Xueming Luo & Christian Homburg

Satisfaction, Complaint, and the Stock Value Gap

This article introduces the concept of a stock value gap—the shortfall of a firm's actual market value from its optimal market value, as measured by a best-performing benchmark. Using a large-scale, real-world database, the authors test the effects of both customer satisfaction and customer complaint on the stock value gap of firms. The results show that customer complaint has a stronger effect than customer satisfaction on the value gap. Furthermore, there is some support for the moderating influences of working capital and firm specialization. The results provide actionable guidelines to build a more complete customer equity dashboard and encourage managers to provide a supportive organizational environment to create shareholder value.

Keywords: shareholder value, benchmarking, customer satisfaction, customer complaint

There is a growing consensus that marketing must be connected to finance. As top management focuses on maximizing shareholder value, researchers have stressed the importance of benchmarking the financial contribution of customer equity (Rust, Lemon, and Zeithaml 2004). Against this background, prior studies on positive customer insights have shown a beneficial impact of customer satisfaction on cash flows, Tobin's q, and excess stock returns (Anderson, Fornell, and Mazvancheryl 2004; Fornell et al. 2006; Morgan and Rego 2006). Luo (2007) finds a negative relationship between customer complaint and firm-idiosyncratic stock returns.

However, to our knowledge, no study in the marketing literature has compared a firm's actual market value with its optimal market value, which is measured by a best-performing benchmark. Perhaps, this lack of research exists because of the challenge to model this best-performing benchmark scientifically. Vorhies and Morgan (2005) cogently argue that benchmarking can be an important competency-enhancing tool. Using a benchmark approach helps a firm (1) identify best practices among competing firms given the same resources and (2) learn from best practices to close the gap to the best-performing competitors. Thus, if marketing research could not model the impact of customer insights on the stock value gap (between the actual and the benchmarked optimal stock value of a firm), finance executives would be less likely to appreciate the role of customer-related investments in helping the firm achieve its highest stock value compared with the optimal benchmark.

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This article attempts to fill this research void. In doing so, we extend the literature on "valuing" customer equity. We add modeling rigor to this literature by introducing an econometric approach to benchmark an optimal market value (Aigner, Lovell, and Schmidt 1977). A clear advantage of this approach is that it can precisely reveal the stock value gap for every company when scientifically benchmarked against optimal, best-performing competitors, instead of nonoptimal, average-performing rivals. The results of the stock value gap analysis and implied shortfalls in future cash flows will equip managers with actionable guidelines that take relevant market competitors into account.

Beyond this methodological contribution, our article adds theoretical depth to the literature by suggesting a more complete customer equity control system. We examine the effects of customer assets (satisfaction) and customer liabilities (complaint) on the stock value gap simultaneously. Whereas previous research has studied them separately, we address the unknown relative importance of customer satisfaction and customer complaint. On the basis of prospect theory, we argue that managers should no longer value satisfaction and complaint in isolation. Rather, both good news (of "angel" customers) and bad news (of "devil" customers) should be considered in one model. Indeed, to optimize firm stock value, managing the downside loss in terms of complaint may matter even more than the upside gain in terms of satisfaction.

Furthermore, we theorize the moderating roles of a firm's working capital and specialization regarding the influence of customer insights on the stock value gap. Not much is known about the impact of these factors in the area of customer satisfaction and customer complaint. By including both working capital and specialization, our research should help foster a contingency view of customers' impact on firm stock performance.

Our research should help advance the research stream pertaining to the marketing–finance interface in several ways (Srivastava, Shervani, and Fahey 1998). First, our work points out the importance of underresearched finan-

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cial metrics (firms' optimal stock value and the stock value gap) for marketing science. These new and important metrics provide refreshing directions for future marketing research efforts to quantify and benchmark the stock market value of investments in innovation, product quality, channel partnerships, and the like (Prabhu, Chandy, and Ellis 2005; Sorescu, Chandy, and Prabhu 2007; Srinivasan and Hanssens 2007). Second, it enables marketing executives to speak the same language as financial executives—that is, by articulating the financial benefit of intangible customer assets, such as satisfaction; liabilities, such as complaint; and their interactions with working capital. Third, our study helps understand more precisely the future cash flows of firms that result from positive and negative customer insights.

Next, we provide an overview of the framework and the benchmark method used to measure the stock value gap. This is followed by our hypotheses for the impact of customer satisfaction and complaint on the stock value gap. In addition, we derive how firms' working capital and specialization can function as contingency factors for this impact. We test the framework with a longitudinal data set assembled from multiple archival sources. We conclude with implications of the results.

Framework and Hypotheses

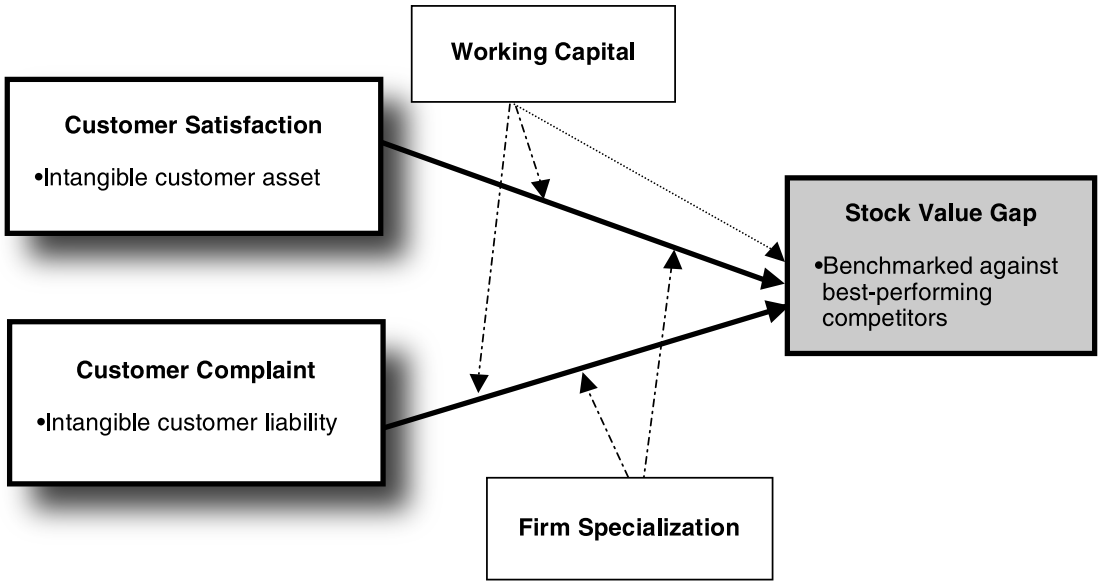
Overview of Framework

Figure 1 provides an overview of the relationships in our theoretical framework. The stock value gap is the shortfall of a firm's actual market value from its optimal market value as measured by benchmarking best-performance competitors. We suggest that customer satisfaction induces a smaller stock value gap, whereas complaint leads to a larger stock value gap. Our framework also predicts that customer complaint has a relatively stronger impact than satisfaction on the stock value gap. Furthermore, we expect that these relationships may change depending on firm contingencies, such as working capital and firm specialization.

Before we develop our hypotheses, we provide a brief explanation of the concept of the stock value gap because this idea appears to be new to the finance-related marketing literature. In general, the question whether a marketer maximizes stock value over time can be stated as follows: Does the firm optimally operate and invest in assets (e.g., customers, brands) that are expected to create value and enhance its stock performance in the most efficient way? Because all firms are not equal in seizing their opportunities and translating their resources into stock performance (Srivastava, Shervani, and Fahey 1998), we can trace out a curve that represents the optimal stock value given the opportunity sets, differences in firm characteristics, and the trade-off between operating characteristics. The resultant curve (efficient frontier) is the optimal stock value benchmark that consists of hypothetical best-performing competitors. This benchmark establishes the upper boundary for the relevant rival firms. Firms on this benchmark are optimal in using the operating resources to maximize their stock value compared with their competition; that is, they achieve the highest possible stock value, holding other things constant.[1] In contrast, firms inferior to this benchmark are not optimal in maximizing their stock value given their operating

[1]Compared with our best-performance benchmarking, a disadvantage of traditional ordinary least squares (OLS) is that it would compare a firm's market value with average-performing competitors. Thus, simple OLS may confound a stock value gap with a random statistical error. When talking about best-performing competitors, we mean the highest possible stock value in our analyzed sample. Interpretations of the results should be made under this premise.

FIGURE 1
Theoretical Framework



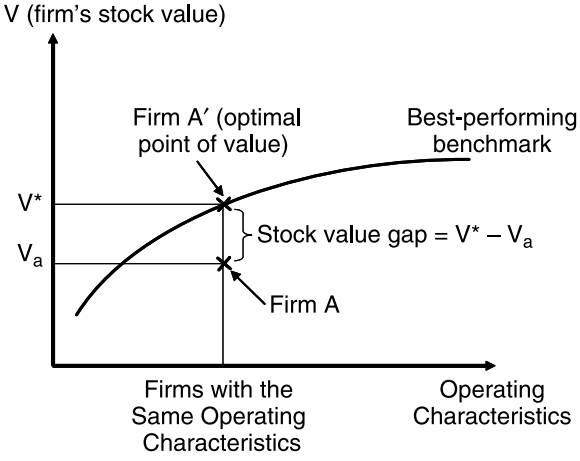
resources. As such, these firms are "underdogs" compared with best-performing competitors and have a stock value gap. This resultant value gap between the actual and the optimal market value is a manifestation of shortages in firms' future cash flows compared with the benchmark. As an illustrative example, Firm A in Figure 2 has an observed value of V_a, but a hypothetical competing Firm A′ on the benchmark has obtained a higher value of V* with the same operating characteristics (i.e., the same current profitability and the same leverage ratio). Thus, Firm A has not achieved its maximum value point, which would be attained if all investment decisions were optimal. In other words, benchmarked against the best-performing competitors, Firm A has a stock value gap (= $V^* - V_a$). Next, we discuss how the stock value gap is related to customer satisfaction and complaint, and we offer hypotheses about main effects, comparison of effect strengths, and moderating effects.

Hypotheses on Main Effects and Comparison of Effect Strength

Theoretically, several pathways can link customer satisfaction with the stock value gap. Following the framework of Srivastava, Shervani, and Fahey (1998), we determine a firm's stock value by the level, timing, and volatility of its future cash flows.[2] Based on this line of reasoning, marketing literature has confirmed several different underlying mechanisms that relate customer satisfaction to these value drivers and, thus, to shareholder value (Table 1).

[2]The fourth driver of shareholder value in Srivastava, Shervani, and Fahey's (1998, 1999) framework is the residual value. As we contemplate a continuous cash flow stream, this driver is incorporated within the first three. Specifically, Srivastava , Shervani, and Fahey (1999, p. 173) write, "If we adopt an infinitely long time horizon, the last of the four drivers is incorporated automatically into the valuation and is an outcome of the first three." As such, if a continuous cash flow stream is followed, representing the capital market value of the firm, we have no residual value term to consider.

FIGURE 2
Illustration of Stock Value Gap Based on Best-Performance Benchmark



In our study, we transfer the well-established link between customer satisfaction and shareholder value (Anderson, Fornell, and Mazvancheryl 2004; Fornell et al. 2006; Gruca and Rego 2005) to our value gap framework. According to the logic of Srivastava, Shervani, and Fahey (1998), firms with higher customer satisfaction are more likely than rival firms with lower customer satisfaction to become best performers with the highest possible stock value. Thus, all else being equal, the higher the customer satisfaction for a firm, the smaller is the stock value gap.[3]

With respect to complaint, we predict that a higher level of customer complaint leads to a larger stock value gap. This linkage appears to be justified, considering that complaining customers often express negative word-of-mouth behavior and that consumers are heavily influenced by this information (Luo 2007; Singh 1988). Moreover, Web-based information channels may even exacerbate the damage of negative word of mouth toward a wider audience, including existing and potential customers (Chevalier and Mayzlin 2006; Srivastava, Shervani, and Fahey 1998). Thus, higher complaint could cause an erosion of customer retention among existing customers and lead to higher costs to convince potential customers (e.g., higher costs for advertising) over time. This line of reasoning suggests that complaint likely reduces the level of net cash flows, delays the timing of new cash flows, and increases the risk of future cash flows. Thus, if we hold other things constant, the higher the complaint for a firm, the larger is the stock value gap to the best-performing competitors over time.

> H_1: All else being equal, (a) the higher the customer satisfaction for a firm, the smaller is the stock value gap to the best-performing competitors, and (b) the higher the customer complaint for a firm, the larger is the stock value gap to the best-performing competitors.

We expect that negative customer complaint may have a stronger impact than positive customer satisfaction. Psychologists explain that negative information appears more useful and diagnostic to the receiver than positive information (Taylor 1992). There is "a greater weighting of negative as compared with equally positive information in the formation of evaluative judgments" (Ahluwalia 2002, p. 271) and in decision making (Herr, Kardes, and Kim 1991). In addition, prospect theory holds that "losses loom larger than gains" (Kahneman and Tversky 1979, p. 263). Thus, in the context of valuing customer experience, this theory implies that negative experience (losses embodied by complaint) may matter more than positive experience (gains embodied by satisfaction).

Indeed, previous marketing research has shown that negative information about products conveys a significantly larger weight for potential buyers than an equivalent size of favorable information (Mahajan, Muller, and Kerin 1984).

[3]Our logic assumes that both satisfaction and complaint can offer financial content in stock markets (i.e., signaling the firm's future cash flows). This assumption is valid because prior studies have suggested that satisfaction and complaint information are often accessible to the public (i.e., through measures, such as the American Consumer Satisfaction Index) and tend to have an impact on stock prices over time (Fornell et al. 2006; Luo 2007).

TABLE 1
Mechanisms for the Impact of Satisfaction and Complaint on the Firm's Stock Value

Value Drivers[a]	Statements in Empirical Studies Referring to Satisfaction (and Complaint)[b]	Proposed Underlying Mechanisms
Level of future cash flows	"Firms that do better than their competition in terms of satisfying customers … generate superior returns." (Fornell et al. 2006, p. 11)	•Lower marginal costs of sales and marketing •Revenue growth from more repeat business
	"Satisfied customers are more loyal and increase their level of purchasing from the firm over time." (Gruca and Rego 2005, p. 116)	•Customer loyalty •Cross-buying •Lower customer defection rate •Positive word of mouth
	"The combined effect should be to raise the level of net cash flow." (Anderson, Fornell, and Mazvancheryl 2004, p. 173)	•Increase in customer retention •Positive word of mouth and recommendation •Increased price tolerance •Customer base as a network asset
	"More consumer negative voice would lead to higher retention costs, higher customer defection rates, and fewer profits, all of which diminish the calculated net present [customer lifetime value] and, thus, future cash flows." (Luo 2007, p. 77)	•Retention costs •Increase in defection rates •Decrease in sales volume
	"We find some evidence that an incremental negative review is more powerful in decreasing … sales than an incremental positive review is in increasing sales." (Chevalier and Mayzlin 2006, p. 346)	•Stronger decrease in sales by negative communicated information than increase in sales by positive information
Timing of future cash flows	"Because it is more likely that receivables turnover is better for firms with satisfied customers, speed of cash flow is positively affected." (Fornell et al. 2006, p. 5)	•Speed of buyer response to marketing efforts •Revenue growth benefits from more repeat business
	"Thus we should expect customer satisfaction to lead to faster market penetration and, in turn, to accelerated cash flows." (Anderson, Fornell, and Mazvancheryl 2004, p. 173)	•Cross-buying •Faster market penetration •Positive word of mouth and recommendation •Increased price tolerance •Customer base as a network asset
Risk of future cash flows	"Firms that do better than their competition in terms of satisfying customers … generate superior returns at lower systematic risk." (Fornell et al. 2006, p. 11)	•Cost of capital
	"Customer satisfaction insulates firms from competitors' efforts and from external environmental shocks, leading to a reduction in the variability of future cash flows." (Gruca and Rego 2005, p. 116)	•Insulating firms from competitors' efforts •Insulating firms from external environmental shocks
	"Thus, customer retention also should positively affect shareholder value by reducing the volatility and risk associated with anticipated future cash flows." (Anderson, Fornell, and Mazvancheryl 2004, p. 173)	•Increased customer retention •Increased price tolerance •Customer base as a network asset

[a]Taken from the framework of Srivastava, Shervani, and Fahey (1998). The residual value as a fourth driver of stock value is incorporated in the first three drivers because the time horizon is infinite (Srivastava, Shervani, and Fahey 1999).

[b]We present some selected studies that have received a lot of attention in the marketing literature. Even more empirical and conceptual support can be found cited within these studies. In reference to customer complaint and the different relative effect sizes of both constructs, to our knowledge, previous empirical literature has not examined their impacts on the timing and risk of future cash flows.

Anderson and Mittal (2000) suggest that negative experience can produce an impact that is "twice as strong on [return on investment]" as positive experience (Gupta and Zeithaml 2006, p. 726). Echoing this, Chevalier and Mayzlin (2006) find that negative book reviews have a stronger impact on relative sales than positive book reviews. As

such, transferred to our framework, if we hold other things constant, customer complaint has a larger effect on the stock value gap than customer satisfaction.

H_2: All else being equal, customer complaint has a relatively stronger impact than customer satisfaction on a firm's stock value gap to the best-performing competitors.

Hypotheses on the Moderating Effects

Working capital. Working capital is a firm's reservoir of cash, ability to pay off short-term liability, and net position in liquid assets. It represents a prominent measure of firm financial health and investment power (Graham and Harvey 2001; Myers 1984). Working capital can determine firm investment in various communication activities toward customers (i.e., advertising/promotional programs) and the financial community (i.e., investor relation activities).[4]

With respect to customer satisfaction, we predict that higher working capital strengthens the impact of customer satisfaction on the stock value gap. This is because firms with higher working capital can quickly signal the financial community about positive news of an increase in customer satisfaction (McAlister, Srinivasan, and Kim 2007; Srivastava, Shervani, and Fahey 1998). In addition, successful investments in advertising and promotion should communicate and leverage positive information about customer satisfaction more effectively. As a likely result, customer loyalty behavior (e.g., cross-buying behavior, positive word of mouth) is boosted, leading to a raised level and lower volatility of future cash flows. Against this background, firms with more working capital and investment power may expand the benefits of customer satisfaction, thus strengthening the impact of customer satisfaction on the stock value gap.

Regarding complaint, we predict that higher working capital weakens the impact of complaint on the stock value gap. When a firm has higher working capital, it can communicate more successfully why complaint has increased and how this will be reversed in the future. This should make complaint less harmful in influencing the customer–profit chain (Gupta and Zeithaml 2006). Another aspect is the opportunity to invest in complaint management. With a supportive environment and healthy investment capital, complaint management can more clearly induce greater future repurchase and brand equity (Fornell and Wernerfelt 1988) or even "increase loyalty beyond the degree before the failure" (Homburg and Fürst 2005, p. 95). Thus, firms with higher working capital can limit the negative cash flow consequences of complaint, which should weaken the impact of complaint on the stock value gap.

H_3: (a) The impact of customer satisfaction on the stock value gap is stronger for firms with higher working capital, and (b) the impact of customer complaint on the stock value gap is weaker for firms with higher working capital.

Firm specialization. By and large, a higher degree of firm specialization means that the firm has similar product or service offerings and more focused operations. More specialized firms tend to have a lower degree of diversification and complexity (Berger and Ofek 1995), a more efficient distribution of resources, and, thus, a higher market value (Laeven and Levine 2007). Higher specialization may suggest a greater ability for the firm to focus resources on shareholder value-adding strategies.[5]

With respect to customer satisfaction, we expect that a higher degree of specialization strengthens the impact of satisfaction on the stock value gap. This is because specialized firms with similar product offerings and more efficient operations are likely to follow a focused approach that can facilitate the transfer of customer satisfaction to valuable customer loyalty and brand equity over time (Fornell et al. 2006; Reinartz, Krafft, and Hoyer 2004). According to this line of reasoning, firms with a higher degree of specialization may expand the benefits of customer satisfaction in reducing the chance of shortfalls in future cash flows and reducing the risk of anticipated cash flows (Gruca and Rego 2005; Srivastava, Shervani, and Fahey 1998). Therefore, firm specialization strengthens the impact of customer satisfaction on the stock value gap.

Regarding complaint, we expect that higher specialization weakens the impact of complaint on the stock value gap. This is because more specialized firms with more focused and efficient product offerings may experience lower costs and greater effectiveness in the complaint management process (Fornell and Wernerfelt 1988). These firms can respond to customer complaints in a more adequate and competent way that promotes customer justice evaluation and future loyalty behavior (Luo 2007). Specialized firms may not only handle customer complaint management more effectively but also leverage complaint information more competently in improving organizational processes and enhancing organizational learning over time. This implies that firm specialization may serve as a buffer against the negative cash flow consequences of complaint, thus weakening the impact of complaint on the stock value gap, in accordance with Srivastava, Shervani, and Fahey (1998).

H_4: (a) The impact of customer satisfaction on the stock value gap is stronger for firms with a higher degree of specialization, and (b) the impact of customer complaint on the stock value gap is weaker for firms with a higher degree of specialization.

Data and Measures

We obtained cross-sectional time-series data to test the hypotheses. In particular, we collected data in the airline industry from multiple archival sources, including Center for Research in Security Prices (CRSP), COMPUSTAT, the American Consumer Satisfaction Index (ACSI), and the

[4]We also check our result robustness using an alternative measure of working capital—namely, firm advertising and promotion capital. We find that working capital and firm advertising and promotion capital are significantly correlated ($r = .351$, $p < .01$), and the moderating effects of working capital still hold with this alternative measure.

[5]However, note that the main effect of specialization on performance outcomes can also be negative. Nevertheless, in their event studies about product portfolios, Woolridge and Snow (1990) and Jones and Danbolt (2005) find evidence for a positive overall effect of diversification.

U.S. Department of Transportation (USDT). Airline data and measures have been used previously both inside marketing literature (e.g., Dixit and Chintagunta 2007; Luo 2007; Rust, Lemon, and Zeithaml 2004) and outside marketing literature (e.g., Lapré and Tsikriktsis 2006; Rose 1990). Table 2 presents the measures and data sources we used in this study.

Our research setting with a single industry is appropriate because, in a scientific benchmarking methodology, researchers should ensure that a firm will not be benchmarked against noncomparables. For example, it is not appropriate or fair to compare the stock value of American Airlines with the stock value of Google, because these companies are from different industries and may have different optimal, best-performance benchmarks (Kumbhakar and Lovell 2000; Narasimhan, Rajiv, and Dutta 2006).

Data and Measure for Stock Value Gap

We measure the stock value gap for each firm with the stochastic frontier methodology (SFM) from the econometrics literature (Aigner, Lovell, and Schmidt 1977; Kumbhakar and Lovell 2000). Essentially, SFM estimates the best-performance benchmark, or the efficient frontier, after accounting for random stochastic error. Because the resultant benchmark represents the maximized and optimal conversion of operating characteristics into a stock value outcome, SFM can objectively and scientifically measure the stock value gap. In marketing, several studies have successfully applied SFM in advertising, marketing capability, retailing, and other familiar areas (Dutta, Narasimhan, and Rajiv 1999; Murthi, Srinivasan, and Kalyanaram 1996; Shi et al. 2005).

There are three primary advantages of SFM over the traditional ordinary least squares (OLS) approach. First, it objectively constructs the benchmark with best performers. In contrast, the traditional OLS approach subjectively provides a benchmark with average performers in an ad hoc, less rigorous way. Second, SFM is stochastic in nature and can not only tease out the biases of outliers but also realistically capture random statistical errors or pure business luck. Third, in contrast to other basic approaches assuming homogeneity, the SFM model can handle heterogeneity with random parameter modeling (Greene 2003; Narasimhan, Rajiv, and Dutta 2006).[6]

Mathematically, SFM models the stock value gap ($g_{i,t}$) with a stochastic term for each firm i (i = 1, 2, …, I) at time t (t = 1, 2, …, T). This stochastic term is the shortfall to the optimal best-performance benchmark. Formally, the SFM model in panel data form is as follows:

$$(1)\qquad V_{i,t} = \alpha_0 + \sum_{k=1}^{K} \gamma_k X_{i,t} + h_{i,t} - g_{i,t},$$

where $V_{i,t}$ is a firm's stock value (collected from CRSP), $g_{i,t}$ is the stock value gap with a $\|[0, \sigma_g^2]\|$ half-normal distribution, and $h_{i,t}$ is random statistical noise with a normal $[0, \sigma_h^2]$ distribution. In addition, $X_{i,t}$ is a vector of firm operating characteristics (i.e., firm sales, profitability, employee productivity, and firm leverage collected from the Bureau of Transportation Statistics [BTS] and COMPUSTAT), and γ_k is the model coefficient (k = 1, 2, …, K).[7]

We specified the log-likelihood of SFM as follows:

$$(2)\qquad \text{Log } L_{SFM} = -\frac{1}{2}\log(2/\pi) - \log\sigma - \frac{1}{2}[(h_i - g_i)/\sigma]^2 + \log\phi[(h_t - g_i)\lambda/\sigma],$$

where $\sigma = (\sigma_g^2 + \sigma_h^2)^{1/2}$ and $\lambda = \sigma_g/\sigma_h$ (Greene 2003; Kumbhakar and Lovell 2000). Because of the possible bias of unobserved heterogeneity in cross-sectional time-series data that could lead to misleading results, we specified a random parameter SFM, an extension of the basic panel. According to Greene (2003, p. 608), the random parameter approach to SFM is based on conditional density: $f^1(V_{it}^1|X_{it}^1, \gamma_i^1) = f(\gamma_i^{1\prime}X_{it}^1)$, i = 1, …, N^1, t = 1, …, T^1, where $f^1(\cdot)$ is the density for the SFM approach. The random parameter SFM accounts for the possibility that parameters are randomly distributed with heterogeneous means: $E[\gamma_i^1|Z_i] = \gamma^1 + \Delta Z_i$, $Var[\gamma_i^1|Z_i] = \Sigma$. This random parameter SFM can accommodate half-normal, truncated-normal, exponential assumptions, as well as firmwise and timewise heteroskedasticity.

We normalize the stock value gap (g_{it}) parameter as a ratio between 0 and 1 (or 100%), because doing so (1) makes the results comparable across firms and (2) enables a more straightforward interpretation of the results (0 means that the firm has achieved the optimal stock value given the opportunity sets and thus has no gap between the firm's actual and optimal market value).[8] The larger this parameter, the wider is the gap between the firm's actual and optimal market value (Aigner, Lovell, and Schmidt 1977; Habib and Ljungqvist 2005; Luo and Homburg 2007). In our SFM results, the mean of the stock value gap was 31.72%, and the standard deviation was 19.05% (see Table 2).

Note that our measure for firms' stock value ($V_{i,t}$) is the risk-adjusted excess return (Campbell et al. 2001; Fama and French 1993, 2006). Following the finance literature, we

[6]This feature of SFM is attractive because cross-sectional, time-series panel data are often confounded with unobserved heterogeneity. If not treated appropriately, such confounding effects could seriously threaten the credibility of modeling results for best-performance benchmark (Dutta, Narasimhan, and Rajiv 1999; Narasimhan, Rajiv, and Dutta 2006). We checked our SFM result robustness by entering a dummy variable (specialized versus nonspecialized airline companies). This robustness check yields quantitatively similar findings, in support of our SFM results.

[7]We measured firm sales as the log of reported sales revenue from the BTS and COMPUSTAT to capture the firm size effect. We expect that sales have diminishing returns (i.e., negative influence of its squared term) (Habib and Ljungqvist 2005). Thus, we entered sales and sales-squared terms. Profitability is the ratio of income after extraordinary items to book value of total assets. We measured employee productivity as the ratio of sales to employees in the firm. We measured firm leverage as the ratio of debts to book value assets (Rao, Agarwal, and Dahlhoff 2004).

[8]Our SFM results on the mean of $g_{i,t}$ (stock value gap) over the years are 33.28 (Y1999), 32.73 (Y2000), 39.08 (Y2001), 33.82 (Y2002), 30.03 (Y2003), 30.16 (Y2004), 31.89 (Y2005), and 31.17 (Y2006). In addition, in our SFM results, we find that the gamma estimate for the stock value gap (σ_g^2) is 6.028 ($p < .001$) and that the gamma estimate for the statistical noises (σ_h^2) is 14.337 ($p < .001$).

TABLE 2
Measures and Data Descriptives

Variables	Definition	Data Source	Data Frequency	M	SD	V1	V2	V3	V4	V5
Stock value gap (V1)	The shortfall of a firm's actual stock value from the optimal stock value based on benchmarking against best-performing competitors	CRSP and French's data bank	Daily (January 4, 1999–December 30, 2006)	31.72	19.05	1.000				
Customer satisfaction (V2)	The overall consumption experience of real users surveyed in the ACSI	ACSI	Quarterly each year (Q1:1999–Q4:2006)	64.762	4.357	–.191	1.000			
Customer complaint (V3)	Customer complaint records filed directly with the regulatory third-party of the USDT	USDT	Monthly (January 1999–December 2006)	48.054	70.309	.370	–.353	1.000		
Working capital (V4)	A firm's reservoir of cash and liquid assets, current assets (accounts receivable, inventories, and cash) less current liabilities (accounts payable and short-term debt)	BTS and COMPUSTAT	Quarterly (Q1:1999–Q4:2006)	–996.704	1,326.293	–.165	.178	–.139	1.000	
Firm specialization (V5)	Coding of airline firms with a higher degree of specialization or a lower degree of specialization		Quarterly (Q1:1999–Q4:2006)	.556	.497	–.069	.297	–.251	.106	1.000

Notes: Correlation result (r) that is greater than .11 has a $p < .05$. BTS = Bureau of Transportation Statistics. French's data bank is available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

adjusted firms' stock returns by regressing them against the Fama–French four risk factors.[9] Thus, we pulled out a total of 26,208 (= 18,144 + 8064) stock price data points, where 18,144 = 9 airline firms × 8 years × 252 trading days for the firm and 8064 = 8 years × 252 trading days × 4 factors for the Fama–French variables. After deriving this clean measure of daily risk-adjusted stock value, we aggregated it to the quarterly level as the firm's stock value ($V_{i,t}$).

Although CRSP has fine-grained daily frequency data and the airline industry has many domestic airline companies, our data set was limited to nine airlines over eight years in 32 continuous quarters, from Q1:1999 to Q4:2006. This is because we do not have complete data for other airline companies across the different archival sources and because these sources have different frequencies of data reporting (see Table 2). The nine airline companies are Alaska Airlines, American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, Mesa Air Group, AirTran Airways, Southwest Airlines, and United Airlines. Importantly, these nine airline companies seem to represent the whole industry well because, collectively, they account for more than 95% of revenues for all U.S. airlines. As a result, after matching firms' stock value gap data from CRSP and BTS with other data for customer satisfaction and complaint from sources such as COMPUSTAT, the ACSI, and the USDT, we have a total of 288 data points (288 = 9 airline companies × 4 quarters × 8 years) for our subsequent analyses.

Data and Measure for Customer Satisfaction

To measure customer satisfaction, we used archival data from the ACSI, provided by the National Quality Research Center at the University of Michigan. This ACSI measure of customer satisfaction assesses real customers' overall experience with products rather than expert opinion (Anderson, Fornell, and Lehmann 1994; Anderson, Fornell, and Mazvancheryl 2004). It uses an interval scale from 0 to 100, in which 100 is the highest level of customer satisfaction.

The ACSI is a comprehensive and reliable data source for measuring customer satisfaction. First, it covers *Fortune* 200 firms from 40 different industries. For each firm, the ACSI interviews more than 200 consumers every year. Thus, more than 50,000 consumers are interviewed by the ACSI annually. Second, it accounts for more than one-third of U.S. gross domestic product and covers all major economic sectors, such as manufacturing durables and nondurables, finance, insurance, communications, transportation, retail, utilities, and others. Third, the methodology of measuring customer satisfaction is consistent across firms and over time. It employs the same interview procedures, survey questionnaire, random sampling, and estimation methods. A rigorous test of the validity and reliability of the ACSI can be found in the work of Fornell and colleagues (1996). Many studies have successfully employed the ACSI data set in the marketing literature (e.g., Fornell et al. 2006; Gruca and Rego 2005; Luo and Bhattachara 2006; Mittal et al. 2005).

However, a limitation of this data set is that it measures customer satisfaction only one quarter per year for each firm covered in the ACSI. In addition, the ACSI does not have customer satisfaction data for all airline companies for the Q1:1999–Q4:2006 period. Given the difficulty of obtaining archival data, we must rely on this best available data source that can be matched with CRSP and other data, such as customer complaint.

Data and Measure for Customer Complaint

In measuring customer complaint, we used secondary data from the USDT. This data source measures real-world customer complaint objectively as the number of complaint records filed by airline passengers to the regulatory third-party of the USDT rather than as self-reported by the airline companies. Because this USDT database is at a monthly level (January 1999–December 2006) by the rate of complaints per 100,000 passengers, we aggregated the customer complaint data to a quarterly level and matched them with the ACSI, CRSP, and COMPUSTAT data sets.

The USDT is a reliable and valid data source for measuring customer complaint. First, it has data for all U.S. airlines, ranging from larger companies, such as American Airlines, to smaller companies, such as Alaska Airlines. Second, it has a comprehensive description of different types of complaints by categorizing the recorded complaints into 12 areas (e.g., flight problems, customer service, oversales, baggage, advertising, disability, discrimination, refunds, animals). Third, the ways and procedures for airline customers to report complaints are the same over time. Since 1999, customers of airline companies can consistently file complaints with the USDT in writing, by telephone, through e-mail, or face-to-face. Therefore, this objective USDT measure of customer complaint has high face validity and is regarded as "the broadest measure available" (Lapré and Scudder 2004, p. 125).

Data and Measure for Other Variables

For firm-level control variables, we collected data from companies' financial reports filed with the BTS, the Securities and Exchange Commission, and COMPUSTAT. Specifically, we obtained airline passengers transported (in natural log), freight transported (in natural log), and mail transported (in natural log). Because these data are reported to the BTS at a monthly level, we aggregated them at a quarterly level to match other data sets.

We control for the influence of firm earnings, measured as airline companies' income after extraordinary items at the quarterly level (Haunschild and Sullivan 2002; Lapré and Tsikriktsis 2006). We also control for firm advertising

[9] $R_{i,d} = \alpha_{i,d} + \beta_i^{MKT}R_d^{MKT} + \beta_i^{SMB}R_d^{SMB} + \beta_i^{HML}R_d^{HML} + \beta_i^{UMD}R_d^{UMD} + e_{i,d}$, where $R_{i,d}$ is the return for a typical stock i at time d excessive to risk-free rate, R_d^{MKT} are portfolio returns of the New York Stock Exchange and the American Stock Exchange excessive to risk-free rate, R_d^{SMB} is the difference of returns between small and large stocks, R_d^{HML} is the difference of returns between high and low book-to-market stocks, and R_d^{UMD} is the return momentum. We then use the residual of this regression as a clean and more precise measure of firm stock return, which has corrected the biases of common market factors. The daily data for the Fama–French factors are from French's data bank (see Table 2; see also http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html).

and publicity investment, which is the sum of airlines' expenses in advertising and publicity at the quarterly level (in natural log) collected from BTS for the Q1:1999–Q4:2006 period.

Our data set has two moderating variables: working capital and firm specialization. We measure working capital as the firm's current assets (mainly accounts receivable, inventories, and cash) less current liabilities (primarily accounts payable and debt). We collected data for working capital from the BTS for the Q1:1999–Q4:2006 period. To measure firm specialization, we construct a dummy variable.[10] In particular, we code specialized airline companies (AirTran Airways, Alaska Airlines, Mesa Air Group, and Southwest Airlines) as 1 and nonspecialized airline companies (American Airlines, Continental Airlines, Delta Air Lines, Northwest Airlines, and United Airlines) as 0.

Furthermore, we control for several macroeconomic factors collected from Datastream for the Q1:1999–Q4:2006 period. More specifically, consumer price is the reported consumer price index each month (in %). We measure interest as the U.S. prime interest rate reported each month (in %). Unemployment is the reported unemployment rate each month (in %). Finally, the oil price is the market price for crude oil in the U.S. market.

Analysis Approach

In the data analyses, our dependent variable is the stock value gap, and our independent variables are customer satisfaction, customer complaint, moderators, and controls. Because the dependent variable has a censored distribution with an upper limit of 1 and a lower limit of 0, we employ a two-limit robust Tobit model to parcel out this sample censoring bias (Greene 2003). In particular, $g_{i,t+1}^*$ denotes the latent stock value gap at time t + 1, the lagged $Z_{i,t}$ denotes a vector of independent variables at time t, and β denotes a vector of coefficients. Then, we specify the observed stock value gap ($g_{i,t+1}$) of firm i at time t + 1 as follows:

$$
\begin{aligned}
(3)\quad g_{i,t+1} &= g_{i,t+1}^* = \beta Z_{i,t} + \varepsilon_{i,t} = \beta_0 + \beta_1 CS_{i,t} + \beta_2 CC_{i,t} \\
&\quad + \beta_3 CS_{i,t} \times WC_{i,t} + \beta_4 CS \times FS_{i,t} + \beta_5 CC_{i,t} \times WC_{i,t} \\
&\quad + \beta_6 CC_{i,t} \times FS_{i,t} + \beta_7 WC_{i,t} + \beta_8 FS_{i,t} \\
&\quad + \beta_{controls} Controls + \varepsilon_{i,t+1}, \text{ and} \\
\varepsilon_{i,t+1} &= \rho\varepsilon_{i,t} + \omega_{i,t+1}, \text{ if } 0 < g_{i,t+1}^* < 1, \\
g_{i,t+1} &= 0 \text{ if } g_{i,t+1}^* \le 0 \text{ (lower bound), and} \\
g_{i,t+1} &= 1 \text{ if } g_{i,t+1}^* \ge 1 \text{ (upper bound),}
\end{aligned}
$$

where $CS_{i,t}$ is customer satisfaction, $CC_{i,t}$ is customer complaint, $WC_{i,t}$ is working capital, $FS_{i,t}$ is firm specialization, and $\varepsilon_{i,t}$ and $\omega_{i,t}$ are residuals.[11] We specify the log-likelihood of the Tobit model as follows (see Greene 2003):

$$
\begin{aligned}
(4)\quad \log L_{Tobit} &= \sum_{i=1}^{N} \log f\left[(g_{i,t+1} - Z'_{i,t}\beta)/\sigma_\varepsilon\right] \\
&\quad \times 1(\underline{c}_i < g_{i,t+1} < \bar{c}_i) - \log\left\{F\left[(\bar{c}_i - Z'_{i,t}\beta)/\sigma_\varepsilon\right]\right. \\
&\quad \left. - F\left[(\underline{c}_i - Z'_{i,t}\beta)/\sigma_\varepsilon\right]\right\}, \ (\underline{c}_i = 0, \ \bar{c}_i = 1).
\end{aligned}
$$

In addition, cross-sectional, time-series panel data may involve unobserved heterogeneity, which can generate a bias in hypotheses-testing results. As a result, we also employ a random parameter robust Tobit model to parcel out this bias. In the random parameter Tobit approach, the model specification is based on conditional density as follows: $f^2(g_{it+1}^2 | X_{it}^2, \beta_i^2) = f(\beta_i^{2\prime} X_{it}^2)$, i = 1, …, N^2, t = 1, …, T^2, where $f^2(\cdot)$ is the density for the Tobit function. The random parameter Tobit also models parameters as randomly distributed with heterogeneous means and can consider both firmwise and timewise heteroskedasticity (Greene 2003; Narasimhan, Rajiv, and Dutta 2006).

Results

Results on Main Effects

In H_1, we predicted that, all else being equal, the higher the customer satisfaction for a firm, the smaller would be the stock value gap to the best-performing competitors. As Table 3, Column 2, reports, the robust Tobit results suggest that customer satisfaction has a negative, significant impact (b = –.051, $p < .05$) on the stock value gap. That is, higher customer satisfaction leads to a smaller stock value gap to the best-performance benchmark, as we expected. In addition, we predicted that, all else being equal, the higher the complaint, the larger would be the stock value gap to the best-performing competitors. As Table 3 reports, the robust Tobit results suggest that complaint has a positive, significant impact (b = .107, $p < .01$) on the stock value gap. That is, higher complaint leads to a larger stock value gap to the best-performance benchmark, as we expected. Thus, overall, the data strongly support H_1.

Results on the Comparison of Effect Strength

In H_2, we predicted that, all else being equal, customer complaint would have a relatively stronger impact than customer satisfaction on a firm's stock value gap to the best-performing competitors. As Table 3 shows, the strength of the effect of customer complaint ($p < .01$) is stronger than that of customer satisfaction ($p < .05$). As such, there is preliminary evidence for the stronger impact of complaint on the stock value gap. To test H_2 statistically, we performed a

[10] In other words, we have two groups: Group 1 (e.g., American Airlines) includes airlines that mainly are hub based in operations; provide full services with relatively different, more diverse offerings; and are relatively less focused and less specialized. Conversely, Group 2 (e.g., Alaska Airlines) includes airlines that mainly are point-to-point in operations; provide limited services with relatively similar, less diverse offerings; and are relatively more focused and more specialized.

[11] Our hypothesis-testing results do not change when we add the lagged dependent variable. In addition, because we modeled autoregressive (AR1) serial correlation with the error terms, our model accommodates some inertia in the system (Anderson, Fornell, and Mazvancheryl 2004; McAlister, Srinivasan, and Kim 2007; Mittal et al. 2005). Moreover, we employed the Hildreth–Houck method in the robust Tobit model to correct autocorrelation and heteroskedasticity biases.

TABLE 3
Impact of Customer Satisfaction and Complaint on Future Stock Value Gap (Q1:1999–Q4:2006)

	Two-Limit Robust Tobit Model					Random Parameter Tobit Model				
	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10
Lagged Independent Variables	Prediction	Estimate	*p*-Value	Estimate	*p*-Value	Estimate	*p*-Value	Estimate	*p*-Value	Support for Hypothesis
Customer satisfaction	H_{1a}	–.051	**	–.055	**	–.052	**	–.053	**	H_{1a} supported
Customer complaint	H_{1b}	.107	***	.109	***	.113	***	.112	***	H_{1b} supported
Customer satisfaction × working capital	H_{3a}			–.032	*			–.031	*	H_{3a} supported
Customer complaint × working capital	H_{3b}			–.077	**			–.079	**	H_{3b} supported
Customer satisfaction × firm specialization	H_{4a}			–.028	*			–.045	**	H_{4a} supported
Customer complaint × firm specialization	H_{4b}			–.005	n.s.			–.006	n.s.	H_{4b} not supported
Working capital		–3.116	**	–2.308	*	–3.095	**	–3.011	**	
Firm specialization		–.093	*	–.072	n.s.	–.091	*	–.075	n.s.	
Advertising and promotion		–.216	n.s.	–.211	n.s.	–.216	n.s.	–.219	n.s.	
Operating passenger revenue		–3.152	**	–3.152	**	–3.125	**	–3.156	**	
Passenger		1.331	***	1.337	***	1.334	***	1.303	***	
Mail		.125	*	.126	*	.129	*	.122	*	
Freight		1.768	***	1.767	***	1.806	***	1.776	***	
Consumer price		–.772	*	–.752	*	–.766	*	–.767	*	
Interest		–.078	n.s.	–.079	n.s.	–.081	n.s.	–.076	n.s.	
Unemployment		.395	n.s.	.395	n.s.	.312	n.s.	.378	n.s.	
Oil price		–.912	*	–.928	*	–.927	*	–.929	*	

*$p < .10$.
**$p < .05$.
***$p < .01$.
Notes: Because stock value gap results are truncated with censored distribution, we employed two-limit robust Tobit regression to test the hypotheses. We used random parameter Tobit models that accommodate firmwise and timewise heteroskedasticity and latent heterogeneity to check results robustness. n.s. = not significant.

Wald coefficient test to check whether the two effects differed in magnitude. The resultant Wald's test clearly favors rejecting the null hypothesis ($F_{diff} = 19.066$, $p < .01$) of the same effect size. Thus, the data support H_2.[12] We conclude that customer complaint has a relatively stronger impact than customer satisfaction on a firm's stock value gap, as we predicted.

Results on Moderating Effects

In H_3, we predicted that the impact of customer satisfaction on the stock value gap would be stronger for firms with a higher working capital than for firms with a lower working capital. The results in Table 3, Column 4, indicate that working capital significantly strengthens (b = –.032, $p <$ .10) the effect of customer satisfaction on reducing the stock value gap to the best-performance benchmark. Thus, customer satisfaction has a stronger impact on reducing the stock value gap for firms with higher working capital, as we expected (see Figure 3, Panel A).[13] In addition, we predicted that the impact of complaint on the stock value gap would be weaker for firms with higher working capital than for those with lower working capital. The results in Table 3 indicate that working capital significantly reduces (b = –.077, $p < .05$) the effect of complaint on enlarging the stock value gap to the best-performance benchmark. Thus, complaint has a weaker impact on the stock value gap for firms with higher working capital, as we predicted (see Figure 3, Panel B). Therefore, H_3 is fully supported.

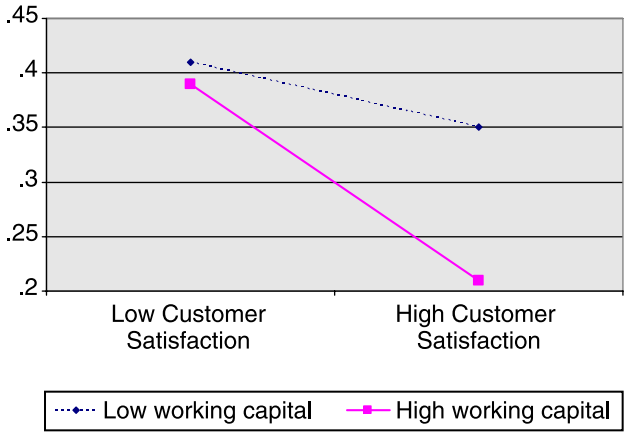
In H_4, we predicted that the impact of customer satisfaction on the stock value gap would be stronger for firms with a higher degree of specialization than for those with a lower degree of specialization. The results in Table 3 support the notion that firm specialization (b = –.028, $p < .10$) strengthens the effect of customer satisfaction on reducing the stock value gap. Thus, customer satisfaction seems to have a stronger impact on reducing the stock value gap for firms with a higher degree of specialization. In addition, we predicted that the impact of complaint on the stock value gap would be weaker for firms with a higher degree of specialization than for those with a lower degree of specialization. However, the results in Table 3 indicate that specialization does not significantly reduce ($p > .10$) the effect of complaint on the stock value gap to the best-performance benchmark. Therefore, overall, the data only partially support H_4.

Results Robustness

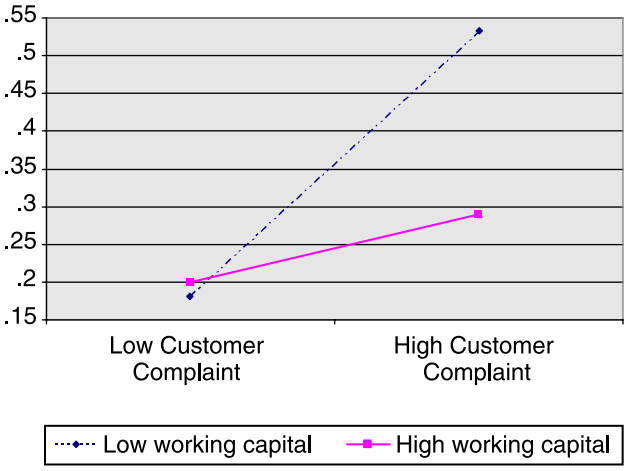
Risk implications of customer satisfaction and customer complaint. As discussed previously, we also expected that satisfaction and complaint would have a significant impact on the risk of future cash flows and, thus, on the volatility of stock prices. To test these propositions empirically, we followed the finance literature (Campbell et al. 2001; Fama and French 2006) and constructed the quarterly volatility of the risk-adjusted excessive return, which is derived from the Fama–French momentum four-risk factor model ($R_{i,d} = \alpha_{i,d} + \beta_i^{MKT}R_d^{MKT} + \beta_i^{SMB}R_d^{SMB} + \beta_i^{HML}R_d^{HML} + \beta_i^{UMD}R_d^{UMD} + e_{i,d}$) for each firm on the basis of daily stock price data. As Table 4 reports, the results suggest that customer satisfaction and complaint have a significant impact on the volatility of firm stock prices (smallest $p < .05$). By and large, the moderating results of working capital are also robust. Thus, these findings confirm that customer insights, such as satisfaction and complaint, influence the share-

FIGURE 3
Plot of the Moderating Role of Working Capital

A. The Moderating Role of Working Capital on the Impact of Customer Satisfaction on Stock Value Gap



B. The Moderating Role of Working Capital on the Impact of Customer Complaint on Stock Value Gap



[12]These Wald's test results still hold and support H_2 even after we include the significant interactions in both the robust Tobit model and the random parameter Tobit model.

[13]The change of R-square for entering the interaction terms among mean-centered customer satisfaction, customer complaint, working capital, and firm specialization was statistically significant ($\Delta R^2 = .04$, $p < .10$). Because the highest variance inflation factor was 3.192, much less than the warning point of 10.0, multicollinearity did not pose a serious threat to the reported findings.

TABLE 4
Additional Results on the Impact of Satisfaction and Complaint on the Volatility of Risk-Adjusted Stock Return

	Dependent Variable = Volatility of Risk-Adjusted Stock Return	
Lagged Independent Variables	**Estimate**	***p*-Value**
Customer satisfaction	–.329	**
Customer complaint	.557	***
Customer satisfaction × working capital	–.108	*
Customer complaint × working capital	–.315	**
Customer satisfaction × firm specialization	–.008	n.s.
Customer complaint × firm specialization	–.096	*

*$p < .10$.
**$p < .05$.
***$p < .01$.
Notes: n.s. = not significant.

TABLE 5
Additional Results on the Impact of the Changes of Satisfaction and Complaint on Future Stock Value Gap

	Dependent Variable = Stock Value Gap	
Lagged Independent Variables	**Estimate**	***p*-Value**
Changes in customer satisfaction	–.038	*
Changes in customer complaint	.066	**
Changes in customer satisfaction × working capital	–.071	*
Changes in customer complaint × working capital	–.113	*
Changes in customer satisfaction × firm specialization	–.009	n.s.
Changes in customer complaint × firm specialization	–.003	n.s.

*$p < .05$.
**$p < .01$.
Notes: n.s. = not significant.

holder value of the firm with multiple channels (i.e., higher level and lower risk of stock prices).

Modeling latent heterogeneity. We also checked the results after modeling latent heterogeneity with a random parameter robust Tobit model. The results appear in Table 3, Column 6. Again, these findings provide further support for our theoretical framework. That is, customer satisfaction diminishes the stock value gap (b = –.052, $p < .05$), and customer complaint enlarges the stock value gap (b = .113, $p < .01$). Again, (negative) complaint has a stronger impact than (positive) satisfaction on the stock value gap ($F_{diff} = 19.317$, $p < .01$). Furthermore, as Table 3, Column 8, reports, working capital strengthens (b = –.031, $p < .05$) the negative impact of customer satisfaction and weakens (b = –.079, $p < .05$) the positive impact of customer complaint on the stock value gap, thus providing more evidence for our hypotheses.

Changes of customer satisfaction and customer complaint. We also checked whether changes in satisfaction and/or complaint over time have an impact on the stock value gap.[14] To test the dynamic effects, we first calculated differences for satisfaction and complaint from time t – 1 to time t. We used the resultant differences to test the impact of changes of lagged satisfaction and complaint on the stock value gap. Again, as Table 5 reports, the changes of lagged satisfaction still significantly affect the stock value gap ($p < .05$), and the changes of lagged complaint also significantly affect the stock value gap ($p < .01$). Because prior marketing literature has focused on the levels of satisfaction or complaint, these additional findings on the changes of satisfaction and complaint over time and their performance implications also help extend the research stream on valuing customer equity.

Moreover, we conducted Granger causality tests (Hamilton 1994, pp. 304–305) to check the time-based causality from customer satisfaction and complaint to the stock value gap. The results suggest that past periods of higher customer satisfaction Granger causes a smaller stock value gap in the future ($F_{Granger\ causality} = 16.382$, $p < .01$) and that past periods of higher complaint Granger causes a larger stock value gap in the future ($F_{Granger\ causality} = 31.771$, $p < .01$).

Sample composition. Because of the possible sensitivity of our results to the sample composition, we conducted all analyses with samples in which we excluded two airlines from the data set. We did this test systematically with all possible sample composition. We found that the findings related to our hypotheses were not affected by such sample composition issues. Furthermore, we checked the effect of different time frames in sample composition. We reran the models with several different samples (Sensitivity Sample 1 with data from Q1:1999 to Q4:2002 and Sensitivity Sample 2 with data from Q1:2003 to Q4:2006). The results across these different samples consistently support our hypotheses.[15]

SFM alternative models. Because the SFM approach may be sensitive to different assumptions about the distribution of the estimated stock value gap, we analyzed addi-

[14]We thank an anonymous reviewer for this suggestion.

[15]Because the USDT data cover 12 areas, it would be worthwhile to check whether our results hold for different subdimensions of complaint. Specifically, because some areas include minimal data points (Luo 2007), we classify them into three subdimensions: service problem complaint (rude or unhelpful employees, inadequate meals or cabin service, and mistreatment of delayed passengers), flight problem complaint (flight cancellations, delays, or any other deviations from the schedule), and other complaint (other areas). Additional data analyses with these subdimensions of complaint consistently support our hypothesis-testing results regarding the impact of customer satisfaction and complaint on the stock value gap.

tional SFM models (i.e., across SFM1 = half-normal, SFM2 = truncated-normal, and SFM3 = exponential distribution assumptions). In addition, we employed a Bayesian extension of SFM to accommodate more rigorously the unobserved complexity in the distribution of the estimated stock value gap. This approach (SFM4) incorporates the semiparametric Bayesian inference with an efficient Markov chain Monte Carlo sampler (Griffin and Steel 2004). The results suggest that our measures of stock value gaps across SFM1, SFM2, SFM3, and SFM4 models are robust (smallest r = .897, $p < .10$). We also tested alternative models with a nonparametric approach of data envelopment analysis (Charnes, Cooper, and Rhoades 1979; Luo 2004), which may complement the parametric approach of SFM. Again, the stock value gap results from SFM and data envelopment analysis are statistically correlated (smallest r = .682, $p < .01$), confirming the result robustness. Overall, these additional models and analyses show that the findings are reasonably robust regarding our theoretical framework on the role of customer satisfaction and complaint in the context of benchmarking the stock value gap.

Implications

This research was intended to examine the impact of customer insights on the stock value gap between the actual and the optimal market value of a firm. Based on benchmarking against best-performing competitors, our results suggest that customer satisfaction induces a smaller stock value gap, whereas customer complaint leads to a larger stock value gap. Our results also indicate that customer complaint has a relatively stronger impact than customer satisfaction on the stock value gap. Furthermore, the impact of customer satisfaction and complaint on the stock value gap may change depending on boundary conditions of working capital and firm specialization. Next, we present the theoretical and managerial implications of the results.

Theoretical Implications

We extend the literature on "valuing" customer equity (Gupta, Lehmann, and Stuart 2004; Rust, Lemon, and Zeithaml 2004). To our knowledge, this is the first study that values customers by employing scientific econometric models that can construct an optimal, objective, and stochastic benchmark with best practices. This technique not only adds modeling rigor to customer equity theory but also helps firms pinpoint actionable customer "levers" to enhance their core competencies for maximized stock value. For example, it shows more precisely how far customer satisfaction (complaint) should be enhanced (reduced) when benchmarked against best-performing competitors. In contrast, prior research has merely advised in a general way that any higher level of satisfaction (lower level of complaint) should be beneficial compared with average-performing rivals in a nonbenchmarking context.

Moreover, according to customer equity theory, both positive experience (i.e., in the case of "angel" customers) and negative experience (i.e., in the case of "devil" customers) are indispensable parts of business reality. However, previous research has studied customer satisfaction and customer complaint separately, likely leading to incomplete and less powerful theoretical implications. In contrast, we consider both sides of customer insights that affect the stock value gap. A direct implication of our study is that though retaining satisfied customers is critical, handling complaining customers may help even more in optimizing firms' stock value. These findings contribute to a finer-grained theory of customer equity.

To scholars at the marketing–finance interface (Srivastava, Shervani, and Fahey 1998), our study is among the first to introduce underresearched financial metrics (firms' optimal stock value and the stock value gap) to marketing. Indeed, finance now challenges marketing forcefully: "Within the firm, capital budgeting involves consideration of how a particular project [managing satisfaction and complaint] will affect firm value" (Palepu, Healy, and Bernard 2000, p. 111). In this sense, our study helps quantify financial returns to investments in complaint/satisfaction handling. More important, it also enables marketers to speak the same language as the financial community—that is, by not only articulating the financial benefit of intangible customer assets with customer satisfaction but also pointing out the financial harm of intangible customer liabilities with complaint.

In addition, no prior research at the marketing–finance interface has uncovered the evidence that negative complaint has a relatively stronger effect on firm stock performance than positive satisfaction. Our study implies that investments in redressing the downside loss (complaint) of customer experience may matter even more than investments in only improving the upside gain (satisfaction). Indeed, if the negative voice of the customer is "loud and clear" (Chevalier and Mayzlin 2006; Luo 2007), the asymmetric and stronger relative impact of complaint should be of strategic importance to close the stock value gap.

We also extend prior research by uncovering the moderating role of working capital and specialization, which helps foster a contingency theory of the marketing–finance interface. We call for further research to investigate the following questions: Do marketing investments in innovation, product quality, or channel partnerships have a financial impact that is asymmetric when benchmarked against best practices? What are the boundary conditions for this impact in the context of analysts' earnings forecast errors and investors' underreactions to intangibles?

Managerial Implications

Companies should build a more complete "customer equity dashboard," which may consist of "blue" indicators (for positive customer experience, such as satisfaction, loyalty, and customer retention) and "red" indicators (for negative customer experience, such as complaint, switching, and customer churn). Customer insights may reveal both good news and bad news to financial markets. Thus, managers should not value customer satisfaction and customer complaint in isolation; rather, they should consider them in a duet (Carter 2006; McGregor et al. 2007; Rust and Chung 2006). These full-spectrum parameters with both blue and red buttons help firms pulse and monitor not just their customer-based asset (value adders, such as happy cus-

tomers) but also their customer-based liability (value destroyers, such as complaining customers) over time.

Furthermore, to optimize firm stock performance with a reduced stock value gap, companies should use a "carrot-and-stick" approach, for example, by establishing a companywide financial and strategic environment that not simply rewards good efforts that promote satisfaction but also punishes misconducts that induce complaint or obstruct complaint handling. Indeed, service failure (i.e., the extraordinary stumble at JetBlue Airlines) raises a red flag, indicating that the brand equity of "customer service champs" can be diminished, if not totally destroyed (McGregor et al. 2007). After all, our study shows that pursuing what is right for the customer (i.e., successful experience with more satisfaction and less complaint) can be in line with what is right for the firm (i.e., smaller value gap below the optimal benchmark).

Moreover, managers should acknowledge firm contingencies when valuing customer insights. We find some evidence for the notion that the impact of satisfaction and complaint on the stock value gap may change depending on boundary conditions of working capital and firm specialization. Firms may benefit more financially and become best performers if they can effectively mesh customer equity dashboard management and a supportive organizational environment (i.e., "considering a chief customer officer, connecting employee pay to customer service, and involving the very top" [McGregor et al. 2007, p. 63]).

Conclusion

Based on a rare, real-world database, our study sheds some new light on valuing satisfaction and complaint from the aspect of benchmarking and reducing the stock value gap. In light of this strength of the benchmarking methodology (it is optimal and stochastic and is compared with best-performance competitors), further research is empowered to move beyond the nonoptimal, nonstochastic benchmark that consists only of average performers. We are hopeful that further marketing studies can relate brand equity, product quality, and innovation to the financial metric of a stock value gap to the optimal benchmark (Gupta and Zeithaml 2006; Rust, Lemon, and Zeithaml 2004; Srivastava, Shervani, and Fahey 1998). In doing so, research may provide refreshing evidence regarding how marketing can help maximize stock performance and close the stock value gap.

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