sub-samples. As predicted by H3a, the coefficients for client satisfaction are positively related to revenues, and are significantly higher in the subsample with a low penetration rate (γ =0.679, z = 4.538) than in the subsample with a high penetration rate (γ =0.486, z = 1.985). These two coefficients are statistically different (X^2 = 2.887, df = 1, p < 0.10). Similarly, the coefficients for doctor satisfaction are positively related to revenue, and are significantly higher in the subsample with a low penetration rate (γ =0.529, z = 4.058) than in the subsample with a high penetration rate (γ =0.353, z = 1.814). These parameters are statistically different (X^2 = 3.906, df = 1, p < 0.05). Finally, the coefficients for patient satisfaction are insignificant in the subsample with a high penetration rate (γ =0.632, z = 1.451), and are significant, albeit negative, in the subsample with a low penetration rate (γ =-1.385, z = -3.291). These parameters are statistically different (X^2 = 4.641, df = 1, p < 0.05). I also observe that the structural equation squared multiple correlations (i.e., the counterpart of R^2 in OLS regressions) for the subsample with low market penetration rate is 82.3%, compared to 75.3% for the subsample with high market penetration rate. These results imply that, consistent with H3, customer satisfaction is more relevant in environments where customers have greater bargaining power.

Robustness Checks

The above analysis does not consider the lack of independence of observations in the panel data with multiple states across time. As a robustness check, I include state dummies in the estimation. These dummies are jointly insignificant and do not affect the inferences. Controlling for quarter dummies does not changes the results either.

In addition, since the choice of time lags between various satisfaction measures and future revenues is somewhat arbitrary, I test alternative lags (e.g., 4 instead of 8 quarters of time lag between client satisfaction and future revenues) and obtain similar results.

Two alternative measures of performance are the number of clients and the number of patients. I repeat the analyses using these measures as the dependent variables. The results are robust to these alternative measures of performance.

Finally, I also estimate changes models instead of levels models, and the results (summarized in **Table 6**) do not change substantively, except that patient satisfaction becomes insignificant in the overall model.

VI. Conclusion

This study examines the following question in a setting with multiple customer groups: What determines the relevance of customer satisfaction measures? By explaining the cross-sectional variations in the relevance of customer satisfaction measures, this study speaks to a broader question in management accounting research: What makes non-financial performance measures more relevant?

Using structural equation modeling, I find that, as predicted by the research site's maintained business model, future revenue is positively associated with client satisfaction and doctor satisfaction. However, contrary to the expectations captured by the business model, future revenue is negatively associated with patient satisfaction. The result suggests conflicting interests of clients and patients. I also find that customer purchasing influence determines which customer satisfaction measure is more relevant in such settings. Specifically, I find that the proportion of voluntary patients who have greater purchasing influence enhances the relevance of patient

satisfaction while decreasing the relevance of client satisfaction. Finally, I find that customer bargaining power increases the relevance of customer satisfaction, in that customer satisfaction measures are more closely associated with future revenues when HBP's market power is low and customer bargaining power is high.

This study has important managerial implications. The results illustrate the importance of considering multiple customer groups at once when trying to determine whether improving satisfaction will result in better financial performance. For firms that have multiple customer groups, managers should pay attention to potential spillover effects between the satisfaction levels of different groups. In addition, by examining the circumstances under which customer satisfaction has the greatest impact on future revenues, the results of this study can help managers make more informed decisions related to resource allocation, performance evaluation, and compensation. For example, the relative weights assigned to customer satisfaction measures in a Balanced Scorecard performance measurement system should probably be heavier in environments where customers have greater bargaining power.

That said, these implications are not necessarily easy to implement. The contingent effects of customer purchasing influence and customer bargaining power must be carefully attended to by organizations before investing in customer initiatives. However, market conditions are always evolving over time, requiring managers to constantly monitor the performance implications of different customer groups and revise their strategy and business model accordingly. The practical implication for managers, therefore, is that they should consider the importance of customer satisfaction given their current business environment while remaining flexible to shift resources between customer initiatives and other operational requirements as well as between different customer groups.

The results of this study should be interpreted with several limitations in mind. First, an inherent limitation of field-based research is the limited generalizability of the empirical results. Second, the satisfaction data of this study comes from third-party surveys and, as a result, I have no control over the design and administration of the surveys. Discussions with the HBP managers revealed that although they follow some recommended procedures of survey design and administration such as random sampling and follow-ups, they do not follow other procedures such as non-response bias analysis (Van der Stede, Young, and Chen, 2005).

Finally, consistent with HBP's business model, the structural equation model assumes linear relations between customer satisfaction and future financial performance. The true relations, however, could be nonlinear (e.g., Ittner and Larcker, 1998a). Nonetheless, the recent marketing literature finds that: (1) over a reasonable range, the assumption of a linear relationship between satisfaction and loyalty is acceptable (Yeung et al., 2002); and (2) models that assume non-linearity between satisfaction and loyalty do not have superior explanatory power over linear models (Streukens and Ruyter, 2004). These empirical results mitigate, but do not completely eliminate, the concern with non-linearity.

Despite the above limitations, this study represents an important step toward understanding the complex relations between nonfinancial performance measures, contextual factors, and future financial performance. This study suggests several directions for future research. First, future studies may enlarge the research sample by including more firms and industries to complement the evidence presented in this study. Second, future research could examine other moderators of the relation between customer satisfaction and future financial performance, e.g., switching costs, repurchase cycle, and strategy. Finally, due to data limitations, this study focuses on a single non-financial performance measure and a single aspect

of customer relationship management. However, customer relationships can be multifaceted, including customer satisfaction, antecedents of customer satisfaction such as product and service infrastructure, and consequences of customer satisfaction such as customer usage and customer volume (Nagar and Rajan, 2005). Future research could explore other dimensions of customer relationship management as well as more comprehensive business models that include customer measures, employee measures, operational measures, and financial performance measures.

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Table 1. Exploratory Factor Analysis of Satisfaction Measures *

Panel A. Client Satisfaction

Survey Questionnaire Items	Factor 1	Factor 2
The ease of doing business with HBP	**.571**	.326
Your HBP account executive's responsiveness to your questions	**.945**	-.094
Thoroughness with which your issues are resolved by your HBP account executive	**.937**	-.068
Your HBP account executive's knowledge of HBP products and services	**.875**	-.043
Your HBP account executive's ability to advise you on your organization's benefits strategy	**.815**	-.035
Your HBP account executive's frequency of contact to meet your needs	**.814**	-.005
Your other HBP service contacts' accessibility to answer your questions	**.914**	-.036
Your other HBP service contacts' responsiveness to your questions	**.937**	-.052
Thoroughness with which your issues are resolved by your other service contacts	**.918**	-.029
Courtesy shown to you by your other service contacts	**.878**	-.043
Effectiveness of HBP's communications with you	**.763**	.113
Effectiveness of HBP's communications with your employees/members	**.634**	.225
The accuracy of your monthly bill	**.526**	.238
HBP's ability to meet your reporting needs	**.557**	.274
HBP's ability to provide a plan that meets the organization's need	.347	**.561**
The value received for the dollars spent on your HBP plan	.167	**.710**
Selection of HBP doctors from which your employees can choose	-.089	**.909**
Your employees/members satisfaction with HBP doctors	-.003	**.884**
% of Variance Explained	64.731	6.439
Cronbach's Alpha	0.872	0.854
Labels for Factors	*Customer service*	*Value*

* Panels A through C present results from principal component factor analysis with oblimin rotation.

Table 1. (Cont.)

Panel B. Patient satisfaction

Survey questionnaire items	Factor 1	Factor 2	Factor 3
Selection of materials in your HBP doctor's office that were fully covered by your plan	**.533**	.218	.049
Your understanding of the plan	**.481**	-.039	.372
Amount of coverage provided by your plan	**.826**	-.072	.118
Amount of coverage in exam	**.887**	.0003	-.043
Amount of coverage in medical materials	**.901**	.005	-.047
Amount of coverage in specialty materials	**.890**	-.008	-.099
Amount of coverage in optional materials	**.884**	-.046	-.087
Value received for the dollars you spent on your care	**.740**	.130	.060
Ease of using your plan	**.419**	.102	.390
Rate your HBP doctor in thoroughness of your exam	-.004	**.911**	.029
Rate your HBP doctor in explanation of diagnosis and treatment	-.032	**.930**	.007
Rate your HBP doctor in personal interest and courtesy	-.046	**.886**	.046
Length of time you waited to receive your service	.266	**.362**	.197
Quality of service	.395	**.399**	.110
Rate your HBP doctor or staff's explanation of your overall coverage	.354	**.394**	.141
Overall experience with your HBP doctor	.079	**.848**	-.026
Selection of HBP doctors	.237	-.102	**.693**
Rate your HBP doctor in convenience of location	-.109	.025	**.893**
Rate your HBP doctor in convenience of office hours	-.051	.159	**.780**
Rate your HBP doctor in length of time between setting an appointment and your visit	-.024	.249	**.653**
% of variance explained	52.260	10.296	4.266
Cronbach's Alpha	0.933	0.910	0.835
Labels for Factors	*Coverage*	*Quality of service*	*Convenience*

Table 1. (Cont.)

Panel C. Doctor satisfaction

Survey questionnaire items	Factor 1	Factor 2
Ease of doing business with HBP	**.681**	.205
Ease of administering HBP's plans	**.658**	.134
Ease of explaining HBP's plans to patients	**.614**	.117
Promptness of payment for claims submitted	**.849**	-.043
Accuracy of payment for claims submitted	**.877**	-.052
Ease of using your remittance advice	**.769**	-.023
Resolution of payment issues	**.888**	-.049
Ease of obtaining eligibility/plan information	**.778**	-.046
Usefulness of HBP doctor communications	**.711**	.058
Responsiveness of HBP employee in resolving your issues	**.764**	.037
Overall satisfaction with HBP compared to other plans you participate in	.115	**.752**
Rate how HBP compares to other plans you participate in fairness of reimbursement fees for services provided	.008	**.791**
Rate how HBP compares to other plans you participate in providing information/training on products and plans	.022	**.767**
Rate how HBP compares to other plans you participate in supporting private practice doctors in remaining competitive	-.026	**.837**
Rate how HBP compares to other plans you participate in patients' understanding of what their plan covers	-.028	**.640**
% of Variance Explained	52.664	9.843
Cronbach's Alpha	0.817	0.876
Labels for Factors	*Absolute doctor Satisfaction*	*Relative doctor satisfaction*

Table 2. Descriptive Statistics

Panel A: Customer Satisfaction Measures *

	Sample Size	Mean	Standard Deviation	Upper Quartile	Median	Lower Quartile
Client Satisfaction with Customer Service	1020	4.01	0.39	4.25	4.04	3.79
Client Satisfaction with Value	1020	3.81	0.45	4.07	3.85	3.59
Patient Satisfaction with Coverage	1020	3.53	0.43	3.76	3.52	3.29
Patient Satisfaction with Quality of Service	1020	4.26	0.33	4.45	4.29	4.09
Patient Satisfaction with Convenience	1020	4.06	0.37	4.27	4.08	3.87
Doctor Satisfaction - Absolute	1020	3.49	0.33	3.7	3.51	3.28
Doctor Satisfaction- Relative	1020	4.19	0.25	4.37	4.23	4.04

* This table presents descriptive statistics for satisfaction measures created by aggregating questionnaire item scores weighted by factor loadings from factor analysis with oblimin rotation (Table 1). Each observation represents a market-quarter. The satisfaction measures are elicited with 5-point scales, where 1 indicates “Poor” and 5 indicates “Excellent”.

Table 2 (Cont.)

Panel B: Dependent Variables, Moderating Variables, and Control Variables *

	Sample Size	Mean	Standard Deviation	Upper Quartile	Median	Lower Quartile
Gross Revenue (millions)	1020	$20.13	$54.07	$19.36	$7.88	$2.07
Net Revenue (millions)	1020	$3.16	$8.89	$2.79	$1.13	$0.34
Number of Clients	1020	580	1,647	441	161	86
Number of Patients	1020	608,350	1,357,399	645,926	295,776	69,082
State Personal Income (millions)	1020	$175,886	$207,558	$224,143	$107,164	$42,274
Market Penetration Rate	1020	11.46%	6.86%	15.21%	9.67%	6.38%
Percentage of Voluntary Patients	816	44.76%	27.06%	68.82%	37.65%	22.81%

* Each observation represents a market-quarter.

Variable Definitions:
Net revenue = Gross revenue – claims payments to doctors
State personal income = Total income received by people who live or work in a state
Market penetration rate = Percentage of HBP patients out of the entire population in each market
Percentage of voluntary patients = Percentage of HBP patients who pay part or all of their HBP insurance premiums

Table 3
Correlation Matrix

	1	2	3	4	5	6	7	8	9	10	11
1. Client Sat. with Customer Service	1.000										
2. Client Sat. with Value	.396**	1.000									
3. Patient Sat. with Coverage	.032	-.088*	1.000								
4. Patient Sat. with Quality of Service	.024	.035	.550**	1.000							
5. Patient Sat. with Convenience	.024	.096**	.595**	.648**	1.000						
6. Doctor Sat. – Absolute	.114**	.183**	.016	-.016	.066	1.000					
7. Doctor Sat. - Relative	.020	.118**	-.017	.005	.037	.664**	1.000				
8. Revenue	.069*	.141**	-.130**	-.044	.018	.234**	.333**	1.000			
9. State Personal Income	.019	.110**	-.067	-.109**	-.025	.247**	.330*	.744**	1.000		
10. Market Penetration Rate	-.019	.120**	-.062	.015	.081*	.053	.079	.394**	-.018	1.000	
11. Percentage of Voluntary Patients	.017	.071	-.015	-.002	.006	.009	-.048	-.075*	.211**	-.347**	1.000

Note: Natural logarithms are taken of each variable. See Tables 1 and 2 for variable definitions.

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 4
Measurement Model for Independent Latent Variables

This table reports the measurement model for the independent variables for a single representative structural equation model (overall sample). The measurement model for these variables is stable across different subsamples (i.e., subsamples with high vs. low percentage of voluntary patients and subsamples with high vs. low market penetration rate).

Latent Variable Indicators	Unstandardized factor loading (λ)	Standard error	z-statistic	R^2	Standardized factor loadings (λs)
Client Satisfaction					
Factor 1: Customer Service	1.000			0.541	0.735
Factor 2: Value	0.732	0.013	56.749	0.387	0.622
Patient Satisfaction					
Factor 1: Coverage	1.000			0.541	0.735
Factor 2: Quality of Service	1.448	0.015	99.579	0.712	0.844
Factor 3: Convenience	1.744	0.054	32.053	0.601	0.758
Doctor Satisfaction					
Factor 1: Absolute	1.000			0.541	0.735
Factor 2: Relative	0.953	0.012	79.344	0.516	0.719
Sample size	1020				
Degrees of freedom	21				
Chi-square	97.86				
RMSEA	0.063				
CFI	0.923				

Note: Chi-square/degrees of freedom (CMIN/DF) is the model chi-square fit index divided by degrees of freedom in order to correct for sample size. Values of CMIN/DF less than 5 are considered adequate fit. The comparative fit index (CFI) compares the existing model fit with a null model that assumes the latent variables in the model are uncorrelated. By convention, CFI should be equal to or greater than 0.90 to accept the model. The root mean square error of approximation (RMSEA) corrects the Chi-square statistic for sample size as well as model complexity. By convention, there is adequate model fit if RMSEA is less than or equal to 0.08 (Hu and Bentler, 1999; Fan et al., 1999).

Table 5
Structural Equation Modeling (SEM) Analysis of the Relation between Satisfaction Measures and Future Revenue for the 20-Quarter Period 2000-2004

	Overall Sample	High % Voluntary Patient Subsample	Low % Voluntary Patient Subsample	High Market Penetration Subsample	Low Market Penetration Subsample
	(1)	(2)	(3)	(4)	(5)
ą	0.496	-0.355	1.294	1.802	0.195
	(1.386)	(-0.540)	(1.889)*	(3.913)***	(0.388)
Client Satisfaction $_{t-8}$	0.546	0.501	0.716	0.486	0.679
	(3.249)***	(1.581)	(2.310)**	(1.985)**	(4.538)***
	0.092	0.081	0.107	0.083	0.199
Patient Satisfaction $_{t-4}$	-0.995	0.226	-1.598	0.632	-1.385
	(-2.665)*	(1.653)*	(-3.542)***	(1.451)	(-3.291)***
	-0.155	0.027	-0.254	0.076	-0.157
Doctor Satisfaction $_{t-1}$	0.478	0.598	0.380	0.353	0.529
	(3.703)***	(2.228)**	(5.168)***	(1.814)*	(4.058)***
	0.113	0.074	0.095	0.043	0.144
Revenue $_{t-1}$	0.769	0.742	0.586	0.846	0.797
	(60.966)***	(33.364)***	(22.970)***	(34.984)***	(47.177)***
	0.872	0.847	0.713	0.782	0.892
Economic Conditions $_{t}$	0.275	0.357	0.470	0.296	0.264
	(13.338)***	(9.233)***	(12.226)***	(16.493)***	(8.673)***
	0.191	0.234	0.380	0.370	0.164
R^2	0.799	0.773	0.661	0.753	0.823
Sample size	612	204	204	306	306
Degrees of freedom	40	40	40	40	40
Chi-square	167.609	103.704	123.915	97.429	84.576
RMSEA	0.054	0.061	0.080	0.058	0.046
CFI	0.948	0.936	0.924	0.927	0.954

Each cell reports the maximum likelihood coefficient estimate, the z-statistic (in parentheses), and the standardized coefficient. ***, **, * indicate p-values of <0.01, 0.05, 0.10 in a two-tailed test.

Variable definitions:
Revenue (Dependent Variable) = Natural logarithm of total revenue in market i in quarter t
Client Satisfaction = Latent variable underlying the two indicators of client satisfaction (see Table 1, Panel A and Table 4) in quarter t-8
Patient Satisfaction = Latent variable underlying the three indicators of patient satisfaction (see Table 1, Panel B and Table 4) in quarter t-4
Doctor Satisfaction = Latent variable underlying the two indicators of doctor satisfaction (see Table 1, Panel C and Table 4) in quarter t-1
Economic Conditions = Natural logarithm of total income received by people who live or work in state i in quarter t
High (Low) Market Penetration Subsample = Sample with the percentage of HBP patients out of the entire population of each market greater (smaller) than 9.67% (median)
High (Low) Percentage Voluntary Patient Subsample = Sample with the percentage of HBP patients who pay part or all of their HBP insurance premiums greater (smaller) than 37.65% (median)

Table 6

Structural Equation Modeling (SEM) Analysis of the Relation between Changes in Satisfaction Measures and Changes in Future Revenue for the 20-Quarter Period 2000-2004

	Overall Sample	High % Voluntary Patient Subsample	Low % Voluntary Patient Subsample	High Market Penetration Subsample	Low Market Penetration Subsample
	(1)	(2)	(3)	(4)	(5)
ą	0.013	0.014	0.016	0.012	0.018
	(5.037)***	(2.959)***	(3.804)***	(3.522)***	(4.150)***
ΔClient Satisfaction $_{t-8}$	0.010	0.014	0.025	0.009	0.023
	(2.186)**	(1.494)	(3.104)***	(0.923)	(3.002)***
	0.079	0.098	0.202	0.054	0.195
ΔPatient Satisfaction $_{t-4}$	0.018	0.016	-0.022	0.013	0.014
	(0.958)	(2.215)**	(-2.088)**	(0.737)	(1.494)
	0.063	0.132	-0.135	0.048	0.098
ΔDoctor Satisfaction $_{t-1}$	0.008	0.019	0.010	0.009	0.020
	(1.669)*	(3.019)***	(2.186)**	(2.075)**	(3.025)***
	0.061	0.132	0.079	0.070	0.105
ΔRevenue$_{t-1}$	0.281	0.440	0.480	0.295	0.266
	(7.095)***	(6.560)***	(7.833)***	(5.555)***	(4.481)***
	0.310	0.447	0.499	0.326	0.291
ΔEconomic Conditions $_{t}$	4.581	16.377	19.131	4.064	8.401
	(2.266)**	(3.429)***	(5.223)***	(1.685)*	(2.272)**
	0.099	0.231	0.351	0.098	0.148
R^2	0.211	0.329	0.118	0.134	0.248
Sample size	561	179	178	281	280
Degrees of freedom	40	40	40	40	40
Chi-square	168.712	179.518	100.130	185.649	98.112
RMSEA	0.060	0.058	0.043	0.069	0.037
CFI	0.933	0.931	0.958	0.922	0.967

Each cell reports the maximum likelihood coefficient estimate, the z-statistic (in parentheses), and the standardized coefficient. ***, **, * indicate p-values of <0.01, 0.05, 0.10 in a two-tailed test.

See Table 5 for variable definitions.

ΔRevenue $_{t}$(Dependent Variable)=(Revenue $_{t}$ – Revenue $_{t-1}$) / Revenue $_{t-1}$

The other changes variables are defined in the same way.

Figure 1. HBP's Maintained Business Model

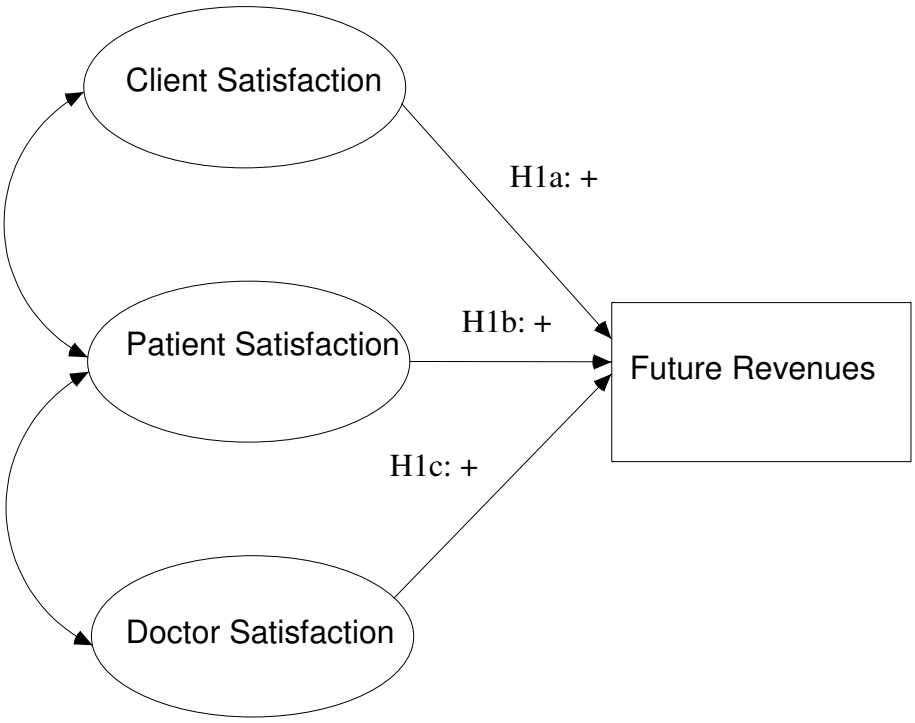
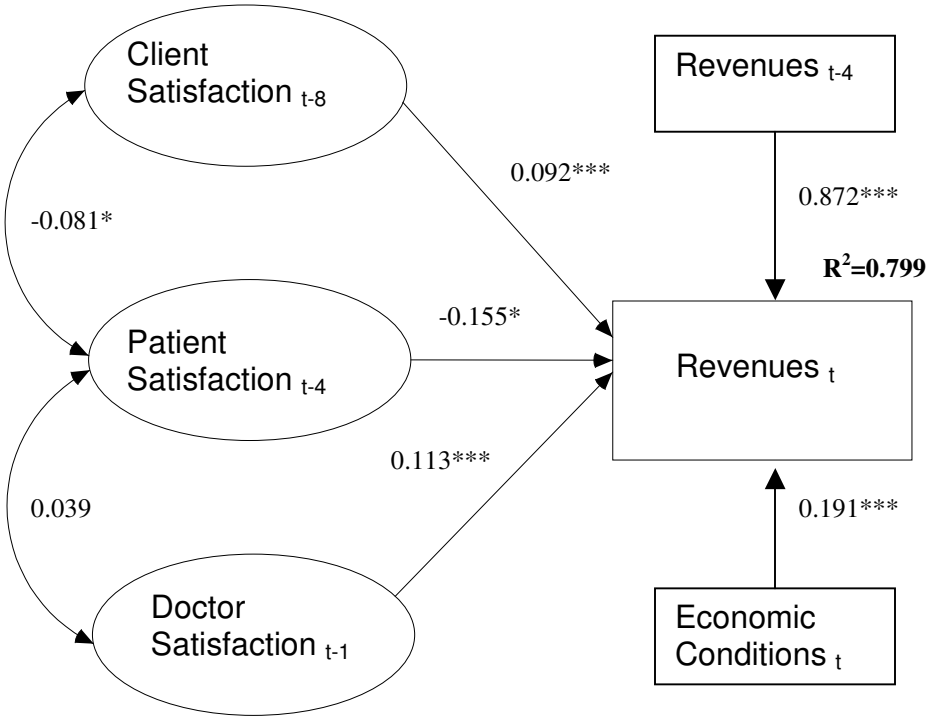
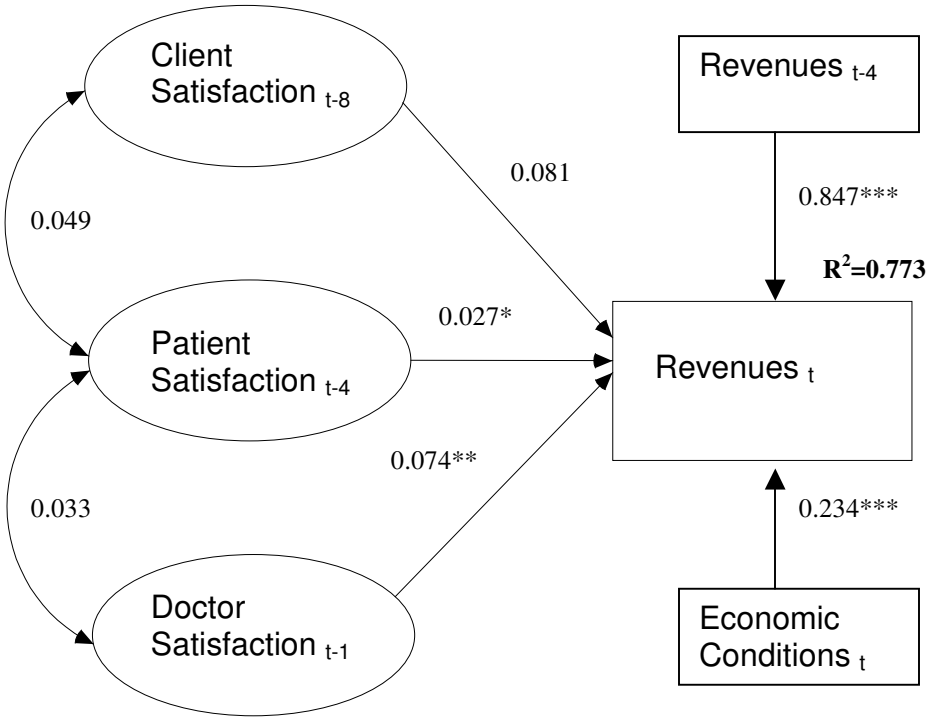


Figure 2.
Structural Equation Model Results for the Overall Sample (Structural Model)



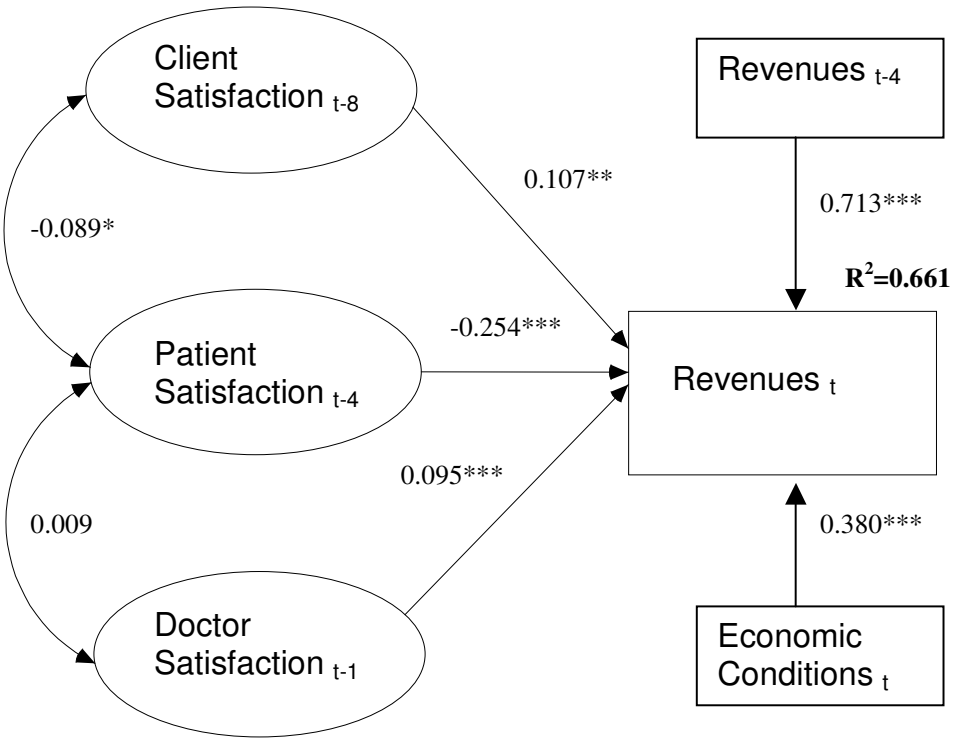
Model fit statistics:
Ch-square = 167.609
RMSEA = 0.054
CFI = 0.948

Figure 3.
Structural Equation Model Results for the High Percentage Voluntary Patient Subsample



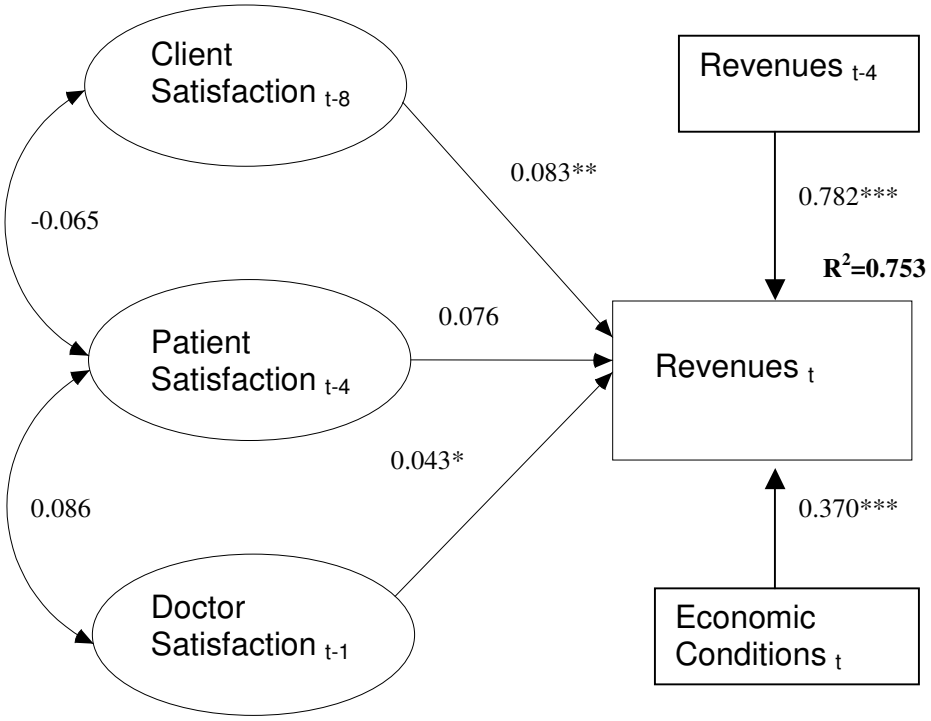
Model fit statistics:
Ch-square = 103.704
RMSEA = 0.061
CFI = 0.936

Figure 4.
Structural Equation Model Results for the Low Percentage Voluntary Patient Subsample



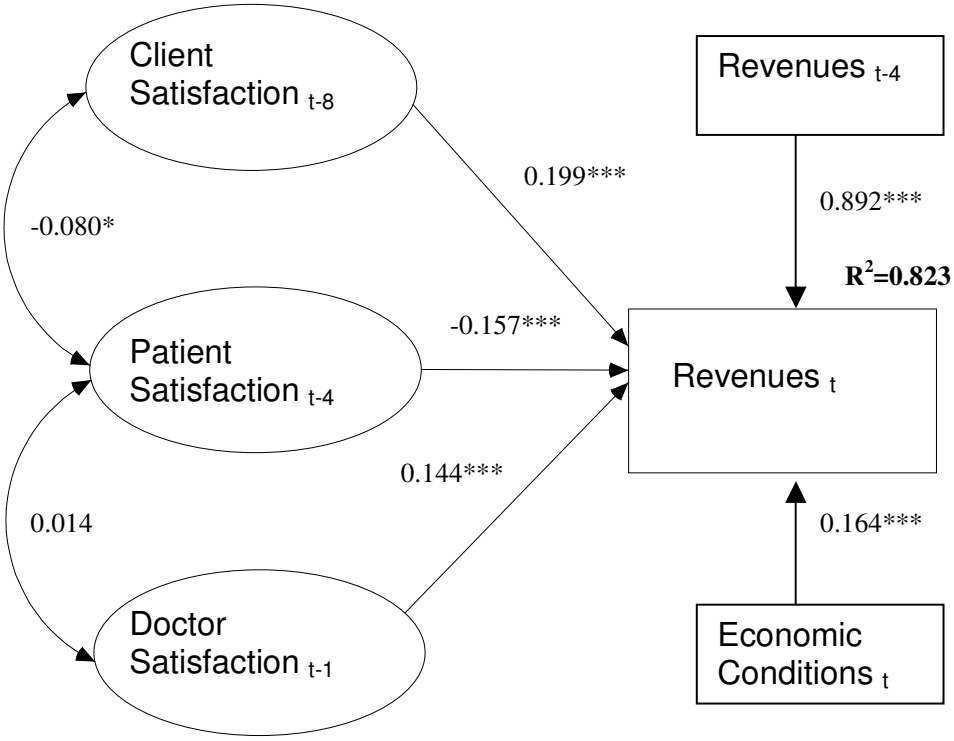
Model fit statistics:
Ch-square = 123.915
RMSEA = 0.080
CFI = 0.924

Figure 5.
Structural Equation Model Results for the High Market Penetration Subsample



Model fit statistics:
Ch-square = 97.429
RMSEA = 0.058
CFI = 0.927

Figure 6.
Structural Equation Model Results for the Low Penetration Rate Subsample



Model fit statistics:
Ch-square = 84.576
RMSEA = 0.046
CFI = 0.954

Appendix A. Excerpts from HBP's 2005 Bonus Plan for all employees

In 2005, our bonus goals have been set to continue our progress toward delighting our patients, clients and doctors. Each factor equates to the indicated percentage of one week's value of pay, totaling one additional week of pay if we achieve 100% for all factors for full-time employees. The bonus for part-time employees will be pro-rated. The goals are as follows:

		Target to Receive		
Category	**% of Bonus**	**100%**	**75%**	**0%**
Patient Satisfaction	20%	87% or more	83% - 86%	82% or less
Client Satisfaction	20%	87% or more	83% - 86%	82% or less
Doctor Satisfaction	20%	60% or more	57% -59%	56% or less
Admin Cost/Claim	40%	1% less than 2004	Between 2004 and 1% less	Same as 2004

As an additional incentive, we will add one extra day of pay (equals a bonus factor of 20%) for each additional one percentage point reduction in our administrative cost per claim, below the target level. Note that the administrative cost per claim target has been adjusted to eliminate some costs related to technology projects and our advertising campaigns.

The satisfaction goals are based on the "excellent" and "very good" ratings.